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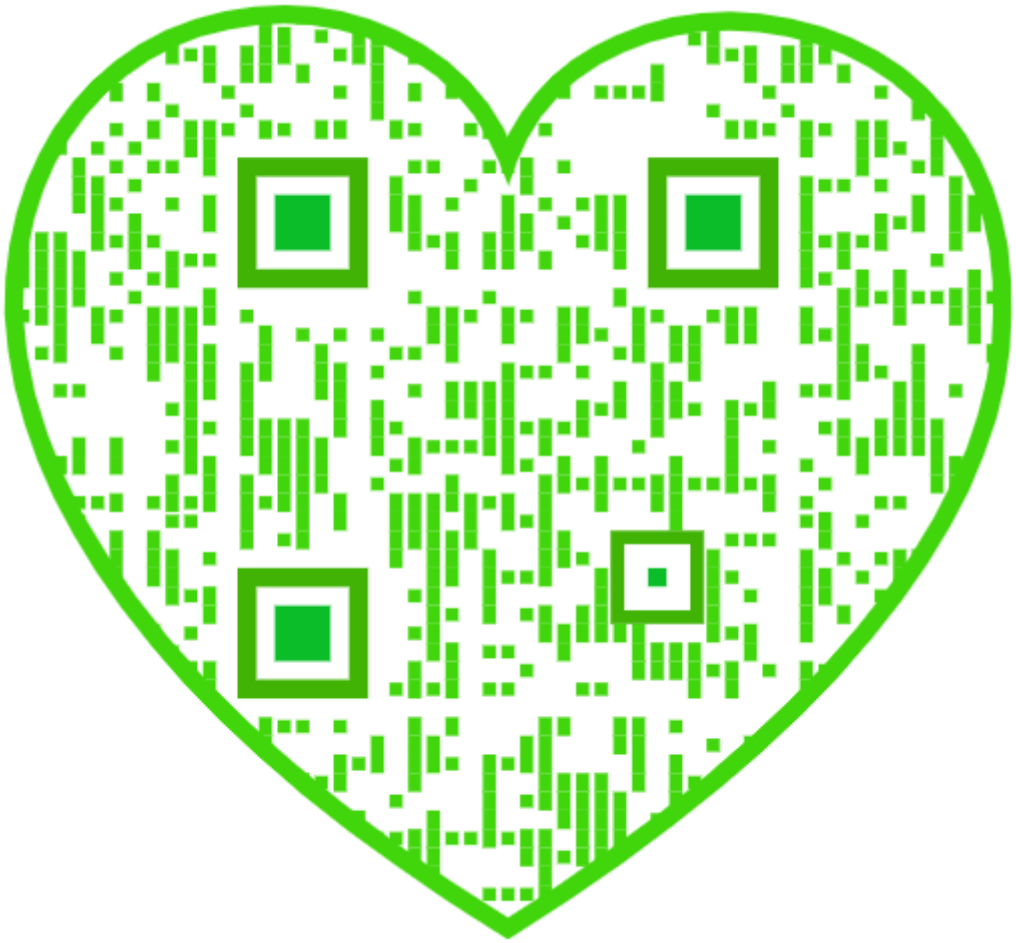

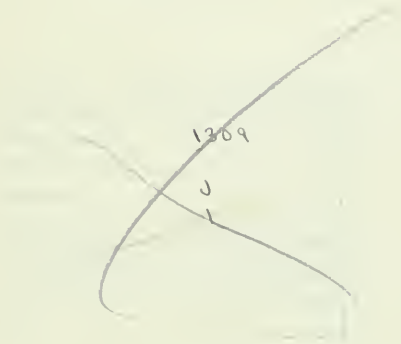
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COAL AGE

With Which is Consolidated The Colliery Engineer

DEVOTED TO COAL MINING AND COKE MANUFACTURE

ISSUED WEEKLY

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July 3 to Dec. 27, 1919

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With Which is Consolidated
The Colliery Engineer

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COAL AGE

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Bolshevism—Not a Principle, But a Passion

By R. Dawson Hall

OLSHEVISM is not a creed, it is a condition. It is a souring of the mind. The person that has it is a man diseased, a man whose judgment is warped by hatreds. The nearest evil akin to Bolshevism is Junkerism. The rich man who does not want to see the poor man thrive (and there are such men) is the analogue of the workingman who begrudges to the capitalist the profits of his good judgment and intelligence. The well-to-do employer who will never believe in the good intentions of the average workingman is the counterpart of the Bolshevist who proclaims all rich men robbers.

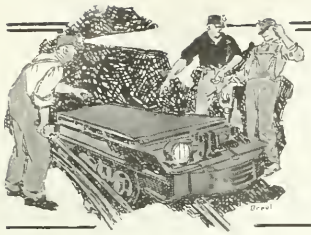
Put a Bolshevist in clover and forthwith he becomes a Junker. Bolshevism never was a principle with him but a passion; and like the dog, as soon as he gets the bone for which he has been barking he loses interest immediately in his loudly proclaimed principle of subdivision.

To judge by what they say, the Bolshevists mistake all capitalists for Junkers; and Junkers believe all workingmen Bolshevists or little better, though the great majority of the *haves* are not Junkers nor a large part of the *have nots* Bolshevists.

Our great need is to see matters sanely, to catch a glimpse of the essential healthiness of private and national life, to watch for and note the many services that are rendered without pay or hope of advantage. Times without number within the compass of a single day every man is the recipient of favors for which he gives no requital and for which the giver expects nothing but thanks. Selfishness has its part in life, but with most men it is not the only motivating nor indeed the leading factor.

The mind of the Bolshevist and Junker is like the stomach of the dyspeptic. In that which delights the normal man he finds fermenting and distressing possibilities. No one need fear that the Bolshevist will rule if we suppress all attempts at revolution, for he is hopelessly in the minority and he knows it; and he will continue so to be. The only possibility is that he may stir up such a reaction in those he unjustly attacks that they may overestimate the importance of the Bolshevist and by inconsiderate action and thoughtless words estrange and anger the immensely more numerous men who are of more temperate mind.

It is certain that the United States democracy is not prepared to cast off the principle of compensating services by their worth, nor will it permit the man who contributes nothing to human welfare and boasts about the little he does to share equally with the man who, by constructive effort, adds to the product of the world and therefore to the well-being of all men.

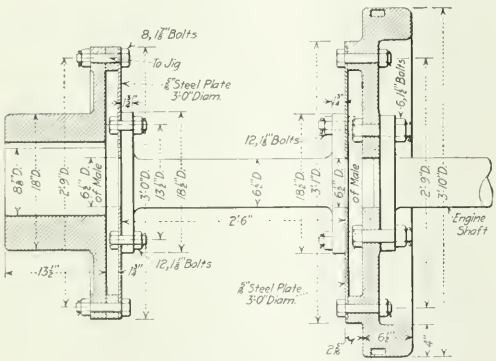


IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Flexible Coupling Between Engine and Fan Eliminates Trouble with Bearings

Frequently a mine fan and its driving unit are located near an air shaft or at some other point where a settlement of the ground may occur. In modern practice a fan and its driving engine or motor are placed on the same steel shaft; when this shaft is thrown out of alignment trouble is caused with the bearings. It is for this reason that a flexible coupling is provided between the engine and the fan. The



DETAIL SECTION OF FLEXIBLE COUPLING

arrangement shown in the accompanying illustration has been used by an English firm for a number of years.

The drawings give the details of the coupling and also its relation to the fan and engine. The engine shown is of the two-cylinder tandem, compound vertical type. The arrangement of the coupling is as follows: At the end of the engine crank shaft is a flange forged on solid, to which a small flywheel is bolted. On the fan shaft is another similar wheel. Between these two flywheels is a short shaft about 2 ft. 6 in. over all, with a flange forged solid on each end; on these flanges are bolted two steel plates which are also secured to the two flywheels in the same way. The thin steel plates forming the flexible connections between the shafts allow a slight settlement in the fan or engine foundations without injury to the shaft bearings. The coupling is now being manufactured by an English concern.—*The Engineer.*

Seamless Tube Wheel Bushings

By William J. Teemer
Pittsburgh, Penn.

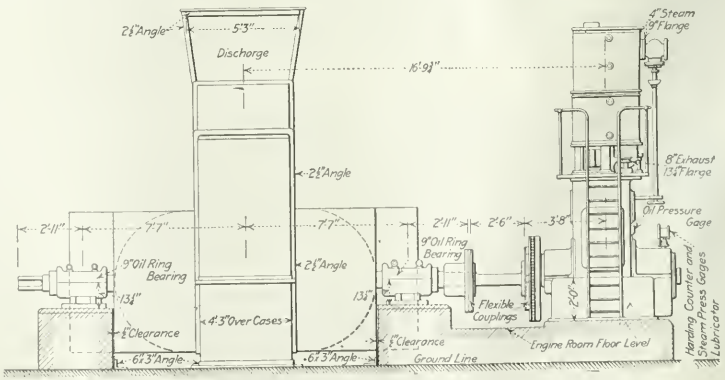
Recently I read an article in *Coal Age,* by E. P. Humphrey, regarding the bushing of worn mine-car wheels with wrought pipe. This practice is good, but it may be considerably improved. Some time ago experiments were conducted upon the use of a "mechanical seamless tube" for the purpose. This tube is made of a high grade of openhearth steel with a carbon content that admirably fits it for this kind of work. Many large mines are now using this kind of bushing material with highly satisfactory results.

Frog Rerail That Prevents Cars from Leaving the Track

Cars that are off the track may be rerailed by the frog here described. The device also prevents the cars from leaving the rails. It does not interfere in any way with cars running through it on the rails.

The timber outside the rail, the guard rail on the inside, the braces between the guard rail and the wing rail are duplicated on each of the rails opposite the frog. One of the large coal-mining companies has installed this type of rerail device at all the frogs on its main haulage roads. The cost of installation is small, the upkeep cost being practically nothing once it is placed. The delays prevented and time saved by the installation of this rerail at one particularly bad frog on a curve was more than sufficient to pay for its installation on all the main haulage roads.

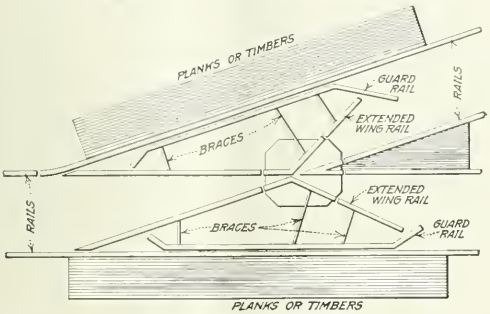
To make this apparatus the wing rails of the ordinary frog are extended. Straight pieces of track rail from 4 to 6 ft. long are used for this purpose, the length



RELATION OF FLEXIBLE COUPLING TO ENGINE AND FAN

depending upon the gage of the track. These are butted against the ends of, and extend diagonally across the track in a line with, the wing rails of the frog. They are spiked firmly to the ties. A better job results if a fishplate is bolted to the end next to the wing rail.

Inside of the opposite rail an ordinary guard rail is placed. The curved ends of this guard rail should be elongated, so that they reach to the end of the extended



THIS RERAIL DEVICE PREVENTS TROUBLE

wing rail. Several heavy timber braces should be fastened between the guard and wing rails. Outside the track rail a heavy plank or timber should be placed tightly against the rail. The top of this timber should be on a level with the top of the rail, and each end should extend several feet beyond the end of the guard rail. This timber raises the flange of the car wheel to a level with the track rail. The extended wing of the frog on the opposite side of the track pulls the car over, and into the frog. As the wheel passes through the throat of the frog, the flange is lifted until the tread is on a level with the rail. At the same time the wing rail crowds the wheel over onto the rail.

Cars that get off the track on the opposite side are also rerailed. Heavy planks or timbers are securely fastened between the point rails of the frog, with their tops level with the top of the rail. These raise the flange of the car wheel level with the top of the rail. The guard rail on the opposite side of track pulls the wheels over onto the rail. A timber or an iron plate between the guard rail and track rail raises the wheel flange on that side, until the tread of the rail will slide over onto the track.

Electrical Distribution in Mines

By E. Steck
Hillsboro, Illinois

The bituminous mines in the central states have a general practice of connecting the entire electrical distribution system underground to a circuit breaker on the surface. This practice has a number of shortcomings. If the circuit breaker trips all the locomotives, cutting machines and other motors are stopped. As soon as the breaker is put in all the motors are thrown on the line, creating a heavy overload on the power-plant equipment. All the machinery below is idle while the circuit breakers are out.

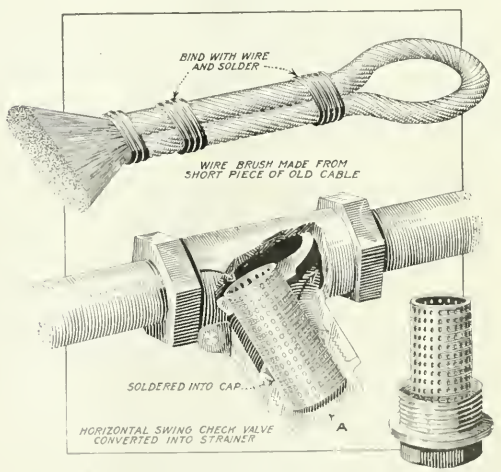
When heavy grounds occur there is no indication of their location. The entire mine is idle until the trouble is found and that section in which the short has occurred is cut off, or the trouble remedied.

By the use of circuit breakers underground trouble can be located much quicker. Only a small portion of the mine will be idle at such times and the starting overload on the plant will be greatly reduced. Take for example a mine having two main entries: A switchboard panel can be placed on the bottom with two circuit breakers and switches, each controlling one-half of the mine. The lights on the bottom can be connected in behind the circuit breaker so that no matter which breaker trips the lights will still be in service. The circuit breakers should be of the switchboard type. This makes each half of the mine independent of the other. This scheme can be further carried out by the location of railway-type circuit breakers at convenient places back in the mine. With such a layout in case of trouble a small part of the mine only is effected and the difficulty quickly located, as it must be behind the circuit breaker which has opened.

The small breakers pay for themselves in a short time because of the shorter shutdowns and the lower number of locomotives and machines affected. The wear and tear for this reason is not so great on the power-plant equipment. If power is purchased, especially where the maximum demand charged is based on short-time peaks, a decided saving in the power bill can be made because all of the equipment cannot then be thrown on the line at once after the main circuit breaker is closed on top.

Wire Brush and Pipe Line Strainer

The wire cleaning brush shown in the accompanying illustration upper view is made from short pieces of old ½-in. hoist cable. The two ends are brought together, forming an eye, the strands being wired in three places and the binding wire soldered. The ends of each part of the cable are then untwisted and spread apart in a


BIND WITH WIRE AND SOLDER
WIRE BRUSH MADE FROM SHORT PIECE OF OLD CABLE
SOLDERED INTO CAP
HORIZONTAL SWING CHECK VALVE CONVERTED INTO STRAINER
A

DETAILS OF A WIRE BRUSH AND AN OIL STRAINER

fan-shape so as to make the brush. These brushes have long life and are useful for cleaning machinery parts. The lower illustration shows wornout horizontal swing check valve made over into a strainer for a small oil line. The swing gate was removed and a strainer made of brass wire mesh was soldered into the valve cap, as shown at *A*. This strainer is cleaned easily.

Burning Steam Sizes of Anthracite with or Without an Admixture of Soft Coal*

THE "Burning of Steam Sizes of Anthracite with or Without an Admixture of Soft Coal" is the title of a bulletin which describes, in the simplest terms, how to burn steam-size anthracite, or mixtures of this, with soft coal so as to get the most steam from the least fuel. An effective means of promoting fuel economy consists, frequently, in the substitution of a cheaper for a more expensive fuel. This bulletin describes briefly what modifications of furnace design and operation may be made in order to insure efficiency in burning mixtures of anthracite and soft coal in furnaces designed for one or the other of these two varieties of coal.

While the essential difference between the burning of anthracite and the burning of soft coal consists, in the case of anthracite, in the use of a somewhat smaller volume of air per pound of fuel and a stronger draft, slight alterations in the method of firing and in the furnace itself (designed for one or the other fuel) are also necessary in case mixtures of soft and anthracite coal are used.

There are four sizes of anthracite used for steam generation. These are commonly known as "buckwheat" and are generally classified as follows:

Size of Coal	Size of Round Mesh Over Which Screened, In.	Average Heat Values per Lb. of Coal, B.t.u.
No. 1 buckwheat	⅝	12,250
No. 2 buckwheat (rice)	⅜	12,000
No. 3 buckwheat (barley)	⅛	11,500
No. 4 buckwheat	⅛	11,000
No. 5 buckwheat	⅛	10,000

Fig. 1 gives the approximate British thermal units per pound of anthracite of known ash content. A mixture of these sizes known to the trade as "boiler fuel" is sometimes used. No. 3 of good quality can be and is burned with excellent efficiency under proper hand-fired conditions. No. 4 is not so suitable for hand-fired furnaces.

The furnace equipment required for burning various percentages of steam anthracite and soft coal is noted in the following cases:

1. Twenty Per Cent. Anthracite—With ordinary furnace equipment designed for soft coal, up to 20 per cent. "buckwheat" or fine sizes of anthracite may ordinarily be burned without any change of equipment or firing practice. Owing to the fact that most boiler furnaces are operated below their normal capacity on soft coal, the foregoing percentage of anthracite can be added without decreasing the capacity of horsepower output of the boiler plant.

2. Twenty to Forty Per Cent. Anthracite—If a greater percentage of anthracite screenings, 20 to 40 per cent., say, is mixed with the soft coal, it will be necessary, in order to obtain full boiler horsepower, to produce air pressure under the grate. One of the simplest and best methods of obtaining the necessary pressure of ½ to 2 in. in the ash pit, is to install a blower of the turbine type for each boiler. Such a blower may be installed very easily and quickly since it may be fitted into the side wall of the ash pit. It should not use over 3 per cent. of the steam developed by the boiler when operating at full capacity. The cost of a steam turbine blower is approximately $200 for a boiler of 150 hp. or more.

A steam jet blower may be used instead of the steam turbine blower mentioned above. This is cheaper, and the more economical types of steam jet blowers are quite satisfactory in producing the desired results. In purchasing a steam jet blower it is most important to investigate its steam consumption. The best type of these blowers will operate on about the same steam as

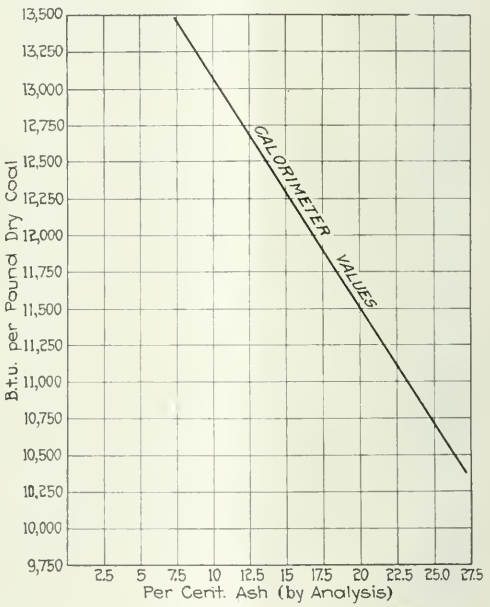


FIG. 1. HEATING VALUES OF ANTHRACITE WITH SIX PER CENT. VOLATILE

that required by the turbine blower, whereas the poorer ones may take from two to five times that amount of steam, in which case they should not be installed. The cost of the steam jet blower should be from $50 to $75 or more for a single boiler of 150 hp. and up. The turbine blower, or the steam jet blower, should be controlled by means of an automatic-draft regulator of the "partial throw" type, in order to obtain efficient results, although fair results are obtainable by hand regulation.

3. Over Forty Per Cent. Anthracite—If more than 40 per cent. of small anthracite is used the equipment recommended is forced draft plus "buckwheat" grates and a good automatic-draft regulator. The grates should vary in the matter of diameter of air openings, draft area and total surface in accordance with the

*Issued by the United States Fuel Administration in collaboration with the Bureau of Mines. Based on an article by William P. Frey, Fuel Engineer.

specific fuels used and their proportions in the mixture. Some plants are able to run efficiently on 100 per cent. of a good quality of fine anthracite if properly equipped for this purpose. The table given below furnishes additional data as to mixtures of various sizes of anthracite and soft coal that may be burned under different conditions of draft.

The proper mixing of soft with anthracite coal is most essential. It can be done either by delivering in a wheelbarrow alternate and predetermined portions of the two kinds of coal, and then mixing by not less than two "turnovers" with a shovel before dumping in front of the furnace, or, on a larger scale, by a similar delivery of car-load lots to the coal tipple where the mixing is done by machinery.

Grates for the fine sizes of anthracite have small air openings which vary in form from round holes, as in the pin-hole grates, to elliptical holes and straight slots, the width of slot or the diameter of the hole varying from $\frac{1}{8}$ of an inch up to $\frac{5}{16}$ inch. The percentage of

PROPORTIONS OF SOFT AND HARD COAL TO BE USED
(For Hand Firing)

		Per Cent Soft Coal	Per Cent Hard Coal
No. 1 buckwheat	Forced draft	30	70
	Natural draft	40	60
No. 2 buckwheat	Forced draft	40	60
	Natural draft	50	50
No. 3 buckwheat	Forced draft	50	50
	Natural draft	65	35
No. 4 buckwheat	Forced draft	65	35
	Natural draft	80	20

draft area through the grate would vary from 3 to 30 per cent.

Stationary, shaking, or dumping types of grates for burning the fine sizes of anthracite may be obtained. The dumping and shaking types facilitate the cleaning of fire with less drop in steam pressure, which is an important feature. A large ash pit is advisable so that fires may be cleaned by dumping or shaking grates, without the necessity of opening the ash-pit doors more than once in 24 hours. The ash-pit doors with forced draft are, of course, sealed to make them air-tight, and therefore, the less often they have to be opened the better. Or still better, separate the undergrate air chamber from the ash pit and install a dead plate in front of grates to dump ashes.

Owing to the slower rate of combustion, the grate area for small sized anthracite is made larger than for bituminous coal in order to develop the same horsepower, except in cases where the soft-coal boiler already has an unnecessarily large grate, which is ordinarily the case. The relation of the grate area to the heating surface is also of importance. This relation is shown in the table below:

For No. 1 buckwheat, 1 to 40. For No. 3 buckwheat, 1 to 30.
For No. 2 buckwheat, 1 to 35. For No. 1 buckwheat, 1 to 25.

The fuel bed should not be less than 6 ft. from any point of the boiler-heating surface. There should be from 2.5 to 3 cu.ft. of combustion space to 1 sq.ft. of grate area. Another detail of furnace construction which is important is that of the division of the heating surface into the so-called passes. As the furnace gases in passing from the fuel bed to the stack are continuously cooling, their volume is consequently decreasing continuously so that the area of the passes should be diminished in the same proportion to cause a uniform flow. The relation between the area of the various passes should be so as to include total boiler-heating surface about as follows: First pass, about 43 per cent. of total heating surface; second pass, about 32 per cent. of total heating surface; third pass, about 25 per cent. of total heating surface. As the width of the gas passage is uniform, the necessary reduction in the volume of the passes is made by reducing the thickness of the gas stream about as follows: In first pass, from 100 to 68; in second pass, from 68 to 52; in third pass, from 52 to 50.

Anthracite coal must be fired evenly in small quantities, and at frequent intervals, the intervals of cleaning depending upon the nature of the coal, rate of combustion, and the skill in spreading thinly and evenly. The leveling bar must be used sparingly, and only for the purpose of keeping the fuel bed level and to keep the thin spots covered up. As a rule it is bad practice to let a fuel bed of No. 1 "buckwheat" grow thicker than 8 in. and No. 2 "buckwheat" should not go over 10 in. and preferably not over 6 or 8 in. respectively. Where an automatic damper regulator is installed, it is important that coal be supplied to the fire in proportion to the air supply; that is to say, as the blower speeds up the firing should also be speeded up, and as the blower slows down the rate of firing should be decreased.

Proper Method of Burning Steam Anthracite

With a good grade of steam anthracite, it is possible to obtain almost as high an efficiency as with bituminous, provided the equipment and operation of the plant are suitable; frequently, moreover, large savings in cost of fuel to generate steam are effected by substituting steam sizes of anthracite for the more expensive bituminous coal. The best results cannot be obtained unless the changes indicated are made so that the furnace becomes efficient for the anthracite. It is extremely important in burning the steam sizes of anthracite to provide against a large excess of air to the fire. The ideal way to burn this fuel is to use undergrate draft and to throttle the uptake damper to a point where the volume of air will be reduced to a minimum for proper combustion. The necessary pressure for penetrating the bed of fuel is supplied by means of the blower, and the volume is regulated by means of the up-take damper. With this equipment an automatic regulator should be connected for the purpose of controlling the draft in accordance with steam requirements, all of which is ordinary standard equipment which readily may be obtained for the purpose.

It must be emphasized that the greatest loss in burning the fine anthracite is on account of too much air for the fire, and the principal way to keep this air down to a proper minimum is by using the up-take damper, throttled as much as possible so as to produce the highest CO_2 without the formation of unburned gases. Loss from this source is much less probable than in the case of soft coal, with its high volatile content, so that with good installations, the CO_2 may be run at 15 or 16 per cent., under correct supervision and regulation. This percentage of carbon dioxide indicates that practically no more saving can be made by closing the damper still further.

The Mine Type Motor*

By L. C. Moseley
Schenectady, N. Y.

SYNOPSIS—*The severe conditions of mining service, particularly as regards vibration, dust and dampness, has led to the design of a type of alternating current motor particularly adapted to mine service. This machine is entirely inclosed except for ventilation holes and is strongly and heavily built to meet exacting conditions.*

DUE to the character of the work in and around a mine requiring motors in different construction from the standard open type of induction motor, a special machine has been designed to meet mining requirements. Since this motor was to be applied to special service, the matter of its design was discussed freely with engineers familiar with mining requirements, and in its development their suggestions were incorporated.

A brief review will be made of the conditions under which such a motor has to operate. The drive of an anthracite coal breaker is about as severe as any to which an electric motor has been applied. The breaker buildings as a rule are immense structures which sway and vibrate, and as a result the motors are subjected to excessive vibration and many shocks. Constant vibration tends to crystallize the shaft, loosen the laminations, break the bars of squirrel-cage rotors, and chafe the insulation on the coils.

The atmosphere surrounding the motor is charged with everything from fine coal dust to dropping pieces of coal, and all exposed parts are covered with dirt and dust. The fine, sharp coal dust works its way into the windings of an open tube motor; and while this dust is a good insulator as long as it is dry, it becomes a good conductor as soon as it is moistened. This may occur as water is used in the process of separating the slate from the coal. Another factor to be taken into account is the starting duty, which is heavy, because shutdowns occur with the machinery full of coal.

In the bituminous fields, much of the coal is shipped as run-of-mine or is screened only. There is, however, an increased tendency to furnish washed coal and as a result washeries are being installed. Motors applied in these washeries are subjected to conditions quite similar to those in an anthracite breaker. In the mines themselves, motors are frequently subjected to dampness and dripping water.

*Abstracted from *General Electric Review*.

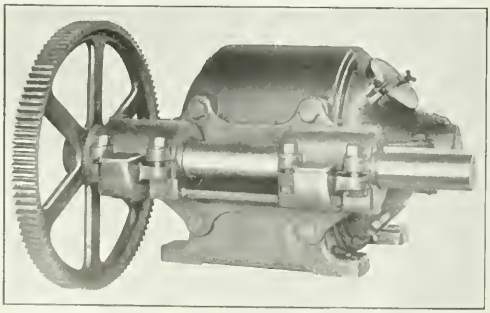


FIG. 1. MOTOR WITH BACK-GEAR BRACKET

One distinctive feature of the mine-type motor is its heavy construction. Another feature of the motors built in sizes up to and including the 75-hp. at 900 r.p.m. is the mounting of the back-gear bracket on the stator frame. Fig. 1 shows a motor having this back-gear arrangement.

The frame is of the box type, without openings, and is made of cast iron of heavy section. On machines up to and including 150 hp. at 720 r.p.m. the bosses for the back-gear attachment are cast on one side of the frame; and in order that the bosses shall be far enough apart to make the support of the bracket rigid and to give a sufficient width between the feet to make a rigid support for the motor, the frame is made exceptionally wide. By having the bosses cast on each frame, the back shaft can be mounted at any time desired.

The back-gear bracket is made of one casting which is attached to the frame by four large bolts placed as far apart as possible, as shown in Fig. 2. The bearings are lined with hard babbitt and are arranged for waste lubrication. They are split horizontally, have broad seats at each end, and are interchangeable but not self-aligning. By using this construction, the back shaft can be removed without disturbing the alignment of the bearings, and the bearing can be replaced without removing the shaft. The motor bearings can be replaced without removing the rotor or the lower half of the shield, and the rotor can be removed on the end opposite the gear without disturbing the back-shaft attachment.

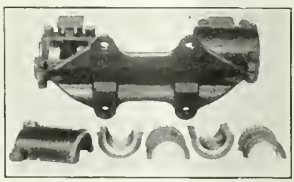


FIG. 2. DETAILS OF BACK-GEAR BRACKET

Both end shields are split horizontally and are held together by large square-head bolts which are placed so as to be readily accessible. The shields are totally inclosed with the exception of openings at the bottom for the inlet and outlet of air. These holes may be left open or a short length of pipe may be attached in order to bring in fresh air. The shields are interchangeable on the two ends of the squirrel-cage motor, but the wound-rotor machine has a longer shield on the collector end than on the other and is supplied with a hand hole and cover in the top half to give ready access to the brushes. The pulley end shield on both wound-rotor and squirrel-cage motors has a shroud attached to assist in the ventilation of the machine, and the upper half of each end shield has two tapped holes for air-gap measurement. On the wound-rotor machines, the brush studs are securely bolted to the end shields.

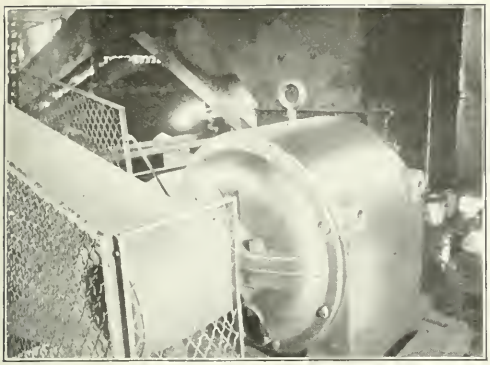


FIG. 3. MOTOR DRIVING SHAKER SCREEN AND PICKING TABLES, DAVIS COAL AND COKE CO., THOMAS, W. VA.

In all cases large bearings are used, split horizontally and interchangeable, being the same on both front and pulley end. Each bearing has two oil rings and two broad seats, one at each end of the lining, hence they are not self-aligning. Considerable trouble had been encountered on bearings having a single seat when used on a geared motor for very severe service due to the vibration pounding the seats out of shape. Special attention has been given to make the bearings both dust-proof and as free from oil leakage as possible. The oil-well covers are lined with felt and are held closed by a spring. Both bearings have overflow oil gages.

Both the motor and back-gear shafts are of heavy construction, so as to minimize the vibration and lessen the tendency of the shafts to crystallize. In order to make the rotors interchangeable, the motor shaft is made for pulley extension, whether the motor is to be used for belting, gearing or otherwise.

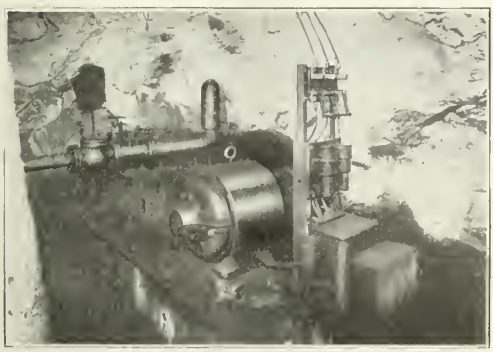
In the design of the rotor, special attention has been given to making it as rigid as possible in order to resist the shocks and vibrations arising from gearing. The rotor spider has an extra long bearing surface on the shaft, to which it is securely keyed. The squirrel-cage rotors have electrically welded end-rings of large section and ample radiating surface, and the conductors are forced into the slots without any slot armor or wedges, thus insuring a rotor that is practically indestructible unless injured by some mechanical means. The windings of the wound rotor motors are similar to those used on standard machines, except that the windings have special moisture-resisting insulation. The collector rings are made of brass and are shrunk on the shell over insulation, the shell being pressed on the rotor shaft.

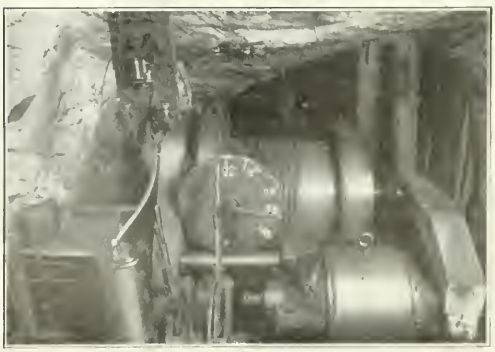
As straight slots are used on the stator, the coils are exactly shaped, form wound, molded and completely insulated before being placed in the slots, the same as are those used in standard motors with straight-slot stators. All stator windings are insulated to resist moisture. Space blocks welded to adjacent punchings are used to separate groups of laminations and thus form ventilating ducts.

Since the continuous rating of an electrical machine depends on the amount of heat that it will dissipate, special attention has been given to the ventilation of the mine-type motor. Sheet-iron fans are attached to the rotor flange on the pulley end. These fans draw air from the outside through the ventilating hole in the bottom half of the end shield. To prevent the air from being forced through the spider and out the other side of the machine, thus failing to strike the windings and punchings, a deflector is placed on the end of the rotor opposite the fan. The air current is thus divided, part of it being forced up over the stator windings and part being forced through the rotor ducts, thus keeping the temperature of the machine at a safe operating value. It is desirable to have only clean air circulate through the machine; and to accomplish this, a short length of pipe is attached to the holes in the end shields to bring in air from the outside.

The mine-type motor is used for driving crushers, belt conveyors, shaker screens, and picking tables, underground hoists; pumps, crushers and similar machines. Because of the heavy character of the work and the dampness usually encountered underground, many installations require a motor of the mine type, the inclosing features tending to keep the dripping water from the windings and the heavy construction tending to reduce vibration.

Although primarily designed for mining service, these motors can be applied to other classes of duty which require an inclosed ventilated motor of heavy construction. A considerable number of mine-type motors have been installed for steel mill auxiliary drive, such as approach tables, straighteners, soaking pit covers, etc., where the character of the work is closely akin to mining requirements. These motors operate in buildings where the atmosphere is filled with dust and small bits of metal, and where in some cases the temperature of the air





FIGS. 4 AND 5. TYPICAL MOTOR INSTALLATIONS UNDERGROUND, ONE DRIVING A PUMP, THE OTHER A HOIST

may be considerably higher than is ordinarily encountered. To meet this later condition, if found necessary, the stator and rotor windings are given a special heat resisting insulation.

In logging operations, motors of the mine type have been installed on the donkeys for dragging the logs from the woods to the loading platforms. These donkeys are portable and the motor installed on the rig is subjected more or less to outdoor conditions, thus necessitating the use of an inclosed ventilated motor. The service is somewhat akin to hoisting, in that frequently high torque is required for starting, and to meet this requirement a wound-rotor machine is applied as it can give a starting torque considerably in excess of normal.

Mine Electric Lighting

By Terrell Croft.
University City, St. Louis, Mo.
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IN LIGHTING a mine electrically no definitely formulated rules can be followed. There are, however, two general principles which should be observed: (1) Where feasible equip the lamps with shades so as to minimize or eliminate glare. (2) Provide sufficient light at the locations where men work constantly so that the possibility of accident will be minimized. In some coal mines it is the practice to light the main entry with 25-watt lamps spaced at 300-ft. intervals, the object being to insure the silhouetting of objects which may obstruct the passageway. At side-entry junctions, use is made of two units, one to illuminate the switch and junction while the other illuminates a portion of both the main and side entries, and thereby tends to eliminate collisions.

Electric lighting safety requirements are expressed in the following Rule 51 from Bureau of Standards "Standardization of Electrical Practice in Mines": "In any part of a mine where there is danger of igniting gas or coal dust, electric lamps, if installed, must be of the inclosed vacuum type, and they shall be inclosed by gas-tight fittings of strong glass and shall have no flexible cord connections. Electric lamps shall be replaced only by an authorized person. In all machine rooms and other places in gaseous mines where the failure of electric light is likely to cause danger, some safety lamps or other proper lights, not fewer than the number to be prescribed for such place by the inspector, shall be kept for use in the event of such failure."

Incandescent lamps are now used to the exclusion of electric light sources of all other types for mine illumination. While carbon filament lamps which have the low efficiency of 3.1 watts per candlepower are still used to some extent in mine service because they provide long life on varying voltage, they are gradually being displaced by the more efficient tungsten lamp The metallized-filament or gem lamp has a filament of carbon which has been so treated that its electrical properties resemble those of a metal. It has an efficiency of about 2½ watts per candlepower. It is probable that in the near future both the gem and the carbon filament lamp will be withdrawn from the market.

The tungsten-filament vacuum or Mazda Type-B lamp has an efficiency of about 1 watt per candlepower. It is obviously more efficient than either the metallized or carbon filament lamp, but has the offsetting disadvantage of being considerably more fragile. The nitrogen-filled or Type-C Mazda lamp has an average efficiency of about 0.75 watt per candlepower. The Type-B lamps are ordinarily obtainable in the following wattages: 10, 15, 25, 40, 50, 60 and 100. Type C lamps are now obtainable in the following wattages: 75, 100, 150, 200, 300, 400, 500, 750 and 1000. When ordering incandescent lamps, the manufacturer should always be advised if the lamps are for mine circuits, on which a considerable voltage variation may be expected.

In lighting around a shaft near the switch where the breaking and the switching is done 40-watt lamps with shallow dome reflectors may be placed above and between the tracks. The units can be spaced at about 7 ft. intervals and mounted about 7 ft. above the rails. The resultant initial illumination is about 4- or 5-foot candles at the floor.

Frequent whitewashing of the walls of underground offices, mule stables and the like will increase materially the illumination of these parts of the mine—or a greater illumination will be available with a smaller energy expenditure.

Underground rooms, mule stables, and the like may be illuminated with 40-watt lamps equipped with angle reflectors mounted on the wall and as high as possible. One unit can be used for each two stalls. In front of the stalls opposite the angle units, 25-watt lamps with deep bowl reflectors may be used to illuminate the feed boxes and the passageway. Underground mine offices are usually small rooms containing a telephone. One 25-watt lamp equipped with a shallow dome reflector will furnish illumination for the interior, but some means should be provided for lighting the entrance so that it can be easily located in the case of fire or accident. Either an angle or a shallow dome reflector with a 25-watt lamp can be used for this purpose. The fire board in the office at the foot of the shaft should be well illuminated with one or two 25-watt lamps equipped with angle reflectors, the number depending upon the size of the board.

Electric lighting circuits should always be arranged so that the lamps operate at from 100 to 125 volts because this pressure is the most economical for incandescent lamps. Two hundred and twenty-volt lamps are uneconomical. The three-wire system is desirable where an incandescent lamp load is considerable. Such a system may be obtained readily from an alternating-current circuit by using a balance coil. Where it is necessary to light from 250 or 500-volt direct-current circuits the usual practice is to connect in series two 125 or five 100-volt incandescent lamps across the circuit.

The effect of an increase in the impurities in domestic sizes of anthracite coal is much more serious than in steam sizes. While good results are obtained with pea coal, containing 8 per cent. of slate and the same amount of bone, yet this means a total of 16 lb. of impurities in 100 lb. of coal purchased. When the impurities exceed this amount to any great extent the result may be satisfactory, but it necessitates more frequent removal of ashes; also, the fire requires more attention—this in addition to the increased cost of the fuel to the consumer. Pea coal containing 20 per cent. of slate is practically worthless for low-pressure boilers; in high-pressure work, reasonably good service is possible; but also in this case ashes must be removed at more frequent intervals and more attention given to the fire.

Preparation of Bituminous Coal—VI

By Ernst Prochaska
St. Louis, Missouri

SYNOPSIS—*After coal has been washed it must be freed from adhering moisture before it can be shipped. Draining bins, elevators, conveyors and centrifugal dryers are some of the means employed for this purpose. The water must also be clarified or the amount necessary will be excessive. The sludge must be dried and if possible pyrite recovered.*

WASHED coal must be freed from adhering moisture before it can be shipped to market. Coal larger than ½ in. can be dewatered easily by simply passing it over draining screens, but the dewatering of finer sizes is a different problem and the methods used at present do not give entirely satisfactory results. We should not overlook therefore any efforts for further development and improvement in the process of dewatering the fine coal.

Before we we can discuss intelligently the methods used at present, we must first determine the purpose of the dewatering process and the scope of the demands made by it upon the apparatus used. The final purpose of dewatering is to produce a coal of the highest possible value. This will permit us to predetermine in each separate case the most economical degree to which the dewatering should be carried. Some typical cases are as follows:

Coking Coal.—A moisture content of from 6 to 8 per cent is the most suitable for the coking process in retort ovens when utilizing the byproducts. Therefore the coal, if the character and size will permit, must be dewatered to this extent. If this is not possible, other means must be employed to help out. Dry-screened dust may be mixed in or even dry-screened fine coal. The amount of the unwashed coal which can be thus mixed in depends upon the percentage of ash it contains.

Fuel Coal.—The degree of dewatering of fine coal depends upon the demands of the consumer, but the moisture should not exceed 10 per cent. Mixing in of dry unwashed fines will also be of some benefit, but the recrushing of coarse coal for this purpose should be avoided ordinarily on account of the greater value of the coarser sizes.

The following may be considered, taking into account the difficulties of dewatering and the rapid increase of these difficulties with any decrease of the moisture in the final product. As much as the conditions permit, the drying of the fine coal should be aided by the mixing in of dry raw coal.

In most cases greatest possible dryness of the coal is required. The requirements of this dryness should be established beforehand by a guaranty in regard to the permissible upper limits of moisture in the final product, so that the washery as well as the consumer may have fixed data to go by.

Simplicity of installation demands the smallest possible space, low power consumption and small cost of installation and operation. The dewatering of the fine coal, appearing at first sight to be easy, thus becomes a difficult problem made more difficult by the inclination of the fine coal to pack together in dense cakes containing a high amount of water.

The continuous stream of coal coming from the mine does not allow, except at high cost, the devoting of much time to any one separate stage of its preparation. One process must follow another without appreciable intervals or interruptions. Even in the storage bins the coal does not remain for any length of time. It must be loaded out continuously. A coal washery knows only the following alternative—few swiftly operating pieces of apparatus or a great number of slower-working machines. For all previously enumerated apparatus the principle of quick operation is easily accomplished; the treatment of fine coal offers serious difficulties which still remain to be solved satisfactorily.

The methods to be employed for drying coal must be adapted to the character of the material. This requirement demands especial consideration. It is impossible to prefer one method above all others at first sight. The character of the fine coal from different mines shows many variations. With a hard, not easily shattered slate the fine coal, and especially the sludge, are innocuous. The dewatering is comparatively easy and can be, at least partly, combined with the water clarification process. But if the slate, or what is even worse, the slate and coal are disposed to produce a microscopically fine pulp held in suspension in the water, the process of dewatering must be carried on in an entirely different manner. The separation of the fine coal from the pulp must be accomplished in the early stages of the process if it is to be carried out successfully.

Methods of Drying

Considering the requirements set forth we have the following methods for drying in use at the present time: (1) Dewatering in bins or pits; (2) dewatering on slowly moving conveyors; (3) centrifugal dryers; (4) filters (for sludge only).

Draining pits were fuly described in Vol. 14 of *Coal Age*, pp. 1072-1075. In addition to this description it might be mentioned that the dewatering of the fine coal is also accomplished to some degree in the commonly used storage bins. A storage of 48 hours will reduce the moisture in the coal to from 10 to 12 per cent. In Europe draining bins are commonly employed and the draining off of the water is accelerated by the use of filter bodies made of expanded metal, which open up the densely packed mass of fine coal. The following results have been obtained with this type of bin:

Capacity of Washery in Tons per Hour	Contents of Bins in Tons	Number of Bins	Time Required Filling-Dewatering of One Bin in Hours		Capacity of All Bins in Tons per Hour	Degree of Moisture in the Dried Coal, Per Cent.
100	600–1200	4–12				
150	1200–2000	8–20	2–6	20–48	20–120	8–13
200	1400–3000	10–24				

The disadvantages of draining bins are as follows: On account of the large surfaces the sludge settles out of the water, considerably delaying thereby the process of dewatering. On account of the lack of other drying apparatus, all sludge produced must be sluiced into the

draining bins, there to be dewatered. The delays also the rapid draining off of the water. In emptying the bins, the coarse coal flows out more rapidly than the fine coal and the sludge, which later clings to the walls. When the bins are emptied this sludge hangs to the walls for some time and drops off suddenly in large masses. This destroys that uniformity of the coal which is desirable for the coking process. The bins also require considerable space in all directions, and if the ground area at disposal is limited it will bring about a cramped or less desirable arrangement of the other apparatus.

Draining conveyors work on quite a different principle. They dewater the fine coal on its way to the storage bins. No special dewatering device is necessary, as the conveying apparatus required in any case is adapted to dewatering the coal. Conveyors or elevators can be used for this purpose, depending upon the juxtaposition of the jigs to the storage bins. When these machines are employed the washed coal can be sluiced from the jigs directly into the conveyors. With elevators the coal must be sluiced into a settling tank out of which the elevators feed. The drained-off water, carrying fine particles of coal in suspension, is sluiced into separate clearing tanks. Dewatering elevators and conveyors must be built heavy, depending upon the character of the coal, the required capacity, and the distance over which the material must be conveyed. This is the more important since the speed of the conveyors must be slow in order to give the water time to drain off.

The following table gives some data on dewatering elevators and conveyors:

Type	—Dimensions— Width	Length,	Slope in Deg.	Speed, Feet per Minute	Capacity per Hour in Tons	Power, Hp.	De-watered to Per Cent. Moisture
Dewatering conveyor	32 in.-13 ft.	50–130 ft.	0–40	1½–12	5–60	4–18	10–13
Dewatering elevator	20 in.- 6 ft.	50–130 ft.	40–65	3 –32	10–60	12–32	10–13

Centrifugal dryers, on account of their high speed, are restricted in regard to the dimension of the diameter of the revolving parts. To accomplish a satisfactory capacity only centrifuges with continuous feed and discharge can be considered. At present only two types of centrifugals are in use. In one the dried coal is discharged continuously, being scraped off the screen plates by knives which rotate at a speed different from that of the screens. In the other type scrapers are not used and the coal is discharged from the screens through trapdoors which open and close intermittently.

The results with the centrifugal dryer, as far as the delivery of dry coal is concerned, are very satisfactory. The moisture in the dried coal is reduced to an average of 6 per cent. The power requirements are not excessive, dryers with a capacity of 60 tons per hour using from 35 to 50 horsepower.

The greatest disadvantage noticed in the operation of centrifugal dryers can be traced to the rapid wearing of the screen plates which, on account of the small perforations, must be made of thin steel. A solution of this problem would be to use a protecting grate inside of the screens and to allow a thin layer of coal to remain on the screens. This would act as a filter bed and protect the screen against the abrasive action of the coal. Besides the frequent renewals of screen plates, which require the installation of at least one spare dryer, the resulting sludge caused by the grinding action of the centrifugal force upon the coal is another and serious drawback. At present, however, centrifugal dryers are the most efficient pieces of apparatus we have for the purpose of reducing the moisture in the washed coal below 10 per cent. It should also be stated that the coal feed to the dryers must be partially dewatered

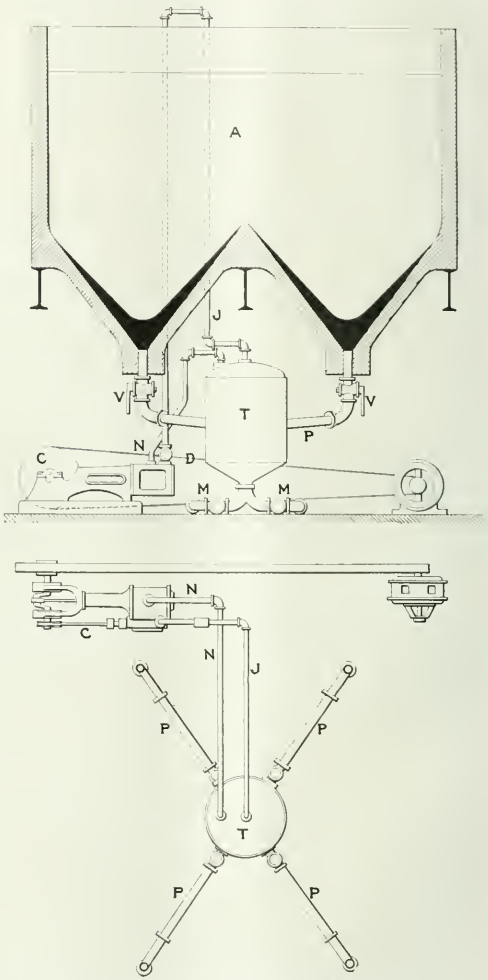


FIG. 20. ARRANGEMENT OF A COMPRESSED AIR INSTALLATION FOR CONVEYING SLUDGE FROM CLEARING BASINS

to at least 15 per cent. moisture, which can be easily accomplished by means of a dewatering elevator.

Filtering apparatus can only be used for fine coal and is best adapted for the dewatering of sludge. Such devices will be described in connection with sludge recovery.

The clarification of the wash water and sludge recovery are carried on side by side in one process. The dirty wash water is separated into clear water on the one hand and concentrated sludge on the other. The clear water flows to the pump cistern and from there is put

into circulation again by pumps. The concentrated sludge is either mixed with the washed coal, with or without further treatment, or stored away in separate bins for boiler-house use; or even in the worst case wasted on the refuse dump. The materials to be considered consist of the overflow water from the settling tanks and the dewatering apparatus.

The process of clarifying is carried on either in large settling basins or in a series of pointed boxes (*spitzkasten*). The employment of clearing basins has been almost abandoned for reasons previously given. The use of spitzkasten has never become popular on account of the large floor space required and the difficulty of removing the concentrated sludge. In a few isolated installations conical clearing tanks of large dimensions, similar to the Callow tanks, have been built but the resulting sludge could not be drawn off in a sufficiently concentrated state or with any degree of regularity. The Dorr thickeners which were taken over from ore-dressing plants have given thus far the most satisfactory results.

The clarification of the wash water must be carried out to such a degree, that considering the necessary addition of fresh water no increase in specific gravity shall occur. Since the quantity of fresh water required to make up for the loss caused by evaporation, the water carried away from the coal, refuse and sludge and by leakages, can be easily determined, we can state: The water clarification is to be carried to such a point that the addition of fresh water shall not exceed the loss of wash water. This means that no water shall be wasted on account of its being too dirty to be put back into circulation. The reason for this is that the cost of water, on account of the immense quantities used, is quite a consideration. A washery treating 2000 tons in eight hours circulates in that time over 1½ million gallons of water.

Methods of Conveying Sludge and Water

The cost of water clarification and sludge recovery should be as small as possible. Little has been done in the way of improvement in this direction. The apparatus employed for settling out the sludge should be arranged in such a way that unnecessary power requirements for the conveying of sludge and water may be avoided. Two methods can be used to accomplish this: (1) The settling apparatus may be located at such an elevation that the overflow water from the tanks can flow by gravity to the clarifying apparatus. This will, however, require in most cases a lifting of the cleared water and the concentrated sludge to their respective places. (2) The clarifying apparatus may be placed sufficiently high so that the cleared water as well as the concentrated sludge can flow by gravity to the places where they are to be used. In this case the overflow water from the settling tank must be lifted to the top of the clarifying apparatus. This latter arrangement has the advantage that it avoids the troublesome elevating of the concentrated sludge and furthermore that it makes the space underneath the clarifying apparatus accessible. The materials used for the construction of the settling tanks are usually either timber (redwood), steel or reinforced concrete. The concentrated sludge can be conveyed by means of centrifugal pumps, diaphragm pumps or by compressed air. Centrifugal pumps can be used when the sludge must be elevated above the permissible height of suction. Diaphragm pumps can only be used on suction lifts and are really used more often as a device wherewith to regulate the flow of sludge than as a conveying medium. Compressed air has been largely used in Europe for conveying the sludge from the clearing basins. In Fig. 20 the arrangement of such an installation is clearly shown. The four discharge points of the clearing basin *A* are connected by the pipes *P* with the tank *T*. Communication between any of the four discharge points of the clearing basin and the tank *T* can be made and interrupted by the valves *V* located in the pipes *P*. From the tank *T* the pipe *J* leads to the air compressor *C*. The three-way cock *D* permits connection of the tank *T* through the pipe *J* either with the atmosphere or with the compressor *C*. To start operation, the pipe *J* is connected with the atmosphere and the valve *V* is opened at the same time. This permits the sludge to flow into the tank *T*. Should the sludge not flow as freely as desired, the cock *D* can be turned in such a way that the compressor takes the air from the tank *T*, creating thereby a partial vacuum in the tank. This accelerates the flow of the sludge. A float indicates the amount of sludge in the tank. As a further safeguard the pipe *J* is carried well above the top of the clearing basin, so that no sludge can enter the compressor. When the tank has been filled with sludge, the valve *V* is closed, the compressor started, delivering compressed air into the tank through the pipe *N*. Now, by opening the valve *M* the sludge is forced out of the tank.

Pump Versus Compressed Air

The question yet remains as to whether pumps or compressed air is preferable for the conveying of sludge. Conveying by means of compressed air is mechanically more perfect. The sludge can be thicker than if handled with pumps, without increasing the wear and tear on the apparatus. But the cost of the installation is considerably higher and the operation requires more careful attention. Smaller washeries will therefore prefer pumps, especially if the nature of the sludge is such that the wear and tear on the pumps is not excessive. Larger washeries having great quantities of sludge to handle should consider compressed air as a medium for conveying it, especially as an air-compressing plant is more or less a necessity around a mine.

The following table shows some results obtained with spitzkasten clearing basins:

Capacity of Washer per Hour in Tons	Total Clearing Surface of Spitzkasten in Sq.Ft.	Number of Boxes	Cleared Water per Minute in Gallons	Concentrated Sludge per Minute in Gallons	Power Required to Lift Sludge, Hp.	Power Required to Lift Water, Hp.
100	860–1620	3– 6	1765–4414	4.4–22	5–15	60– 86
150	1076–2152	5– 8	2647–6621	9.0–33	6–30	70–100
200	2152–3230	5–12	3530–8828	17.5–44	10–30	90–130

As mentioned previously, the process of clarifying the water is carried on either in large settling basins or in a series of spitzkasten. In actual fact, however, little has been accomplished in this respect. In most cases the same water is used over and over again until it becomes too thick for any further use. It was, and still is, the common practice to run a washery with one filling of water, according to the nature of the raw coal, say for from three days to two weeks, and at the end of this period to empty all the jig and settling tanks and fill them up again with fresh water. This is a crude

method, but for the lack of something better it was tolerated even if every washerman condemned it.

This deplorable condition remained unchanged until the advent of the Dorr thickener. This apparatus embodies a highly efficient, economical and mechanically perfect device for settling out the fine impurities. The Dorr thickeners make it possible to recover as a clean, granular coal material which normally goes to waste, and at the same time furnishes a wash water as pure as originally supplied to the system. The operation of these thickeners is entirely automatic and continuous. Power and operating cost are almost negligible. They may be installed in any form of circular tank or basin up to 200 ft. in diameter. If the nature of the ground permits, simple excavations with concrete overflow rims are often used.

The settled solids are continuously discharged in the underflow as thick sludge. The operation of the thickener may be so controlled as to deliver an overflow either entirely clear or containing a certain percentage of solids. For an installation of given size, the natural settling rate of the material being handled and the rates of feed and of underflow determine the amount of solids in the overflow.

It has been found that the thickener works best if the feed does not contain material larger than 20 mesh. As the overflow from the washed-coal settling tanks, and more especially from the centrifugal dryers, contains a good deal of coal bigger than 20 mesh, it is advisable to put in a classifier ahead of the thickener for the purpose of removing the coarse particles of coal in a dewatered state and to pass only the fine slime to the thickeners.

Details of Dorr Classifier

The Dorr classifier, as shown in Fig. 21, consists of a shallow, rectangular tank with a sloping bottom. The tank may be set at any desired slope, usually about 2½ in. to the foot. The feed to the classifier is continuous; all granular material settling to the bottom of the tank is raked up the incline by reciprocating rakes and discharged at the high end above the water level. The fine and more slowly settling solids overflow with the excess water at the opposite end. Broadly speaking, the slope of the bottom, the speed of the rakes, and the dilution of the feed determine the character of the two products.

The classifier serves to dewater the granular coal and to remove the remaining small amounts of coal slime, which can be settled out in the thickeners. Fig. 22 shows a Dorr thickener of 70 ft. diameter with concrete tank. The flow sheet given in Fig. 23 shows a typical arrangement for a water-clarification and sludge-recovery plant.

The power required for operating a 70-ft. Dorr thickener is about 1.5 hp., and the speed of the rakes is approximately from 4 to 8 revolutions per hour.

Under normal conditions of the overflow water from the washed-coal settling tank 30 gal. per minute can be cleared per 100 sq.ft. of settling area, so that a 70-ft. thickener will be able to handle the overflow water from a washery treating 100 tons of coal per hour, if we asume that the water required for washing will be three times the weight of the coal, or 723 gal. of water per ton. The overflow can be easily cleaned so that it does not contain more than 2 grams of solids per liter (approximately 117 grams per gallon) or only 0.2 per cent. of solids. The underflow or the sludge can be

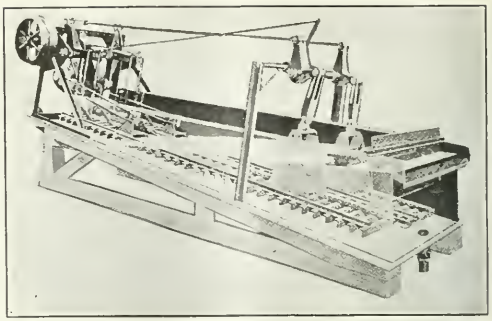


FIG. 21. VIEW OF A DORR CLASSIFIER

concentrated so that it will contain up to 58 per cent. of solids. This is about the limit of density that will still permit the handling of the sludge through pipes or with pumps.

A sludge containing too much impurity to be mixed in with the washed coal entails great losses upon the economic operation of a washery. Furthermore, this sludge, if wasted upon the refuse dump, will fire in course of time and is liable to cause thereby much trouble and damage.

The loss of combustible with the sludge is of greater importance with coking coal, where the fines are of greater value than with fuel coal. Therefore, efforts to treat the sludge for fine-coal recovery are advisable. Many different methods have been tried, but thus far the results obtained have been only mediocre. This is not surprising, considering the fineness of the material. The possibility, however, of a separation can be based upon the fact that even the smallest particles of coal show a granular structure, whereas the fireclay or the crushed slate are of such a fineness that the particles are held in suspension in the water.

All Fireclay Should Be Removed

Successful separation of coal from the sludge demands a distinct difference in the size of the grains. The requirements are that the fireclay shall be removed from the sludge as much as possible without great loss of coal. Up to the present time the only successful method for such a separation depends upon a swift current of fresh water in the shape of sprays, but the tendency at present leans toward the use of apparatus now employed in the ore-dressing plants, such as slime tables or Dorr classifiers.

One important piece of apparatus at present operating at least halfway successfully is the Kohl-Simon screen, shown in Fig. 24. The screens having fine brass-wire mesh (65 mesh to the inch) are hung at their upper ends on the swinging rods *A* and on their lower ends on the bails *B*. The eccentrics *C* give the screens a reciprocating motion and at the same time the double cams *D* impart to the screens a forcible vibrating motion.

The sludge to be treated is sluiced onto the screens through the launder *E*. Fresh-water sprays are forced against the sludge through the pipe *F*, which has ¼-in. holes over its whole length on the under side. These sprays wash the fireclay, which has finer grains than the coal, through the screens into the launder *G*. The fine coal freed from the fireclay travels over the screens and is collected together with part of the wash water

in the launder *H*. The following results were obtained with this apparatus:

Daily Input In Gallons	Solids Per Cent.	Fresh Water Used in Gallons	Clean Coal Produced Ash Per Cent.	Moisture, Per Cent.	Amount of Water in Gallons	Resulting Dirty Water Solid Matter Ash Per Cent	Coal Per Cent
			Tons				
60,000	10.39	63,000	4.78	8.16	14.78	120,000	39.74	60.76

Instead of shaking sreens, revolving screens are also used. These screens have a perforated zinc mantel with a fine brass-wire mesh fastened securely thereto on the inside. The fireclay is washed through the screen by fresh-water sprays, just as with the shaking screens.

The use of slime tables is still in an experimental state, but judging from the results obtained in the ore-dressing plants a successful operation can be expected. The Dorr classifier has been used in the anthracite region to recover coal from the breaker slush. Over 55 per cent. of the coal contained in the slush was recovered and the ash reduced from 30 per cent. to 22 per cent. This was further reduced to 16 per cent. by treating the recovered coal on tables.

All known methods of treating the sludge can only be used to a limited extent. Success can only be expected if the impurities are in finer grains than the coal. This requires preliminary investigations, which will also give data in regard to the size of the screen perforation. Sludge with 30 to 40 per cent. ash treated over screens with sprays gave a recovery of about 20 to 30 per cent. of coal with from 8 to 10 per cent of ash.

Drying of the Sludge

The sludge, treated or untreated, must in every case be dewatered before it can be mixed with the washed coal. On account of the fineness of the material centrifugal dryers cannot be taken into consideration. Heat dryers are not an economical proposition and therefore we must have recourse to filters. The requirements for filters are identical with the requirements for all the other apparatus used in a washery—that is, continuous operation, high efficiency, simplicity of construction, low cost of installation and operation, and durability.

Nobody will expect that any one piece of apparatus will fulfill all of the foregoing requirements, but in regard to filters the continuous drum-type comes nearer to doing it than any other. Sludge containing 35 per cent. solids and 65 per cent. liquid has been dewatered with it to only 20 per cent. moisture. This will make it appear feasible that a sludge with 56 per cent. solids and only 44 per cent. liquids can be brought down to at least from 12 to 15 per cent. moisture. This would put the sludge in such shape that it could be mixed with the washed dried coal without increasing the moisture content of the final product to any appreciable extent.

Pyrites are found in the coal either in the form of sulphur balls or in the shape of fine scales and grains disseminated throughout the mass. The separation of the pyrites from the coal does not offer any appreciable difficulties on account of the great difference in the specific gravities of the two materials. The specific gravity of pyrites is from 4.9 to 5.2, and even the slate carrying fine flakes of sulphur has a specific gravity of only slightly below 3.

A more serious problem is how to prepare the pyrite if it occurs in considerable quantities. This can be best accomplished by wet separation, and the following methods are used:

1. If the pyrite appears in large pieces or is contained within large pieces of slate, hand picking and subsequent separation into pure pyrite and mixed products is advisable.

2. Instead of hand picking, the heavy pyrite can also be recovered in coarse coal jigs, which have an auxiliary screen sloping toward the center. The pyrite is removed from the lowest point of the screen through a kettle valve. In some instances nut coal jigs have a separate bed for the separation of the pyrite and three products are made in the following manner: (a) Pyrites through an artificial bed and screen into the hutch; (b) slate through a slate gate, located at a somewhat higher level, and (c) clean coal overflowing in front of the jig.

3. Rewashing of the refuse is a method especially advisable for large size pyrites.

4. For fine pyrite the methods under (b) and (c) can be adapted by using a fine coal jig.

5. If the pyrite is so finely disseminated that it partially goes over with the sludge, it settles out in the clearing basins and the sludge rich in pyrite can be treated on tables. On account of the small quantities of pyrite in coal the economic results gained by its recovery usually lie within narrow limits. The great price fluctuations of sulphur are also discouraging, and under normal conditions a lasting profitable operation is at best doubtful. In a washery the jigs use most of the water required, but depending upon the different installations water is also used for spraying, in dust collectors, and in sludge treatment. In a general way it can be assumed that about from three to six tons of water are

FIG. 22. DORR THICKENER, 70 FT. IN DIAMETER, WITH CONCRETE TANK

required for each ton of coal, or from 725 to 1450 gal. of water must be put in circulation for each ton of coal treated. But the amount of water actually necessary varies a great deal with the charater of the raw coal, the number of sizes made and the expected output. The last point demands especial consideration.

The water consumption increases immensely if the washery is overloaded. In such cases the water must assume part of the work which the overloaded jigs cannot perform to the required degree of exactness. The table below will show what quantities of water are required in a washery. We assume a mine hoisting 3000 tons of coal per day and that 80 per cent. of this amount will be handled in the washery. The table shows the different sizes of the washed coal made and the required quantities of water. If the washery is designed for a daily capacity of 200 tons—that is, for a 12-hour shift—the hourly water requirements are 203,537 gal. or 1017 gal. of water per ton of coal.

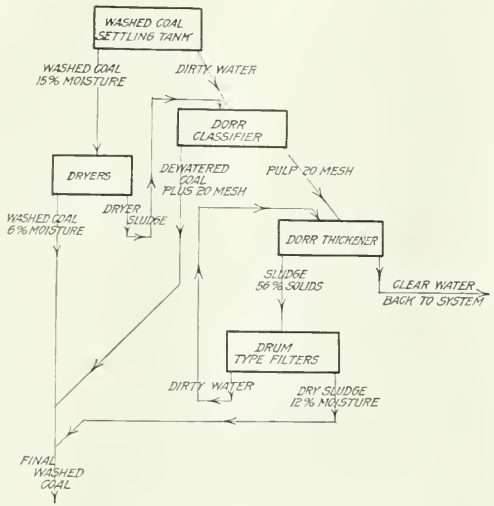


FIG. 23. TYPICAL LAYOUT FOR A CLARIFICATION AND RECOVERY PLANT

Size of Coal	Percentage	Amount in Tons	Water Required in Gallons per Ton of Coal	Water Required in Gallons per Day
Lump coal	20	600	....	.....
Nut coal, ¾ to 3 in.	35	1,050	965	1,013,250
Fine coal, ¼ to ¾ in.	30	900	1,440	1,296,000
Sludge 0 to ¼ in.	15	450	240	108,000
Fresh water for spraying nut coal	....	....	24	25,200
Total	100	3,000	....	2,442,450

It thus becomes clear that only in extremely exceptional cases can the clarification and reuse of the wash water be neglected. Assuming the cost of water at only 0.005 of one cent per gallon (which means 20,000 gal. for $1), the water alone would cost 5.09c. per ton of coal and the daily expenditure for a washery with an output of 2400 tons of coal would be $122.16 for water alone. Therefore, every effort should be made to clarify and recirculate the water without appreciaole wastage.

Water losses can be divided into unavoidable and avoidable ones. Unavoidable ones are brought about by evaporation and by a certain amount of water being carried away with the washed coal, the refuse and the sludge. These losses are increased by any necessity for rapid operation, which gives little time for drainage. Only in the bins has the coal time to lose some of the water. With the installation of mechanical dryers, however, this loss has been greatly diminished as most of the water adhering to the coal is returned to the system. But there still remains the loss of water caused by the moisture in the outgoing refuse and sludge.

The loss of water that drains out of the bins is avoidable through collecting it in gutters. Avoidable also are the losses caused by leaky tanks and sluiceways. These losses increase with the age of the washery and can hardly be entirely eliminated. The use of steel, cast iron and concrete for tanks and sluiceways will cut down this loss considerably and will also make the whole plant a good deal cleaner. The idea that a washery must be sloppy is not only erroneous, but expensive.

The amount of the water losses varies widely with the construction of the washery, its age and the materials used in its construction. It is safe to assume such loss as amounting to from 8 to 10 per cent. of the total quantity used. This amount must be taken into consideration in figuring upon the necessary fresh-water supply. Whether these figures will be sufficient depends entirely upon the efficiency of the water-clarification plant.

If mine water which is acidulous or salty is used, greater quantities must be wasted so as not to increase the acidity of the water beyond a safe point. If concrete is largely used in the construction of tanks and sluiceways, care must be taken to keep the acidity of the water within close limits, as acid water has a disastrous effect upon concrete structures.

In general the degree of water clarification desirable depends upon the proportionate cost of power and water, the possibility of clarifying the water and of allowing the dirty water to run away without damaging adjoining property or polluting streams.

Pumps and Cisterns Usually Employed

For water circulation in the washery centrifugal pumps are almost universally used. The character of the water, the requirement of lifting large volumes of water under comparatively low heads and the floor space at disposal forbidding large pumprooms, render centrifugal pumps especially advisable. It must be emphasized also that the whole washer operation depends upon the uninterrupted service of the circulating pumps; therefore, it would be mistaken economy to leave a spare circulating pump out of the washery equipment merely on account of lack of convenient space or a shortage of money.

The fact that water clarification is the final process places the pump cistern at the lowest point of the washery. It is important to make the pump cistern big enough to take care of all the water in circulation when the pumps are shut down and, on the other hand, to give the pumps sufficient water from which to draw at the beginning of the operation. It has been found advisable to interpose between the circulating pump and the jigs a water tank or high-level reservoir for the purpose of supplying the jigs with water under constant

pressure and at the same time to provide further storage space.

The power required for the circulating pumps varies considerably, depending upon the volume of water to be circulated and upon the difference in elevation between the pump cistern and the jig tanks. Approximately, it can be assumed that for a washer having a capacity of 100 tons per hour there are required 70 to 125 hp.; for 150 tons per hour, 100 to 150 hp.; for 200 tons per hour, 140 to 170 hp.; for 250 tons per hour, 160 to 250 hp. Besides the circulating pumps several other pumps are required to handle the sludge from the thickeners and the clear water and the sludge from the clearing basins. It is also advisable to install a high-pressure pump for fire protection and for the purpose of washing off the floors and washing down the accumulated dust from the roof trusses.

The amount of power required depends primarily upon the capacity of the washery. The following must be considered to determine the total amount of power required: The methods of operating the screens, the jigs, the dust collectors, the crushers, etc.; in short, all of the mechanically operated equipment. This in turn depends upon the character of the raw coal and its impurities. The power required for each piece of apparatus designed for a certain capacity and material is known; therefore, the summation of the power required for all the apparatus gives the total power necessary. To this total, however, must be added a certain percentage to take care of the power losses sustained in transmission.

Local conditions and arrangements of the machinery influence power consumption. To reduce the power requirements to a minimum it is desirable to either use the natural elevation or to raise the raw coal to such a height that the flow of the materials can be carried on by gravity alone or with the aid of sluicing water. In a level country there are some limitations to this ideal condition on account of the difficulty encountered in designing and operating heavy elevators of great capacity in an economical manner.

The power required per ton of coal treated will vary between considerable limits. Average values taken from existing installations are given as from 2 to 3 hp. per ton of hourly capacity. Some modern installations, however, with a complete system of water clarification and sludge recovery, require as much as 5 hp. per ton of hourly capacity.

From the foregoing discussion it can easily be seen that only after a careful examination of all the details will it be possible to decide upon a suitable general arrangement. Furthermore, the cost of power plays an important part in the proper selection of the machinery. A mine paying only ¾c. per kilowatt-hour can consider in the selection of the machinery other advantages than a mine paying 1½ cents.

The following table gives the average power required for the different pieces of apparatus used:

		Power Required for a Washery Having a Capacity per Hour of — Tons		
	Description of Apparatus	100	150	200
1.	Dust collector in screen house	5 to 18	6 to 18	7 to 18
2.	Screens in tipple	6 to 15	8 to 25	15 to 40
3.	Picking tables and loading booms	10 to 15	10 to 25	15 to 30
4.	Conveying rock and picked-out slate	6 to 15	6 to 15	6 to 15
5.	Conveyors from screen to fine coal bin	5 to 10	6 to 12	8 to 15
6.	Crushers	80 to 120	100 to 160	150 to 200
7.	Raw coal elevator	15 to 30	20 to 50	30 to 60
8.	Conveyors for raw coal storage bin	5 to 10	5 to 12	5 to 15
9.	Magnetic separator	5 to 10	5 to 10	7 to 15
10.	Preliminary screens	5 to 10	7 to 15	10 to 20
11.	Dust collector	5 to 10	5 to 15	6 to 05
12.	Coarse coal jigs	15 to 25	20 to 40	40 to 52
13.	Coarse refuse elevators	5 to 10	7 to 12	10 to 15
14.	Rescreening of nut coal	5 to 8	5 to 12	7 to 15
15.	Conveying nut coal to storage bins	5 to 6	5 to 8	6 to 10
16.	Conveying middle products	5 to 6	5 to 8	6 to 10
17.	Crushing middle products	10 to 30	20 to 40	30 to 60
18.	Rewash jigs	5 to 10	10 to 15	15 to 20
19.	Fine coal jigs	10 to 15	15 to 20	20 to 30
20.	Concentrating tables	7 to 12	10 to 15	15 to 20
21.	Fine refuse elevators	2 to 5	3 to 6	5 to 8
22.	Conveying fine coal to storage bins	8 to 20	12 to 30	15 to 30
23.	Drying of fine coal	60 to 100	100 to 150	150 to 200
24.	Sludge recovery	5 to 10	10 to 15	15 to 20
25.	Water circulation	70 to 125	100 to 150	140 to 175

(to be concluded)

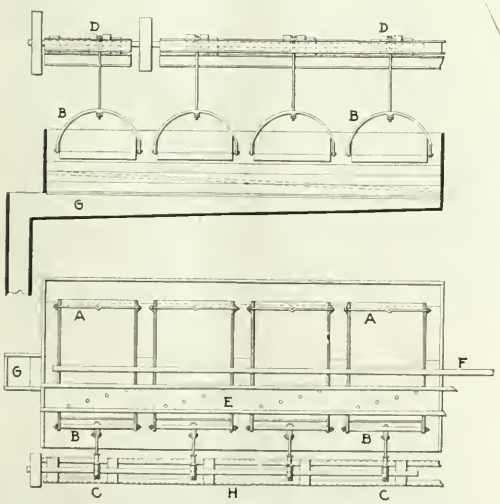
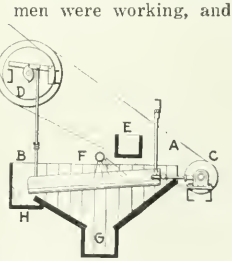


FIG. 24. KOHL-SIMON SCREEN USED IN SEPARATING COAL FROM SLUDGE

With the object of recovering living men within a mine after a disaster the first effort should be to ascertain, from a reliable source, in what parts of the mine men were working, and to locate those parts of the mine to which the men might go to get the best air. The rise and dip and the location of pillar work and wet places would be clearly shown on the mine map, as would the position of pumps. Any pumps driven by compressed air may make available a supply of fresh air. Presumably, entombed men will go to those parts that are naturally damp or wet or where compressed air machinery may be in use, and the first efforts of rescue should be directed to those districts of the mine in which there seems to be the greatest likelihood of finding men alive. If any parts of the mine have been liberating explosive gas, it may be presumed that the explosion originated in one of those. The report of the fireboss should be examined to ascertain in what sections of the mine he has previously found explosive gas. In the absence of such information, the exploration should be made first along those entries of the mine that show indications of least violence and heat. If men got out of the mine immediately or shortly after the explosion, an effort should be made to reach that part of the mine.



WHAT THE ENGINEERING SOCIETIES ARE DOING

Engineering Council Condemns Low Salaries

Declares Compensation for Services Has Not Risen with Living Cost and Seeks a Classified Salary Schedule

REPORTING at the recent regular meeting of Engineering Council, the committee on classification and compensation of engineers presented the following analysis of the situation and suggested the lines of its future action. Reports from separate sections of the committee are also briefly abstracted herewith:

In attempting to formulate standard rates of compensation for professional engineers, the first task is to find what rates are actually in force, especially in those fields where attempts at standardization have been made. The second task is to inquire what adjustment should be made to correspond to the great change which has taken place in the cost of living, or, in other words, in the value of the dollar. How great this change has been during the past twenty years is realized by few. Fortunately, an accurate determination is available in the statistical records of average prices which for many years have been gathered and published by leading commercial organizations.

A record of average prices of the necessaries of life kept by R. G. Dun & Co. shows that prices have increased continuously for 22 years. A certain quantity of staple necessaries could have been purchased July 1, 1897, for $72.45. By Jan. 1, 1905, the same quantity cost $100.32. On Jan. 1, 1914, before the outbreak of the war, the cost had risen to $124.53; May 1, 1917, to $208.43, and Oct. 1, 1918, to the maximum of $233.23. This enormous increase in prices of the necessaries of life has been accompanied by an increase in wages, especially among workers organized in unions which had the power to compel attention to their demands. In the unskilled labor market the relations of supply and demand raised wages during the war to points in some cases exceeding the increase in the cost of living. No such increase has taken place in the compensation of salaried workers in the professions. It has been assumed that these workers, living in a different social environment, had a margin of compensation sufficient to enable them to meet the increased cost of living. This assumption is not justified by the facts. Where salaries have been increased during the past three years, there are few cases in which the increase has been at all commensurate with the increase in prices of the necessaries of life, which the salaried worker, like the wage worker, has to purchase. That this is a correct statement is amply proved by many direct comparisons which have been made of the wages of the workers in various skilled trades and the salaries of the rank and file of technical and professional workers.

There is little doubt that an unprejudiced investigation would show that a large proportion of the salaried workers in professional occupations during the past three years have been unable to pay their living expenses from their earnings and have been obliged to rely on income from property owned or to use up savings of other years in order to maintain themselves.

A serious question is whether the present scale of prices is here to stay. There has been a general belief that with the coming of peace and the resumption of productive industries a heavy fall would occur. It has been assumed that the salaried worker would have to wait for this so that he could again live within his income. It now appears, however, to be the opinion of many financiers and economists that the present high prices of necessaries are likely to continue for a long time, probably for several years. The salary of $2000 a year which a man received from 1902 to 1905 will now buy less than $1000 worth of necessaries. This has been the case for two years. If this is to continue for two, three or four years to come, then surely the salaried worker, in a professional or any other occupation, has an equitable claim to have his compensation brought back in purchasing power to where it was fifteen years ago.

There is another aspect of the compensation of the professional worker which has been frequently misunderstood, but which, with present knowledge, ought no longer to deceive. The pay of professional engineers has for many years been influenced by the idea that a young man in the earlier years of his work should expect moderate compensation because of the future to which he might look forward. In Great Britain this idea found expression for many years in the custom of the young engineer paying a premium during a number of years' service in order to learn the business. There was justification for this idea during the period when the development of engineering was so rapid that a large proportion of the men who were turned out from the few engineering schools or the engineering workshops were able eventually to rise to positions of large responsibility and importance, commanding high salaries. That condition has been altered. Of the men who begin technical engineering work today, only a very few selected ones can rise to positions of responsibility commanding high salaries. The rank and file must inevitably be ten times as numerous as the captains and lieutenants, and a hundred times as many as the majors and generals.

The man of exceptional ability, indeed, may find it worth his while to work for low compensation because of the future awaiting him. But to hold up to the rank and file of technical workers the idea that they can afford to work for insufficient salaries for the sake of some future high

THE ENGINEERING COUNCIL, of the Engineering Societies Building, 29 West 39th St., New York City, is a body which considers and promotes the interests of engineers as a whole. Its member societies are the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Society of Electrical Engineers, and the American Society for Testing Materials. J. Parker Channing, a mining engineer, is chairman and Alfred D. Flinn, secretary. M. O. Leighton is chairman of the National Service Committee.

position, which they have not one chance in twenty or fifty of attaining, is a gross deception.

The committee believes, therefore, that in adopting standards for the compensation of workers in all technical fields due consideration must be given to the great increase in the cost of living which has taken place. The dollar of salary must be considered with regard to what it will purchase today and is likely to purchase next year, and not with regard to the value of the dollar ten or fifteen years ago.

This increase in compensation is necessary not merely as a matter of justice to the engineer, but in order that engineering work may be maintained on the plane that it must be to secure economical and efficient work. Not only the leaders but the rank and file of technical workers often have it in their power largely to affect the cost of the work in their charge by the quality of the effort they exert.

There is no economy in paying such men at rates inadequate for their support, for this leaves their minds burdened with anxieties, when they should be free to give their best efforts to the work in hand. Moreover, such a rate automatically tends to drive the abler men into other occupations and to leave in charge of the work only those of less ability who are unable to make a change.

The municipal and state section of the committee, Arthur S. Tuttle, chairman, reported that it was formulating a standard classification of positions and duties, and a schedule of titles and qualifications has been prepared to be incorporated in a questionnaire for circulation among engineers of all states and the more important cities.

The Federal Government section, John C. Hoyt, chairman, reported that a survey of Government activities shows 28 offices that employ Government engineers. A letter was sent to each member of the Cabinet requesting a list of engineering bureaus in his department, and favorable responses were received from all except the Secretary of War.

The railroad section, Francis Lee Stuart, chairman, reported that a questionnaire had been prepared to be sent to the chief engineers of the railroads under Federal control, but after conference with Director General Hines it was decided to send it to members of the founder societies connected with railroads. A letter outlining the work of the committee and suggesting a simple general classification into eight groups accompanied the questionnaire. These eight groups of engineers are as follows:

(1) Chief administrative officer having full charge of organization, including determination of policy; (2) head of major subdivision in responsible charge of large unit; (3) head of intermediate subdivision in responsible charge; (4) head of minor subdivision; (5) on general duty under direction but requiring special education and special training and the use of initiative and originality; (6) on subordinate duty requiring special education or training but not requiring special originality; (7) on subordinate duty not requiring special education, training nor originality; (8) on special duty of responsible character requiring particular qualifications and initiative.

Interior Department Will Henceforth Be Headed by an Engineer

Far-reaching changes in the executive machinery of the Federal Government were proposed in the bills introduced in each house of Congress on June 25. The Federal Department of the Interior will become the Department of Public Works, if the legislation proposed is enacted. The main idea is to assemble all engineering activities of the Government in one department.

Such bureaus of the Interior Department as are not of an engineering character are to be placed under the jurisdiction of the appropriate departments, while engineering bureaus from other departments are to be included in the Department of Public Works. The bill proposes that the Patent Office is to be removed from the Interior Department and placed under the Department of Commerce. The Bureau of Pensions is assigned to the Department of the Treasury. The Bureau of Education goes to the Labor Department. The Bureau of Indian Affairs also is transferred to the Department of Labor, with the proviso that the engineering and construction work and the land and mineral surveys now performed under the direction of the Bureau of Indian Affairs are to be prosecuted under the Department of Public Works. St. Elizabeth's Hospital and the Freedman's Hospital in Washington, D. C., are assigned to the Treasury Department. Columbia Institution for the Deaf and the Howard University go to the Bureau of Education, under the provisions of the bill.

On the other hand, the Department of Public Works is slated to absorb the Supervising Architect's Office of the Treasury Department; the Construction Division, River and Harbor Improvements, Mississippi River Commission, and California Débris Commission of the War Department; the Bureau of Standards and the Coast and Geodetic Survey of the Department of Commerce; the Bureau of Public Roads and the Forest Service of the Department of Agriculture.

The bill provides that the Secretary of Public Works "shall by training and experience be qualified to administer the affairs of the Department and to evaluate the technical principles and operations involved in the work thereof." The measure excepts from the foregoing provisions the Cabinet Officer who is the head of the Department at the time of the passage of the bill.

Four assistant secretaries, each to be paid $7500 per annum, are provided and their duties outlined. One assistant secretary is to have administrative jurisdiction over all matters of engineering design and construction. Another is to have charge of architectural design and construction. The third is to have jurisdiction over all scientific work and surveys, while the fourth assistant secretary is to be in immediate charge of all land and legal matters. The assistant secretaries are charged with the duty of coördinating and bringing into efficient relationship all the activities of the department, so that it may be harmoniously and efficiently administered.

An important feature of the bill is the proviso that engineer officers of the United States Army detailed on non-military work are to be assigned by the Secretary of War to like duties under the new department, for not over two years. This enables the Secretary of Public Works to make gradual transfer of improvements and instrumentalities to civil administration without detriment to public interest. Members of the Corps of Engineers may, under the direction of the Secretary of Public Works, be detailed by the Secretary of War to temporary duty in the new department for such instruction, training and experience as is desired.

The bill was introduced in the upper House by Senator Wesley L. Jones of Washington, and in the lower House by Representative Frank C. Reavis of Nebraska.

Proper and Lawful Examination of a Mine by the Mine Examiner*

The Mine Inspector or Examiner Should Be the Most Efficient Official About the Mine. The Law Prescribes What the Examiner Must Do While Making His Daily Inspection, But Does Not Restrict His Additional Activities in the Interest of Safety. An Inspection May Be Entirely Legal But Not Proper or Adequate

By Steve Gosnell
Hallidayboro, Illinois

"SAFETY FIRST" has been the great slogan of all the leading industries of the United States for the last few years. Much has been written upon this subject and many safety devices invented for the protection of life and property. Many articles have appeared and are appearing in our leading mining journals relative to the efficiency of mine officials, and it is needless to intimate that these have not neglected the mine examiner.

If there is an official about the mine that should be efficient, it is the mine examiner, for upon him depends the safety of every man underground. Especially is this true in gaseous mines. Now let us apply "Safety First" in the examination of a mine, since such an examination cannot be "proper" except it be safe. Also note the distinction between "proper" and "lawful" examinations.

For example: The Illinois statutes permit the mine examiner to begin his examination eight hours before the men's entrance into the mine. Is this "proper" or "safe"?

I contend that it is not, for the reason that many things may and do happen within the space of eight hours. Sixty per cent. of the mines in southern Illinois generate explosive gas in dangerous quantities, and I am safe in saying that almost all of them employ a night shift which begins duty anywhere from 4 to 11 o'clock p.m. and retires as late as 7 o'clock a.m. The day shift going on duty at 6:30 o'clock a.m. permits the examiner to begin his examination at 10:30 o'clock p.m. the preceding day.

Suppose that several entries generate explosive gas in dangerous quantities, which, of course, is taken care of by ventilation: Upon beginning his duties, the examiner proceeds to examine certain sections of the mine, finds everything in good order and ready for work; but after his departure some members of the night shift have business in this particular section, and upon leaving it carelessly leave a trapdoor open, short-circuiting the air current. This door stands open somewhere from two to six hours, or until the day shift goes on duty. The entries fill up with gas, the mine manager has no report of this gas until the miners working in this section arrive at their working place, and, with their open lights ignite it. He then gets the report that an explosion has occurred and 2, 6, 10 or maybe 100 men are burned or killed.

Now this examination was conducted strictly according to the Illinois mining laws, but was it proper or safe? True, the law gives the state inspector of mines the authority to require in writing the addition of other examiners for the purpose of examining the mine, in shorter periods, but this also possesses a disadvantage, as there are few examiners that will go to the trouble of enforcing the law.

The mine examiner is required by law to see that the air is traveling in its proper course and in proper quantity; and to measure with an anemometer the amount of air passing the last crosscut or breakthrough of each pair of entries, or in the last room of each division in longwall mines, and at all other points where he may deem it necessary; and to note the result of each measurement in the mine examiner's book kept for that purpose.

He must inspect all places where men are required in the performance of their duty to pass or to work, and must observe whether there are any recent falls or dangerous roof or accumulations of gas or dangerous conditions in rooms or roadways; examine especially all roadways leading to escapement shafts or other openings for the safe exit of men to the surface, the edges and accessible parts of recent falls, old gobs and air courses. As evidence of his examination of rooms and roadways, he must inscribe in some suitable place on the walls of each, with chalk, the month and day of the month of his visit.

When working places are discovered in which there are recent falls or dangerous roof or any other dangerous conditions, he is to place a conspicuous mark or sign thereat as notice to all to keep out; and in case of an accumulation of gas, to place at least two conspicuous obstructions across the roadway not less than 20 ft. apart, one of which shall be outside the last open crosscut.

Upon completing his examination he is required to make a daily record thereof in a book kept for that purpose, for the information of the company, the inspector and all other persons interested; and this record is completed each morning before the miners are permitted to enter the mine.

He is required to take into his possession the entrance checks of all men whose working places have been shown by his examination and record to be dangerous, and to give such entrance checks to the mine manager before the men are permitted to enter the mine in the morning.

This, if carried out, constitutes a lawful examination; but to properly and safely examine a mine, the mine examiner or examiners should begin their inspection not more than three hours before the men's entrance into the mine, and then only when all other persons are out except it be men employed near the shaft bottom

*Paper presented before the spring meeting of the Illinois Mining Institute.

whose duties do not take them off the main entry or through trapdoors.

Each examiner should be allotted a certain territory, an amount that will permit him to make a thorough examination and close observation of all conditions under his jurisdiction. Upon his arrival at the mine he should see that the engineer and fireman, if such are employed, are on duty and that the fan is running at proper speed.

A dusty condition of the mine should also be observed by the examiner. This factor alone is highly dangerous in the presence of gas, or where shots are fired with black powder.

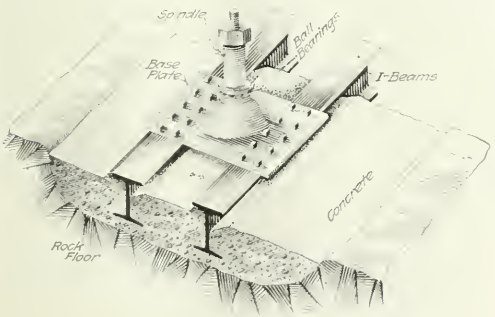
Dirty haulage roads, and poor and improper timbering are other dangerous conditions that should receive the strict attention of the examiner. He should not only mark working places as evidence of his examination, but should mark all trapdoors and regulators which are used for guiding the air current.

When places are found in either new or old workings in which an accumulation of gas exists, this should at once be removed by a special curtain or brattice erected under direction of the mine examiner before the men are permitted to enter the mine for the day.

Anchoring the Bullwheel of 3500-Horsepower Haulage

By Ralph W. Mayer
California, Pennsylvania

A MINE with an output of 7000 tons of coal a day uses a 3500-hp. engine to drive its rope haulage. A 1⅛-in. cable is employed. The trip consists of from 120 to 150 cars, holding from three to four tons each, making a load of from 400 to 500 tons of coal in each trip exclusive of the weight of the cars. A single track is used, except at the turnouts and partings. It is necessary that the bullwheel be set so that neither it nor the

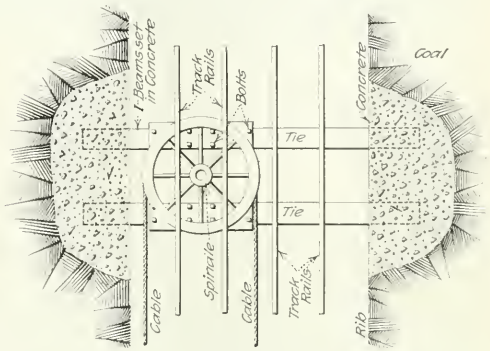


METHOD OF CONSTRUCTING ANCHORAGE

rope shall interfere with the motor haulage which delivers the cars to the rope-haul parting.

This object is accomplished by anchoring the bullwheel underneath the rails. Placed in this position, it would carry away possibly several miles of track and delay the operation of the mine for an indefinite period, if it should pull loose. This contingency is guarded against by anchoring the bullwheel so that it is practically impossible for it to pull out.

The anchorage is constructed as follows: Heavy 16-in. I-beams, about 3 ft. centers, are placed across the parting, underneath the rails of both the tracks, and set into hitches cut into the rib for a distance of 6 ft. or more. The bottom is also taken up and the beams let down into the floor, so that the top of the bullwheel is below the bottom of the track ties. When the beams had been put into place the hitches in the rib were filled with concrete, as was also the space excavated in the floor. Underneath the wheel the concrete is only brought up level with the top of the beams. A pit with concrete walls made considerably larger than the wheel



DETAILS OF BULLWHEEL ANCHORAGE

was formed so that the wheel might be removed from underneath the track without disturbing the rails. The ends of the beams are covered over level with the top of the floor. A baseplate 3 ft. square and two or more inches thick is bolted to the I-beams. The bolts pass through holes on both sides of the beam web and through corresponding holes in the baseplate. Thus four rows of bolts across the plate hold it fast to the beams. Underneath the plate the concrete is not brought up to the top of the beams, a space of 6 or 8 in. being left unfilled so that the bolts may be passed easily up through the holes in the beams and plate.

A short pedestal in the center of the plate supports the spindle, which has a thread and nut on its upper end for holding the wheel down. The entire weight of the wheel rests upon the top of the pedestal and ball bearings are here located, upon which the wheel revolves. The spindle receives the pulling stress of the cable. The baseplate, pedestal and spindle are cast integral and an extra piece is kept on hand at all times to replace the one in use should it become worn out or unsafe. The bullwheel is 7 ft. in diameter.

No ties are placed under the rails over the bullwheel pit as the rails are of 90 lb. steel and amply strong enough to support the load passing over them. Plates of ½-in. steel cover the wheel pit. Each plate is long enough to extend the full width of the pit. They are cut so that they fit snugly between the rails and thus keep the dirt out of the pit. Although a car seldom gets off the track over the pit, the plates are sufficiently strong to carry the weight of a derailed car. Directly over the top of the wheel spindle a hole is cut through the plate for oiling the bullwheel. When not in use this hole is covered by a small plate a little larger than the hole. This is fastened to the larger plate by means of a rivet, which acts as a pivot, so that the small plate may be swung back to uncover the hole when oiling is necessary.

Effect of Breaking of Coal on the Emission of Gas

By Robert Dunn
Victoria, B. C.

SYNOPSIS—*What effect has the bringing down of coal upon the emission of gas? The attempt to ascertain the answer to this question in the Crow's Nest Pass region has developed some unexpected results. Daily sampling and analysis of the mine air showed that the amount of gas in the mine air changed but little and seemed to bear no relation whatever to mining operations.*

SOME attention has been given in the columns of *Coal Age* to the coal fields of the Crow's Nest Pass District, Eastern British Columbia. The special instance which I have in mind is an article appearing in the issue of Apr. 10, 1919, being a digest of a report by George S. Rice, chief mining engineer, U. S. Bureau of Mines, on the subject "Bumps and Outbursts of Gas in the Mines of the Crow's Nest Pass Coal Field." In view of this interesting account of Mr. Rice's investigation and conclusions, it seems apropos to give some account of work that since has been carried on under the direction of George Wilkinson, chief inspector of mines for British Columbia, in connection with the mines of this district with particular reference to the flow of gas.

Mr. Wilkinson set out to ascertain what bearing the breaking of coal has on gas emission. The evidence accumulated indicates that, while it has some effect, its extent is not important. The coal of the Coal Creek mines, the chief producers of the section under discussion, is saturated with gas as a sponge may be with water, and is bleeding it constantly. This being the condition, Mr. Wilkinson's conclusion is that the best method of keeping the percentage down to well within the safety zone is to provide ample ventilation. More splits than usual are considered necessary with a comparatively small number of working places in each split. This is his theory of the operating policy which must be adopted in order that the percentage of methane shall be kept down to the minimum.

It is unnecessary, perhaps, to say that this course has been followed throughout the district. Furthermore, the Coal Mines Regulation Act now provides that the withdrawal point not only in these but in all mines of the province shall be 2.5 per cent., so that when the percentage of methane in any working place is found to equal or exceed this figure the law insists on the immediate removal of the miners. It has been established that a ¼-in. gas cap in the Coal Creek mines equals the 2.5 percentage of gas fixed as the point at which the men must be withdrawn. This was learned by measuring flame caps and comparing them with percentages of samples of mine air taken at the same time and analyzed. It may be stated incidentally that a ¼-in. gas cap in the Crowsnest region represents a greater percentage of gas than does the same cap in the mines of Vancouver Island.

To return to the matter of gas flow, there have been taken and analyzed 380 samples of the mine air in the Coal Creek mines by officials of the Department of Mines since Dec. 15, 1916, which date coincides with that of Mr. Rice's visit to the Crowsnest district. From the records thus secured, one of the objects of which was to ascertain the relationship between the gas flow and the working of the mines, it is possible to show quite conclusively that the coal beds give off just about the same amount of gas at all times. This interesting investigation, it may be explained, has been facilitated by the fact that there have been periods when the mines have been idle through strikes and for other reasons. The daily taking of samples continued without interruption and consequently some rather striking figures having to do with this point can be quoted.

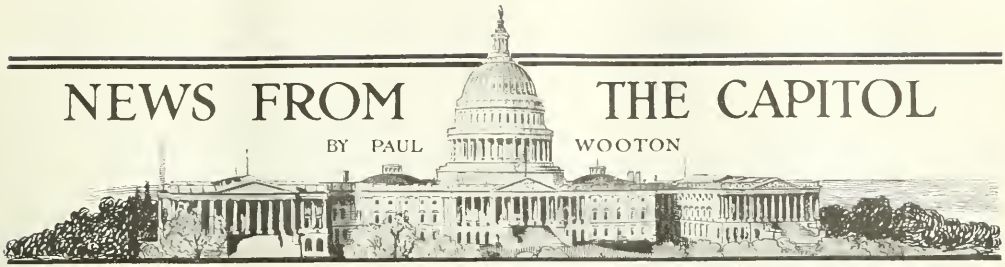
Taking No. 1 East Mine, Coal Creek, south side split, for the first illustration, a sample was secured after the mine had been idle for 45 hours that showed 1.82 per cent. methane. Another sample taken after the mine had been idle for 30 days showed 1.52 per cent., or a decrease of only 0.3 per cent. after 28 days of inactivity. Another sample taken after the mine had been in operation for nine days showed 1.66 per cent. or an increase of only 0.14 per cent.

Other figures relating to the main return airway, No. 1 South Mine, Coal Creek, are interesting in this connection since they indicate that there was an increase in the amount of gas given off during an idle period. A sample taken after the mine had been inactive for 10 days showed 1.24 per cent. of methane, and another, obtained 31 days after the men had been withdrawn, gave 1.46 per cent., or an increase of 0.22 per cent. after 20 days of idleness. A sample taken after the mine had been idle 19 days showed 1.62 per cent. of methane, or an increase of 0.38 per cent. The same quantity of air was in circulation throughout the period of this investigation. Samples taken from No. 1 East Mine, south side split, to demonstrate the change as to gas emission during the working periods, resulted as follows:

9 a. m.	2.02 per cent. methane
9 p. m.	2.20 per cent. methane
7 a. m.	2.08 per cent. methane

Maximum change during period of breaking coal 0.08 per cent.

NEW MINE DEPARTMENT BUILDING OF RALEIGH COAL AND COKE CO., AT RALEIGH, W. VA.



George S. Rice Returns from Interesting Tour of European Coal Fields

THE French are showing engineering ability second to none in the rehabilitation of their coal mines, according to George S. Rice, the chief mining engineer of the Bureau of Mines, who recently returned from a personal survey of the coal situation in France, Belgium, Germany and England. The reclaiming of the French mines, however, is being delayed by the French governmental policy, which Mr. Rice does not undertake to criticize. The policy to which he refers is that of opposing the purchase of foreign mining machinery owing to the overwhelming balance of trade against France.

In Great Britain, Mr. Rice found that the financial interests are frankly calculating the effects of a total discontinuance of coal exports from England proper. Apparently, England needs all the coal she can produce. It is evident that present restrictions on local consumption of coal can not be continued indefinitely. Mr. Rice found powerful influences at work tending toward the nationalization of coal mines. Mr. Rice gained the impression, however, that the opinion of the majority of the people is that the time is not ripe for the nationalization of the coal industry. That sentiment, however, may not have crystallized to the point where it may be effective in preventing such a step.

Mr. Rice went to Europe several months ago at the head of a Bureau of Mines commission. He now is engaged in writing a report on the great deficiency in the fuel supply of Europe. He also will reduce to a report other observations and conclusions that he reached as a result of this trip. In a running story of his survey, Mr. Rice says:

On our arrival in Paris, thanks to Professor Probert, our itinerary was practically arranged. Through the kindness of Secretary Baker, a military automobile was placed at our disposal. This greatly facilitated our movements in a territory where ordinary means of transportation are partially disrupted. We visited first the Lorraine iron mines. Then we went to the French steel plants which had been destroyed by the Germans. We visited the mining areas of Luxemburg and those in the vicinity of Metz, after which we went through the Saar coal fields where we saw the German miners working under French military control, helping to supply, in part, the loss of production in the Pas de Calais field. We then returned to Paris via Verdun where we had the honor of spending the night in the citadel as the guest of the commandant. We had an opportunity to go over the whole battle area on which occurred the most intense conflict in the whole history of clashing arms.

On our return to Paris, Dr. Cottrell left us to visit the air-fixation plants in Germany. Professor Probert and I went to the Pas de Calais coal field. In addition to examining the mines which had been willfully destroyed, we made interesting observations at the principal French mines which escaped that fate. These mines continued in operation during long periods when they were under shell fire. Professor Probert then returned to the United States. I was requested to take part in an advisory capacity on coal matters in an Allied conference with German representatives at Cologne. The object of the conference was to obtain information as to what Germany had to offer in exchange for foodstuffs. As France and Italy each was in great need of coal and coke, it was hoped that Germany might have a surplus of these fuels. It proved that Germany had no coal or coke from the Westphalian field to offer, other than that already going to the occupied territory on the west bank of the Rhine. Strikes and labor difficulties, ascribed partially to food shortage, had cut down the output. It was at this conference that the Germans complained that the French had made no accounting to them of the coal taken from the Saar valley. Major-General Gaillard, who presided, merely smiled and did not call attention to the fact that they also had received no bill for the damage done French coal mines. The bearing of the Germans on that occasion was not that of those who recognize military defeat.

While waiting for the conference to convene, I had time to visit the mines on the west bank of the Rhine in the Westphalian field and the remarkable brown coal field near Cologne. On the return from Cologne I visited the mining region of Belgium from one end to the other—from Liege to Mons—and thence continued over the line into the devastated mining region as far as Lens.

I was detained in Paris by some matters pertaining to the Economic Commission's work, but as soon as I could get away I went to the south of France to visit the St. Etienne, Marseilles and Alias coal fields. I was interested particularly in the latter where there are great outbursts of nearly pure carbonic acid gas which appears to be held under very high compression in the coal.

I then went to England, where I visited the typical iron mines in the Cleveland and Cumberland districts; the oil shale workings in Scotland, and various collieries.

Fuel Administration Winding Up Affairs

While the Fuel Administration passed out of existence June 30, the Labor Bureau will be continued during the life of the Washington wage agreement. Congress has been asked and doubtless will furnish $50,000 to keep this bureau alive since there are certain negotiations which must be continued as the Fuel Administration is a party to the agreement which continues until peace is signed. In addition, the business office will require a few weeks to close up the books and records. The final report of the statistical division is now in the hands of the printer. C. E. Lesher, who has been in charge of that division, now will devote his entire time to the mineral fuel section of the Geological Survey, of which he is head.

COAL AGE

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Always Need for Skill in Mine Work

AT no time has mining work been without its tricks requiring a degree of practiced skill. Yet it is a question whether the modern methods make any more demand on the trained ability of the worker than those which preceded them. The main difference lies rather in the fact that present-day methods are new and constantly changing. If it were not for our multiplicity of booklets and our machinery demonstrators, we should be at a loss to handle our new equipment.

To illustrate with a few simple examples, the miner's torch was provided with a wick by the miners at no little expense of ingenuity and patience. To form one, to blow in the leading strand, to pull the wick into place without matting the cotton, to make it just tight enough and not too tight, long enough and not too long, to burn off the bunched ends, to regulate the length of the exposed wick by a deft blow below the spout or on the bottom, to keep the lamp burning in a draft—these were a few of the tricks which a college graduate in mining found at first a little perplexing. For quite a while after his first initiation, he was obliged to leave the manipulation in the hands of his foresight man or defer a good deal to his advice.

At some mines the paraffin-wax lamp was introduced and was a cause of no little puzzlement. It was always too hot or too cold. The novice held it too long over the blacksmith's fire and melted the solder, or, if that did not result, it got so hot he could not hold it and the grease would run out of the spout in a steady stream. Again the lamp would get too cold and the wax would harden and gum the wick, and when the flame burned low the wax would completely congeal and cease to flow, thus putting out the light.

Then came the acetylene lamp. It had difficulties all its own but none more trying than those with the old oil torch. How difficult they were at first! How long the first carbide users struggled with the feed regulation and the cleaning of the burner! There were difficulties innumerable, not so much because the operation was hard, but because the technique was new.

The electric lamp is the simplest of all for the user though there is something to learn about protecting it from breakage and injury. Nor is the work in the lamphouse of any great complexity. The old safety lamp required probably just as much or more skill from the lampman and his assistants.

And again, driving a mule was always more of an accomplishment than running a mine locomotive, but a certain amount of the ability was attained so early by boys who played around the mines or trapped at the doors, or by farmer boys who learned the art of judiciously handling such animals in their fathers' barns, that it never appeared that there was much of art in its exercise, and the knowledge seemed so innate as to be really hereditary.

Taking care of mules in a stable, feeding them rightly, tending their wounds intelligently and dosing them prudently was a more difficult task than the charging of storage batteries. But information was available everywhere. It was not always correct information, but there was a lot of it. You could get it at any crossroads grocery, and farmers discoursed at length on the subject with the passers-by, giving dates and other details of painful experiences of their own.

But about the storage battery, while much needs to be known, it is all simple enough to learn. What makes it perplexing is that it is new. It has to be acquired all at once and not in the space of years, and the information must come from only one or two; and instruction cannot, like mule lore or mine-pick learning, be obtained from all the wiseacres of the neighborhood. With something that is new, one holds oneself absolved if a mistake is made. But with old, well-tried instruments one cannot dismiss obligation nor avoid being laughed at when something goes wrong. That is why when a tool is well established every one is willing to do his utmost to use it with maximum efficiency.

No, mining is hardly more difficult now than before, but because the art is new and changing and because we need more technical excellence than ever before, we need good schools for all classes of mine employees.

Foreign trade is still looked upon as a means of dumping excess product on the foreigner—a spot trade to start as soon as the domestic trade lags and cease as soon as domestic trade recovers—but business of that kind is successful only in peculiar emergencies. To do a large business and do it profitably it must be of a permanent character and pursued unremittingly regardless of trade conditions.

Face the Worst First

EVERY man should be placed, as far as possible, so that he will do that work for which he has aptitude and liking. But unfortunately it is not possible, nor is it always efficient even where possible, to have such a division of labor, mental or physical, that a man will always be doing that for which he has a natural penchant or an inborn ability.

But every man can, when new needs arise, develop new qualities to meet them; and sometimes it is only a lack of opportunity that has prevented a real aptitude from making its appearance. Some men, for instance, shrink from interviews, pleasant or unpleasant; some will even swoon when making a speech; but after a little experience, either of these demands on their fortitude will rouse in them their sporting blood, and they will find a joy in meeting criticism with a deft diplomacy and in changing by a brilliant speech the points of view of a large audience.

When a man is confronted with a necessity making an undue drain on his courage, perseverance and comfort he should put this unpleasant duty first. "Face the worst first" is a good maxim. Many a business has been spoiled because the executive feared to tackle his bitterest task. Many a bright man has failed because he left unpleasant matters till after he had exhausted all the labors that seemed to him pleasant. Many an industrious man who worked far into the night on some congenial task, congenial perhaps only to him, thought it strange that his work was not recog-

nized. But he could never succeed because he left the most important work day by day to do work that suited his peculiar temperament or tried perhaps to do his work in a way he had followed before and one that pleased him, rather than in the best and least laborious way.

Many are the idiosyncracies of humanity. Some men who can no longer learn must have those idiosyncracies protected; others who can learn should be spurred and led by the bridle till they can overcome their unnatural fears. But the man who shies at the worst tasks will never be a good executive. In the unpleasant occasions of life often lie our easiest and greatest of opportunities when once we try them.

Most of us have so much to do and such little time to do it in that we can coax ourselves into the belief that we are doing our whole duty when we let the multiplicity of pleasant jobs fill up our time to the exclusion of the less pleasant. However, let us not deceive ourselves; we are never so busy that we can delay action on large matters to spend our time on more trivial issues.

The nation's most prized possession is not its wealth but its smile. It is the incarnation of its hope, the symbol of its optimism and the warranty of its democracy. Our smiles are the springs by which we cushion the blows and jars to which we are exposed. Only with humor and a smile can we measure up the workaday world with sanity and meet its trials with composure.

Cost of Mine Supplies

THE increasing difficulties that the hard-coal mines are facing are seen in the higher costs for supplies and materials necessary in the mining operations in that field. For instance, in 1909 the anthracite companies expended over 23 million dollars for supplies as compared with 40 million dollars spent in the bituminous field, where four or five times as much coal was produced. The percentage of gross expenditures for supplies by the hard coalers amounted to 19 as compared with 12 in the bituminous field.

Expenditures for supplies vary over a wide range, this being frequently due, no doubt, to the personal equation of the one compiling the statistics, though there are exceptions even to this. For instance, in one case where a mine official carefully estimated the cost of supplies at three different operations, it was found that these vary from 7c. to 20c. per ton of coal mined. The low cost was naturally obtained under favorable conditions where the mining was at relatively shallow depths, while the high costs represented unfavorable conditions such as deep shafts, large amounts of water to handle, pitching coal (resulting in difficult haulage) and gassy conditions.

The distribution of the cost of material and supplies, according to the leading coal-producing states as given in the United States census reports for 1909, showed variations of from 8c. to 29c. per ton. The State of Indiana showed the lowest. Kansas was second, with 9c. per ton, and Illinois and Ohio both 10c. per ton. Kentucky and West Virginia both showed a cost for supplies and material of 11c. per ton. Oklahoma pays substantially the highest price for her supplies and materials, the figure given being 29c. per ton, the nearest approach to this being the State of Iowa with 17c. per ton. While Oklahoma shows this unusual cost for materials and supplies on the basis of cost per ton, the discrepancy is materially reduced when computed on the percentage of costs to revenue. Figured on this basis, Oklahoma still stands at the head of the list with 14¾ per cent., but West Virginia is a close second with 13 per cent.

The matter of cost of materials is one that will justify the closest attention of the operator. It is extremely difficult to provide any adequate check on mining supplies, particularly those used underground, where they are liable to be misplaced and eventually lost. The resumption of more normal conditions in the coal industry with the return of the old competitive basis of operation will make it necessary to follow up the question of costs carefully once more, and the mine manager will find this a profitable field for his attention.

A man may regard as his proper wage just what he can get, or he can regard it as what he is justified in getting. If it is the first then no mercy can be shown him. He must accept reductions under durance in the same measure with which he imposes advances. If he believes there is a fair wage which he is entitled to, he should not strike to obtain more, even when the industrial conditions wholly favor a demand of that sort.

Increased Efficiency in Mechanical Equipment

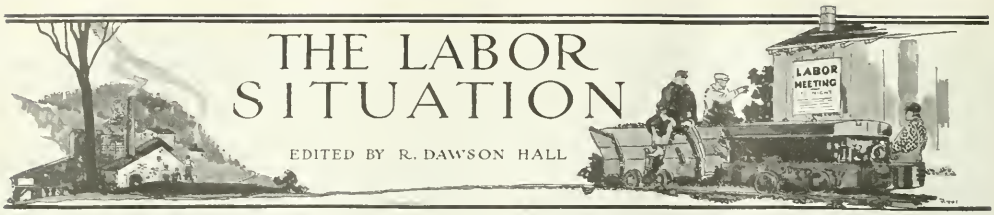
A CLOSE scrutiny of statistical data discloses some interesting features on the increased efficiency and broader application of mechanical equipment to the production of coal. Thus it is interesting to note that the Pennsylvania bituminous production, while showing an increase of nearly 28 million tons during the 1910-1916 period, had at the same time a substantial decrease in the boiler power used.

The total number of boilers in the bituminous field declined from 3200 in 1910 to 2731 in 1916, indicating the adoption of higher powered units and the more general use of the private central station, though the purchase of power may also have been something of a factor in this connection.

The decline in the total horsepower of from 454,846 in 1910 to 441,067 in 1916—in view of the substantially increased output during the same period—indicates a wholesome improvement in the efficiency of the engine and power equipment generally employed around the mines; especially is this obvious when it is remembered that the increased mining depths have caused longer hauls and more difficult ventilating and pumping problems during this time.

A still more significant figure, perhaps, is the marked increase in the tonnage produced per boiler in use. The tons produced per boiler increased from 46,180 in 1910 to 61,950 in 1916. The tonnage produced per boiler-horsepower also shows a wholesome increase from 327 tons in 1910 to 384 in 1916.

The conclusions to be drawn from these figures are obvious. The progressive operator is looking carefully into the mechanical equipment of his colliery. He is raising the standard in this direction and demanding the best and most economical apparatus that the market affords. And the extraordinary advance in wage scales of the past year or two will give new impetus to this movement.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Never was there any question as to the attitude of the Sankey Commission in Great Britain in regard to the nationalization of coal mines. It was a picked body as far as the representatives of the public were concerned. It was chosen to advocate certain measures, and it advocated them. What else could be expected of such men as Sidney Webb and Sir Leo Chiozza Money than that they would advocate nationalization of mines and of every other kind of public utility, the disposal of which might be entrusted to their judgment. The fact that the latter is knighted does not make it unnatural, with present-day conditions in England, that he should hold extremely radical points of view. Sir Leo Chiozza Money is an author and journalist. He was a Liberal and Collectivist in the House of Commons, where he sat for North Paddington and Northants. He has written much on physical and social problems. He doubtless received his honors because of the support he gave to his political party.

With such men representing the public, the Commission's radical report was to be expected, but it appears that Great Britain is by no means ready for the nationalization of mines. The press seems to be a unit in deploring the kind of report which the Royal Commission has brought in, and it is quite generally thought that the government will pay little attention to the recommendations which have been submitted to it. The commission was appointed at a time of panic, when the threat of the miners to paralyze the country caused everybody the utmost apprehension. A representative of the owners has put the case very accurately as follows:

Report an Expression of Fear, Not Opinion

"The Sankey Commission was conceived in apprehension, and the Sankey report was born in fear. If we allow fear of the miners' leaders to rule our actions now we only postpone the evil day of reckoning. The great question is, will the miners wreck the country if we insist on sound reforms and refuse panic-stricken palliatives. I firmly believe they will not. Smillie and his fellow-extremists have their following among miners, but they do not rightly represent them. Smillie's own election as leader was a hole-and-corner affair, in which the majority of the local miners took no interest. The problem is one of leadership. The miners as a class are not revolutionists, and they can be led for good as well as for evil. If Smillie does represent the miners we may as well fight him now as later, and we can rely on the more democratic trade unions as well as on the bulk of the working classes who as consumers know what the miners' policy means. If on the other hand Smillie does not represent the miners then let us not be intimidated by him into doing things we know are bad, but rather press on reforms which are sound, and rely on the good sense of the miners to support the forces of reform and order."

There is very little question that something more or less radical will be done, but it is hardly likely that it will reach anything approaching nationalization or confiscation of mines. There is a possibility that a curb may be placed on the large royalty payments now being made to owners of coal lands, because no initiative or ability is required of those who ask for large returns on inherited property and who have, by reason of its limited quantity, a chance to secure whatever recompense they desire. It is altogether different with those who are actually producing coal. The work is one which requires ability of a high order and much confining labor. It is realized that the men who produce coal are conferring a benefit on the people, whereas those who merely ask for a big royalty for coal in the ground are simply performing a disservice to the public.

The treatment of the Government bill for the regulation of British railroads has been treated almost contemptuously by the House of Commons. Pages of Sir Eric Geddes' measure for the purchase of any railway, tramway, canal or lock have been bodily removed. Parliament has showed itself strongly against the nationalization of railroads and it is likely that it will not view the nationalization of coal mines in any different way.

To Tax Labor of Children $2 Per Day

With the purpose of bringing an end to child labor in the United States, Representative Mason of Illinois has introduced a bill (H.R. 2251) under the provisions of which a tax of $2 will be levied on children under 14 years who are employed in factories, and the same amount for children under 16 years whose work is performed in mines and quarries. This tax will be a per diem tax for each child so employed.

It would appear unfortunate for the country at large that a difference should be made between the age at which children can be employed in factories and mines. Every thinking man will appreciate that children should not be allowed to go to work before they are 14 years of age. When they are that age they should be allowed to enter any place of work they may elect. The bill which Mr. Mason presents will practically tend to deplete the coal industry by causing the children when they leave school to enter factories instead of mines.

Those of us who have studied the effects of industry on humankind know that there are certain specific diseases resulting from many kinds of factory work, whereas it is gradually being recognized that there is nothing approaching a mine disease, unless it be ankylostomiasis, of which the shallow coal mines of the United States are entirely free. In fact it may be safely said that ankylostomiasis is a surface disease, and that the health of mine workers is more secure when working in the mines than it would be when toiling on the surface.

Would Rather Forbid Child Labor Altogether

At the last Congress, said Mr. Mason in his statement, a law was passed prohibiting all shipping of goods made by child labor from one state to another. The Supreme Court set aside this law by a majority of one, holding that Congress had no right to regulate interstate commerce in goods made by child labor. I offered no amendment, when a change in the constitution which would empower it to pass such an act was presented in Congress. In the meantime I propose, as a present measure, a tax of $2 a day, to be paid by the employer, when children under 14 years of age are employed in factories, or when children under 16 are engaged to work in quarries or mines. I believe the Supreme Court would sustain such a law.

"The states in the north prohibit child labor while several of the southern states are employing young children in their factories. This gives the southern states an unfair advantage from a manufacturer's standpoint. But to correct that inequality is not the main purpose of the bill. What we want to do is to protect the children of the country. I believe it is a great national crime to put the children in shops and factories, thus dwarfing their minds and bodies. It has, moreover, a tendency to debase the quality of our citizenship."

A meeting of the executive board of the three anthracite districts of the United Mine Workers was held at Wilkes-Barre on Thursday, June 26, to decide on the place where the next tridistrict convention is to be held. The convention will frame up new demands on the operators which the mine workers hope to obtain at the expiration of the present agreement, Apr. 1, 1920. They are evidently looking quite far ahead, and to exhibit how forehanded they are, Aug. 19 has been tentatively set as the date for the convention. The miners feel that they have everything in their own hands, seeing that experienced miners are extremely hard to get and the demand for coal is pressing. It is said that quite a number of miners who left for munition plants have not returned.

Mine Workers Getting Ready To Make Demands

Those who believe themselves well posted regarding the labor situation in the anthracite region are disposed to think that the 7-hr. day will be demanded with the present rate of pay, but it is certain that, whether this is so or not, recognition of the Mine Workers' Union by means of the check-off will be demanded. If the shorter day is definitely shelved then wage increases will doubtless be looked for. The miners feel that they have poor arguments to advance for a shorter day, in view of the fact that the force engaged in the anthracite region at the present time is not able to supply the demand which the public is making upon the anthracite operations.

It is stated that, at a conference held during the second week of the month at Cincinnati, an agreement was reached, between officials of the Solvay Coal Co. on the one hand and President F. C. Keeney and Secretary Fred Mooney, of District 17, United Mine Workers, on the other as to the organization of the mines of the company at Kingston and Kieferton, Fayette County, W. Va.

For some time the Mine Workers' representatives have been engaged in an effort to organize the mines in question. An agreement having been reached a formal contract governing mines, etc., will become effective shortly. Finishing touches will be put on the work of completing the organization of locals at the two mines mentioned, by duly constituted organizers.

No wage and working-conditions agreement was made at the preliminary conference held in Atlantic City during the third week of June as to the wage scale which would prevail in the New River district when the ratification of the peace treaty terminates the wage contract and the general employment contract now prevailing. The conference at Atlantic City was attended by members of the scale committee representing the operators of the New River field and by members of the scale committee representing the miners of the same field. The conference adjourned to meet at Charleston on June 26. There will be little difficulty in reaching an agreement as to wages but one or two other propositions may make the task somewhat more difficult although it is believed an agreement will eventally be reached.

Good Feeling in Fairmount Region Pronounced

The United Mine Workers of Clarksburg and vicinity began the last week in June to make elaborate preparations for their street parade, picnic and victory celebration which was scheduled for July 4. The celebration was arranged for by Pinnickinneck Local No. 1379. Invitations were sent out to every local within a radius of 50 miles of Clarksburg so that it will partake much in the nature of a state celebration. An effort was being made to secure Frank J. Hays of Indianapolis, international president. State Labor Commissioner S. B. Montgomery is also scheduled to deliver an address.

Of more than passing interest and significance was the decision of the coal operators' committee and the miners' committee of the Preston County field to have the operators and miners attend a celebration at Kingwood on July 4 and 5 in a body, inasmuch as it disclosed the cordial feeling existing between the miners and operators of that section. The operators were arranging to furnish a brass band, put 2500 men in the line of the parade and to furnish and roast the biggest bull in Preston County. Every man connected with the mining industry in Preston County was invited to be present. Gov. J. J. Cornwell will be one of the speakers.

Four weeks of strike in the coal mines near Fernie and throughout District No. 18 have resulted in no visible advance toward a surrender on the part of the operators, and the miners through their union leaders have applied to Premier Oliver for the appointment of a commission to investigate wages and working conditions within the mines, and have stated that upon this request being granted the strike shall be declared off within 24 hours.

It will be noted that the Gladstone local union at Fernie called upon the pit bosses to relinquish their work and so permit the mines to fill up with water and gas, but these officials did not believe themselves entitled to do so, in view of their responsibilities not only to the operator but also to the state. The correspondence relative to this attempt on the part of the local union at Gladstone follows herewith:

Resent Short Pay That Goes With Short Hours

Fellow workers, we wish to draw your attention to the fact that we are at this time engaged in a struggle to maintain the just rights of a certain portion of our membership. We think it is hardly necessary to point out to you the fairness of our demands, as you must readily realize that with the cost of living forced up to the limit, whereby it is impossible for the worker to support himself and family, it is absolutely essential that there be no reduction in wages at this time, but rather a general increase all around is needed to offset the ever-increasing cost of the necessities of life.

It has come to our notice that the coal company intends to use your services to replace those of some of our members who are out to secure a living wage.

Fellow workers, we appeal to you not to permit yourselves to be used for such a despicable purpose. We would ask you to fall in line with the firebosses, who to a man refused to fill any job of a man who is out on strike. We realize the position they have placed themselves in by such action, and we certainly admire their courage. The members of Gladstone local union have already pledged themselves not to resume work until all firebosses are reinstated without prejudice or discrimination on the part of the management, and are ready to take the same stand with regard to yourselves. We ask that you will think the matter over carefully. Is it worth while to earn yourselves the animosity or illfeeling of all right-thinking men, to pander to the wishes of those who, however much they pretend to have your interest at heart, would if it suited their purpose take the same stand in regard to yourselves that they are taking with the ten and eleven-hour men at the present time? (Signed) "Gladstone Local Union, per Secretary."

Pit Bosses Declare Their Moral Obligation

In reply to the foregoing the pit bosses directed a letter to the members of the miners' union, the essential part of which reads: "Most mine officials are holding their positions, not only through the company's choice, but by government qualification, and in the ordinary course of affairs are responsible to both parties for the safe and efficient management of their respective departments. At the present time, owing to the conditions created by a general suspension of work, they are simply trying to limit the unavoidable damaging of property, upon whose welfare the city of Fernie depends for its very existence.

Should we imitate the example of the firebosses formerly employed at Coal Creek mines, who, taking a different view of the obligations inherent to their position, ceased work immediately when the general strike order went into effect, we would render ourselves guilty of a grave breach of trust and an action that all right-thinking men could not fail to consider as highly reprehensible.

We might further state that at no time has the management required the officials to do any kind of work other than that strictly covered by the strike clause included in the agreement still in force.

To Our Friends From Across the Sea

EVERYONE will see at a glance that these people are Romany Gypsies. Though they have lived many hundreds of years among other people, they have never made any friends. The reason for this is that they do not dress like other people, they talk their own language when speaking to one another, and they do not care to live in tidy quarters. Some of the foreigners who come over here soon dress like us, talk English as we do and keep their homes as neat as a new pin. These people soon find that they have lots of friends in America. Other foreigners wear shawls, go around barefooted, with disorderly hair, and Americans find it hard to be friendly with them.

Be an American!

Dress well, talk English only, keep an orderly home, and everybody will welcome you

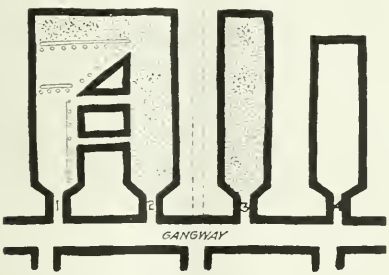
DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Robbing Pillars, Anthracite Mines

Letter No. 1—Referring to the article of Joseph R. Thomas, *Coal Age*, May 22, p. 938, kindly permit me to submit the following brief sketch of my own experience in drawing pillars on steep pitches in the anthracite mines of Pennsylvania, where I worked as miner and assistant foreman, both in directing and performing the work and caring for the safety of the men employed.

The accompanying sketch will show the method that I used and which proved very satisfactory, both in respect to the amount of coal recovered in the pillars and the safety of the men engaged in the work. Considerable of this work of drawing back pillars had to be performed under a clay or sandy top that made it necessary to protect the men with temporary batteries, formed by setting a row of posts across the chute and nailing lagging to the back of the posts. As indicated



DRAWING PILLARS ON STEEP PITCHES

in the figure, this form of battery was first extended across the chute and then across the pillar. The work of taking out the pillar was started by driving a narrow crosscut through the pillar about 15 or 20 ft. below the upper end. When the pillar had been thus cut through, the stump above the crosscut was taken out, the work being started at the upper corner. As shown in the figure, it was necessary to keep a row of posts just behind the men and these posts were set with good cap-pieces above them.

At times when the roof was bad, it was necessary to use forepoles that projected over the men to keep loose material from falling on them while at work. In this manner, the entire pillar was removed in sections, taking out one stump at a time. It would happen sometimes that the caving of a room on each side of a pillar would make it impossible to draw back that pillar, without driving a narrow heading up the center, as indicated by the dotted line in the center of the pillar between Rooms 2 and 3 in the figure, these two breasts being shown as caved. This is never done, however, unless there is no other way of taking out the pillar, as the driving of the heading up the center of the pillar means additional expense for yardage, and the other plan mentioned is much cheaper and safer.

Fern Glen, Penn. JACOB SKOFF.

Mine-Haulage Proposition

Letter No. 1—In answer to the request of J. H. Dickerson, *Coal Age*, June 5, p. 1058, asking for suggestions regarding a change that he proposes to make to shorten the haul in his mine, permit me to say that my opinion is that it would pay to make the change suggested, unless the cost of cleaning up, timbering and laying the new track proves to be heavier than what I imagine.

Mr. Dickerson gives no data regarding the present condition of the haulage road now in use. I assume, however, that this is an old haulage road that has been in use a long time, as the development of the mine must be considerable, judging from his statement that the distance from the working face to the foot of the hoisting shaft is 2½ miles by the old road.

Now, it is probably true that the expense of keeping up the old road, including repairs of track, replacing worn rails and setting new timbers to say nothing of cleaning up roof falls and making the necessary allowance for delays caused by wrecks due to broken rails, bad track, etc., is a considerable item on the monthly cost-sheet. This expense will all be avoided when the new road is ready for use.

The condition of the entries that are to form the new road must be bad indeed if the expense of cleaning up these entries, timbering and laying the track is so great as not to warrant the investment. It is estimated that this proposed change would shorten the haul by a distance of 875 ft., which would certainly prove an important item in the relative cost of operation and would greatly improve the efficiency of the service, increasing the output of the mine and bringing larger returns on the capital invested.

Comparing the two methods, the present system of haulage represents a higher cost of maintenance, a smaller daily output of coal, and involves the possibility of delays caused by wrecks and necessary track repairs, all of which means reduced efficiency in the mine and a higher cost of production. On the other hand, the adoption of the proposed change would mean a considerable expenditure at the start, in order to clean up the entry and timber and lay the track. It is true that this expense would all come at one time, but the result would be an increased output of coal each day, greater efficiency in the mine and a large reduction in cost for repairs and maintenance. As a result, the cost of production would be greatly decreased.

One should consider, also, that in the old system now in use, the high cost of maintenance comes at a time when it is least desired, when the mine is on the

retreat or decline and there is an ever-decreasing income to be realized on the output. Let me repeat, then, that in my opinion the proposed change will amply repay the outlay required, judging from the information available.

SAMUEL MCKAY.

Burgettstown, Penn.

Letter No. 2—Referring to the proposition of shortening the haul in a mine, as suggested by J. H. Dickerson, *Coal Age*, June 5, p. 1058, let me say that I would not hesitate to finish the work already started and make the proposed change, as this would give a straight haulage road and shorten the distance to the foot of the shaft 875 feet.

Assuming that the number of trips made by the motor would be increased in proportion to the shortening of the road or the distance to be hauled, I estimate that the motor would make 25.7 trips a day, instead of 24 trips as formerly. It is stated that the distance from the working face to the foot of the shaft is $2\frac{1}{2}$ miles, which makes the present length of haul $2\frac{1}{2} \times 5280 = 13{,}200$ ft. By the new road, the length of haul would, therefore, be $13{,}200 - 875 = 12{,}325$ ft. Then, calling the number of possible trips, after making the change, x, we have $12{,}325 : 13{,}200 :: 24 : x = 25.7$ trips.

Hauling 50 tons in each trip, this would mean an increase in the daily output of the mine, for the same capacity of the motor, $50(25.7 - 24) = 85$ tons. It is probable, however, that the hauling capacity of the locomotive will be increased by this change, owing to the haul being over a straight road having no crooks or turns and there being less danger of delay from derailed cars and other causes. The grades of both roads can be considered as practically level, but the new road will have a great advantage over the old road for a long time to come, both with respect to economy and safety.

There is another item of saving worthy of mention, since it will be available eventually. I refer to the saving in rail and trolley wire, which would also be in proportion to the shortening of the haul. Using 25-lb. iron, estimated at a value of, say $80 per ton, and trolley wire valued at 30c. per foot, the total saving effected by the change would be

For rails,	$\frac{2 \times 875}{3} \times \frac{25 \times 80}{2000}$	= $583.33
For wire,	875×0.30	= $262.50
	Total	$845.83

This is a saving well worth considering.

West Pittston, Penn. RICHARD BOWEN.

Coefficient of Rolling Friction

Letter No. 1—Little as most mine officials may realize it, our old friend the coëfficient of rolling friction is one of the most dominating factors in the production of coal. This is not appreciated as it should be, it being one of the unseen forces, and the average mining man has enough visible worries to keep him fully occupied without hunting others that do not appear.

The wrecking of a trip in the mine, the burning out of an armature, a squeeze or a roof fall receives prompt attention by mine officials; but labor unrest, loss of supplies and, among many other things, the wasting of power due to the abnormal journal friction of plain-bearing cars, which gives a high coëfficient of rolling friction, are the invisible factors so generally ignored and yet so productive of high cost of production.

In the issue of *Coal Age*, May 29, p. 999, E. Steck, Hillsboro, Ill., developed certain facts concerning the haulage capacity of locomotives that had a rolling friction of 30 lb. per ton when hauling plain-bearing cars (presumably) having the same rolling friction.

Rolling friction includes the track resistance as well as the journal and other frictional resistances due to the rubbing of wheel hubs on the points of axles, journal boxes or holding devices. But since the track resistance is only a fractional part of the total resistance encountered, it can very properly be ignored. In other words it is so small that it cannot be justly considered as a separate item.

The 10-ton-motor, discussed in the article, developed 103 hp., at 7 miles per hour, it being equipped with steel-tired wheels, which meant that its tractive effort would be one-fourth of its weight or 5000 lb. while its effective drawbar pull, for level track and grades varying from 1 per cent. to 5 per cent., was found to be as follows:

Level track.....4700 lb.	3 per cent. grade....4100 lb.
1 per cent. grade....4500 lb.	4 per cent. grade....3900 lb.
2 per cent. grade....4300 lb.	5 per cent. grade....3700 lb.

The effective drawbar pull is the tractive effort minus the track and frictional resistances of the locomotive to which must be added 20 lb. for every 1 per cent. of grade multiplied by the weight of the locomotive in tons, which in this instance is 10 tons. The number of tons this locomotive would haul on the different grades was found to be as follows: Level, 157 tons; 1 per cent. grade, 90 tons; 2 per cent. grade, 61 tons; 3 per cent. grade, 46 tons; 4 per cent. grade, 35 tons; 5 per cent. grade, 28 tons. The frictional resistance of the mine wagons or pit cars, as stated previously, was considered as being the same as the frictional resistance of the locomotive (30 lb. per ton) and it was assumed that the cars weighed when fully loaded 5.25 tons, the tare being 1.25 tons. The locomotive was shown to be able to haul the following number of cars and tons of coal:

Grades	No. of Cars	Tons Coal per Trip
Level	30	120
1 per cent.	17	68
2 per cent.	12	48
3 per cent.	9	36
4 per cent.	7	28
5 per cent.	5	20

The number of cars hauled was found by dividing the haulage capacity of the locomotive by the gross weight of a car (5.25 tons); and the number of tons of coal hauled was found by multiplying the number of cars by four tons, that being the capacity of each car.

The frictional resistance of 30 lb. per ton, or a coefficient of rolling friction of 1.5 per cent. is all right for computations based on plain-bearing wagons, though it is at times slightly lower but more often somewhat higher. However, as showing that it is not fair to consider all mine cars or wagons as having this high frictional resistance, there are a number of completely authenticated tests that have shown that the frictional resistance of flexible, roller-bearing wagons averages 12.9 lb. per ton, which gives a coëfficient of rolling friction of 0.645 per cent., as has appeared in former issues of *Coal Age* and other journals.

To speak of mine cars, in general, as having a frictional resistance of 30 lb. per ton, tends to discredit those mining officials who are discarding their old fash-

ioned plain-bearing equipment simply because they discovered that they were wasting many dollars through excess of power, lubricant and labor required to run the old type of cars.

Using the same haulage capacities or capacity for the different grades as developed by Mr. Steck we can find the number of cars and the tonnage of coal hauled per trip by the same 10-ton locomotive, by substituting the frictional resistance of the roller-bearing cars (flexible rollers, 12.9 lb.) for the frictional resistance of the plain-bearing cars (30 lb. per ton).

The results are as follows:

Grades	No. of Cars	Tons Coal per Trip
Level	69	276
1 per cent.	26	104
2 per cent.	15	60
3 per cent.	11	44
4 per cent.	8	32
5 per cent.	6	24

The increased tonnage amounts to the following: Level track, 130 per cent.; on a 1 per cent. grade, 67 per cent.; 2 per cent. grade, 25 per cent.; 3 per cent. grade, 22 per cent.; 4 per cent. grade, 14 per cent. and on a 5 per cent. grade about a 20 per cent. increase. This discrepancy for the 5 per cent. grade is due to the fractional parts of a car, which might have been added but it was deducted.

It is seen therefore that the difference in the coefficient of rolling friction of the flexible, roller-bearing wagons (0.645 per cent.) and that of the plain bearing cars (1.5 per cent.) has quite an appreciable effect on the actual tonnage that can be hauled by a locomotive of a given size. It is not reasonable to consider the figures for grades over 3 per cent., for it is seldom that the grade in a main haulageway will ever be greater than that, except for very short distances, and even that is a good indication that some grading can profitably be done.

It is hardly possible than 69-car trips could be handled in the average mine operation, so that we must then consider that instead of a 10-ton locomotive being required, that an 8-ton or even a 6-ton locomotive would haul 30 cars on a level track, provided they were equipped with flexible, roller-bearings; whereas, as demonstrated, a 10-ton locomotive would be required to haul 30 cars of the same size when equipped with plain, friction-bore wheels.

Grades in Haulage Must Favor Loads

There is no real good excuse, except in isolated cases, for a pronounced grade against the loads; and the grade against the loads should never exist except for very short distances, if maximum production is desired. The ideal track layout is where the grades are equalized; that is, where the locomotive has to exert as much energy in hauling the empties back into the mine as it does when hauling the loaded cars out.

It must not be assumed, however, that there will be no power saving on even a very pronounced grade, for there will always be the saving that is brought about by reduced journal friction, which as pointed out is a factor well worthy of consideration at all times. The pull exerted by gravity is the factor that limits the haulage capacity of locomotives on grades, and since it exerts a pull of 20 lb. per ton on plain-bearing and roller-bearing wagons alike, the decreased savings on long and pronounced grades is easily explained.

It is even of more importance to have easy running cars, or cars requiring a low drawbar pull per ton, when the grades are against the empties for the reason that the drawbar pull of plain-bearing cars increases 40 per cent. when running empty, while the drawbar pull of flexible, roller-bearing cars under the same conditions only increases 15 per cent. That means that the coefficient of rolling friction of plain-bearing cars will increase from 1.5 per cent. to 2.1 per cent.; while for flexible roller-bearing cars it will increase only from 0.645 per cent. to 0.721 per cent.

These figures take on added significance when we consider that to produce a 6-hp. value at the locomotive drawbar the input into the locomotive will be in many instances about 9 hp. and the line losses will bring this up to about 12 hp.; or if the power is purchased it will be increased to about 15 hp. Therefore, any reduction in the drawbar pull required at the locomotive represents an actual dollars-and-cents savings. Flexible roller-bearing wheels or journal boxes under mine wagons produce those savings and in addition bring about many other economies that can only be appreciated by the man who owns and operates the cars.

Philadelphia, Penn. EXPERIENCE.

Certification and Safety

Letter No. 8—Believing as I do that every man interested in the coal industry and working for its betterment should voice his opinion in regard to the employment of uncertified men, as permitted by the revised mining law of Pennsylvania, I am led to offer a few comments on this subject.

In my opinion, when the legislature of Pennsylvania passed the act revising the former mining law, which required all mine foremen, assistant foremen and firebosses to hold certificates of competency granted them by state examining boards, the law makers took a step backward. In support of this opinion, let me ask, what was the object sought to be attained by the old law, in requiring the certification of these officials? The answer is, it was to secure more efficient management in the mine and promote the health and safety of all persons employed underground. Today, the efficient management of mines is just as important as ever, and it is just as necessary to promote the safety of mine workers as it was in those days when certification was made a law in Pennsylvania.

In respect to responsibilty, I suppose that an uncertified mine foreman would be held responsible for whatever might happen in the mine of which he had charge. But a man cannot be held responsible for things that he does not know; and how many uncertified foremen know all the requirements of the mine law regarding the safe operation of mines? Further, if the mine foreman does not know what the law requires, how can he know that the operations in his charge comply with the law in respect to safety?

Again, there are some mine foremen who are not citizens of this country and cannot, therefore, obtain a certificate. Others have not worked in the mines of the state the necessary five years required by law. The employment of these men is an injustice to American citizens who have fitted themselves for the position of mine foreman and, by hard study, have succeeded in passing the examination and securing the certificate granted by the State Board of Examiners.

Aside from these reasons, however, it is my belief

that no uncertified official can or does command the same respect as the man who holds a certificate certifying that he is competent to perform the duties of mine foreman. Where there is no respect for the foreman in charge, there can be no discipline in the mine; and where there is little or no discipline, there is greater liability to accidents that can only be avoided by the strict enforcement of the mine law and the mining rules and regulations.

Speaking from my own personal observation, allow me to say that that piece of paper, which our lawmakers have now thrown into the scrap pile by reason of this amendment, has had a wonderful effect on all the men employed in our mines. For the benefit of the operator, and for the sake of the men employed underground, the amendment should be repealed and the certification of mine officials restored.

The Value of Certified Mine Foremen in the Economical Operation of Mines

Few men will deny that the certified man is worth far more to the operator, in the long run, than the uncertified man. The certificate shows that the former has studied mining and has a knowledge that the other does not possess. Before the passage of the amendment, Pennsylvania was in the lead in respect to state mining laws; but the act permitting the employment of uncertified men in the mines has placed us far in the rear of any of the other coal-producing states.

While the uncertified man may make good for a time, sooner or later the occasion is sure to arise that will show his incompentency and reveal the need of certified men in that position. The study required to gain a certificate has made the certified foreman familiar with the requirements of the law and acquainted him with a knowledge of the principles of mining that makes him master of the situation at all times.

In closing, let me urge that all men interested in safe mining should insist that none but certified men be employed in a responsible position in the operation of a mine. The employment of uncertified foremen may some day prove a very costly experiment, owing to the ignorance of the foreman in charge and for which the state is mostly responsible.

Experimenting with uncertified foremen is unnecessary, today, as there are scores of certified men who hold no position and whose study and labor in preparation for foremanship was rendered of no value by this enactment. Let me say that certification is the only safe rule in mining operations and should once more be made law in Pennsylvania and placed on the state docket.

GRIFFITH GRIFFITH.

Blackfield, Penn.

Letter No. 9—I read with deep interest the letter of James Touhey, *Coal Age*, Feb. 20, p. 374, regarding the necessary certification of mine officials, in order to secure a maximum of safety in mining operations. Mr. Touhey has dealt with the subject in such a manner that there is little to be added in support of the question of the need of all mine officials being certified.

In the second letter that appeared on this subject, however, James M. Roddie, Apr. 17, p. 723, raises two points to which, I believe, exception will be taken by many readers. He suggests that the candidate for a certificate entitling him to act as mine foreman should have "at least nine years of practice in the general routine of underground work." Again, speaking of state mine inspectors, he says that they are "the intelligent heads, geenrally of the state boards of examiners." The statement, to say the least, would seem to reflect seriously on tne other members of the board.

Five Years Practical Experience Sufficient

Now, in regard to the experience required of a candidate for a certificate of competency, it is my opinion that a longer term than five years' practical experience in and around the mine is not always essential and would not guarantee the competency of a man to act as mine foreman. My belief is that it is possible for a person having five years' practical training to become proficient in the various operations of mining and be able to discharge his duties as foreman.

It must be admitted, as Mr. Roddie agrees, that a certificate of competency is merely "an index," and not a guarantee that its holder is competent. Such a guarantee must be based on the successful performance of a foreman's duties in a mine of which he has had charge; but that would be a poor excuse to offer in favor of employing uncertified mine foremen.

Again, Mr. Roddie's characterization of state mine inspectors as "the intelligent heads of examining boards" seems unfair. Allowing that the certificates they grant are merely indices of a candidate's qualifications does not, as Mr. Roddie claims, make the board of examiners who grant such certificates "mere indices themselves."

The granting of a certificate to a candidate is simply evidence that he has satisfied the requirements of the examining board. Here the authority of the state mine inspector, as a member of the examining board ends. The appointment of a certified man to act as mine foreman is not under his control or that of the state, but is left to the direction of the mine operator or the management of the mine. It would be absurd to suppose that an examining board could guarantee the competency of a man appointed to a position by another party.

Discussion by Institute Reaches no Conclusion

Before closing, I want to endorse what Mr. Touhey has said in regard to the failure of an intelligent body of men, such as the Coal Mining Institute of America comprises, in discussing the need of the certification of mine officials, to reach any understanding. To my mind, such a result is inexcusable and suggests that other matters were before them that were of more consequence than the question of safety in coal mining.

My opinion is that the employment of uncertified men as foremen in mines is a backward step and invites the miserable conditions that existed before the government of Great Britain found it necessary to appoint commissions to ascertain the causes of mine accidents and means for their remedy.

The past history of coal mining is a record of great loss of life and property as the result of unrestrained and careless practices. The oft recurring disasters in mines created the necessity of enacting laws requiring that mine officials possess more theoretical and practical knowledge, and we now recognize that these laws have made mining safer and more efficient than was possible by the former haphazard methods employed.

Today, the universal cry for more education and greater efficiency in every branch of the industry is

fully justified and particularly so in coal mining. This cry should silence all arguments in support of the policy of employing uncertified men in positions of responsibility underground. WILLIAM WESNEDGE.

Ladysmith, B. C., Canada.

Bolshevism in America

Letter No. 1—The opening statement made in the Foreword in *Coal Age*, May 15, predicting the failure of Bolshevism, for the reason that "what a man gets by force will eventually be taken away from him by someone else who is stronger," has a particular application to America today. This is, as indicated by the title of the foreword, the "Day of New Ideals." The new is replacing the old in every event of life, and every day sees the American citizen growing stronger. Under these conditions, Bolshevism has no chance.

The spread of this evil in our country has been often referred to as a menace to be feared. But, in seeking a remedy, we must place ourselves squarely behind our ideals of justice and equity. We must see that no person has any cause for legitimate grievance, under our flag. It is true that Bolshevism is a menace to the safety and peace of the country if the American people do not awaken to its danger and give adequate support to our executives and judges in their rigid enforcement of the laws against organized anarchy.

What is needed, today, more than anything else, is the enactment of laws that will deal promptly and adequately with that freedom of speech that advocates anarchy and violence, criticises the government, attacks the constitution or in other ways reveals a spirit that is un-American.

Under the constitution, the government of our fathers has made us the freest, happiest, most successful and most powerful nation on the earth. To maintain these characteristics, we must array ourselves on the side of justice and against all disturbing propaganda. When our people give their loyal support to the legislators and the courts, in their enactment and enforcement of our laws, there is afforded no opportunity for anarchy to raise its head and disturb the peace of the country.

On the other hand, if the people manifest a spirit of indifference and assume the attitude of "Let George do it," they open the door for Bolshevism to enter and let down the bars for the spread of anarchy. In closing, let me say that, If what American people have and hold as a gift of their fathers is worth preserving, we must fight for it whenever and wherever is is endangered.

Clinton, Ind. JUSTICE.

Firebosses as State Officials

Letter No. 7—Kindly permit me to correct the statement of W. Wesnedge, which he made in his letter, *Coal Age*, May 15, p. 919. In referring to my previous letter, Mar. 20, p. 544, he seems to regard me as favoring the employment of firebosses by the state.

In that letter, however, I said plainly "I am not in favor of firebosses being employed by the state; nor do I think that they should be considered in any other capacity than that of a mine examiner, whose duty is not only to examine the mines for gas but to discover any other danger such as may arise on the roads, travelingways or working places of the mine."

I did remark that "these men should be in the mine during the entire day," but it was my meaning that they should perform a full eight-hour shift. In my opinion, the work that falls to a mine examiner, if properly performed, will keep him busy eight hours every day. My plan has always been to have the mine examiners enter the mine eight hours before the time for the men to start to work in the morning. This gives them ample time to examine the mine and remove all dangers from standing gas, requiring the extension of brattice for its removal, taking down of any loose top and setting any necessary timbers for the support of the roof in the working places, besides performing other tasks required to make the mine safe for work and maintain a healthy condition.

FIREBOSSES, MINE EXAMINERS, SAFETY INSPECTORS

On coming out of the mine in the morning, my idea is that they should not be called on to enter the mine again that day. Instead, there should be a second force of mine examiners that enter the mine at 7.30 a. m., or when the men proceed to work. These examiners should remain in the mine a full shift and look after the safety of the men at work in their places. If the term "mine examiner" does not properly apply to this second force of examiners, I would suggest calling the first set of men who perform the work of the so-called fireboss, the "mine examiners," and the second set of men who remain in the mine during the day and look after the safety of the men at work, "safety inspectors."

My reason for outlining this plan, by which the mine examiners remove all accumulations of gas as they find them, is that the brattice they erect for this purpose will still be in place and a good current of air will be sweeping the face when the men enter their places for work in the morning.

DANGER OF REMOVING GAS DURING THE DAY, WHEN THE MEN ARE AT WORK

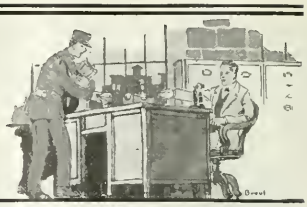
In the present plan of firebossing, a place containing any dangerous supply of gas is reported as being "unsafe" and a danger sign is fixed at the entrance of the place to warn men of the danger. Then, when the fireboss has had his breakfast he returns to the mine and proceeds to remove the gas from those places where it was found. But, this must be done when a hundred or more men are at work in the mine. Moreover, there is always a chance that some heedless miner may enter the place with an open light, not seeing or else ignoring the danger sign, and in doing so he endangers the life of every man in the mine.

When foreman of a very gaseous mine it was always my plan for the firebosses to enter the mine at 11 p. m., an hour before midnight. Between that time and the beginnning of the morning shift, they were able to remove all accumulations of gas from the working places by extending brattices in such places where gas was found. When the men went to work in the morning every place was clear of gas and the mine safe from explosion. I have always advocated this policy as being the only sure method of performing the work of firebossing. When gas is allowed to remain standing in a working place, with the intention of removing it later, there is surely the liability of a possible explosion occurring, which chance is avoided by the prompt removal of the gas when found.

Farr, Colo. ROBERT A. MARSHALL.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Modulus of Elasticity

Kindly explain the meaning of the expression "modulus of elasticity," and describe in what way it is used in practice. I find the term used frequently in textbooks treating the strength of materials but have not understood its application. ELECTRICIAN.

Chicago, Ill.

The root meaning of the word *modulus* is a measure and the "modulus of elasticity" of any material is a term or quantity that is the measure of its elasticity. For example, a force applied to a steel wire in the direction of its length will cause an elongation in proportion to the force exerted, per square inch of section of the wire and within the limits of elasticity of the metal. Some materials are very elastic and others less so, the elastic limit being greater in the former than in the latter case.

If the force applied is such that the elastic limit of the material is exceeded there results a permanent deformation; in other words, the material does not return to its original form or state when the force ceases to act. Beyond the limit of elasticity of any material, rupture is liable to take place. The force producing rupture, expressed in pounds per square inch, measures the ultimate strength of the material.

It has been found that the average quality of steel is elongated 1/29,000,000 of its length for each unit of force (lb. per sq.in.) exerted on the cross-section of the material, within the elastic limits of the steel. Thus, if it were possible to assume that the elasticity of the steel was not exceeded, a force of 29,000,000 lb. per sq.in. of section would stretch a steel wire an amount equal to its length. In other words, the length of the wire would be doubled. But, since the elongation within elastic limits is proportional to the force applied per square inch of section, the ratio of that unit force (lb. per sq.in.) to 29,000,000 expresses the fraction of elongation.

For example, a 000-wire has a sectional area of 0.1318 sq.in. (167,805 circ.mils). A force of 1000 lb. applied to this wire will produce a tension of $1000 \div 0.1318 = 7589$ lb. per sq.in. The elongation in 100 ft. of this wire would then be $(7589 \times 100 \times 12) \div 29{,}000{,}000 = 0.314$ in.

It may be of interest, in this connection, to estimate the tension or pull (lb. per sq.in. of section) that would cause an elongation equal to the expansion due to a rise, in temperature, of 1 deg. of the Fahrenheit scale, in any given length l of steel wire.

For example, taking the coefficient of expansion of the steel as 0.00000625, the expansion, per degree (Fahr.), is 0.00000625 l. Also the elongation of the same length of wire due to unit pull p, or tension, (lb. per sq.in.) is $1/29{,}000{,}000\ lp$. Therefore, equating these two values and finding the stress or tension required to produce the same change in the length of wire as a rise, in temperature, of 1 deg. F., we have

$$1/29{,}000{,}000\ lp = 0.00000625\ l$$

$$p = 29{,}000{,}000 \times 0.00000625 = 181+ \text{ lb. per sq.in.}$$

Practically, therefore, a tension of 181 lb. per sq.in. in a steel wire produces an elongation equal to the expansion caused by a rise in temperature of 1 deg. F.

Cost of Electric Lighting

We are about to install a system of electric lighting, on the main haulage road, in one of our mines. The distance from the shaft bottom to the inside parting is 2000 ft. We propose to use 25-watt, tungsten lamps distributed along the haulage road at distances of 100 ft. apart, which will require, say 40 of these lamps. They are to be operated on a 110-volt circuit, and we are anxious to know what size of copper wire should be used in this installation; also, the cost of lighting if electricity is purchased at the rate of 13½c. per kw.-hr. and the system is operated ten hours a day.

———, Tenn. SUPERINTENDENT.

The first step in the solution of this problem is to decide on the permissible line drop, which we will assume to be 5 per cent. of the voltage at the generator, leaving 95 per cent. of that voltage to be consumed by the lamps. The second step is to ascertain the current required to light these lamps, which is found by dividing the total wattage by the effective voltage, or the voltage absorbed by the lamps. Forty 25-watt, tungsten lamps consuming 95 per cent. of the 110-volt pressure will require a current of $(40 \times 25) \div (0.95 \times 110) = 9.57$, say 10 amp.

Now, allowing for a 5 per cent. line drop the size of wire required to transmit a current of 10 amp., under a pressure of 110 volts at the generator, is found by multiplying the resistance of the wire per mil-ft. (10.8 ohms), by the length of the wire, in ft. ($2 \times 2000 = 4000$ ft.), and that product by the current required for the lamps (10 amp.), and dividing this result by the effective voltage, or the voltage absorbed by the wire conductor ($0.05 \times 110 = 5.5$ volts). The result thus obtained will be the circular mils required in the wire, or the square of its diameter, in mils.

Applying this rule, we find the required circular mils in the wire section, in this case, is $(10.8 \times 4000 \times 10) \div 5.5$ equals 78,545 cir.mils. The diameter of wire required is, therefore, $d = \sqrt{78{,}545} = 280$ mils, or 0.28 inch.

The cost of operating this lighting system, consisting of forty 25-watt lamps, at the given rate (13½c. per kw.-hr.), will be $40 \times 0.025 \times 0.135 = 13½$c. per hour, or $1.35 per day of ten hours. The forty 25-watt lamps consume $40 \times 25 = 1000$ watts, or 1 kw. of energy.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Bituminous (Penn.) Firebosses' Examination, April 11, 1919

(Selected Questions)

Ques.—What should a fireboss know about mine gases and why?

Ans.—A fireboss should be thoroughly familiar with the character and behavior of the common mine gases and those forming the atmosphere; namely, methane or marsh gas, often called carbureted hydrogen (CH_4), carbon monoxide or whitedamp (CO), carbon dioxide (CO_2), hydrogen sulphide or sulphureted hydrogen (H_2S); and the heavy hydrocarbon gases, olefiant gas or ethene (C_2H_4) and ethane (C_2H_6). The principal gases of the atmosphere are nitrogen (N_2) and oxygen (O_2).

The fireboss should know the specific gravity of each gas referred to air as unity and its density referred to hydrogen, besides the molecular weight, which is twice the density. It is important that he should understand the laws of diffusion, the occlusion of gases in the coal, and their emission or escape through the pores of the coal, besides the escape of gas by feeders when the gas issues from pockets or crevices in the strata.

The fireboss should understand the effect of mine gases on flame and on human life, and be familiar with their character as inflammable, explosive, or poisonous. He should understand the principles and facts of combustion and know what gases are extinctive and which support combustion. He should understand the effect on mixtures of gases forming the firedamp, blackdamp and afterdamp in mines.

Finally, the fireboss must understand how to remove gases from the mine, in the quickest and safest manner, and know what is necessary to do to perform the work. He should be able to detect the presence of the different gases, in mine workings, with the aid of the safety lamp, in order to perform the duties of an efficient and competent fireboss and insure the safety and health of the men in his charge.

Ques.—State, in detail, where, when and by whom danger signals should be used.

Ans.—When a fireboss enters the mine in the morning, he must place a danger signal at the top of the shaft, or the mouth of the mine, as a warning that men must not enter until the signal is removed. He must place a danger signal at each entrance to a place where gas is found to prevent men entering such places unwarned. The fireboss must be careful to see that all abandoned places where gas may collocct are fenced off with proper danger signals.

In case a miner's shot misfires, or he discovers some danger in his place, it is his duty to withdraw and place a danger signal at the entrance to the place, after which he should report the danger to the foreman. It is the duty of the foreman, or the superintendent of the mine, to see that proper danger signals are placed at the entrance when the mine is idle for a time, or when the circulation of air in the mine is impeded or shut off by damage to the fan or obstruction in the air-courses.

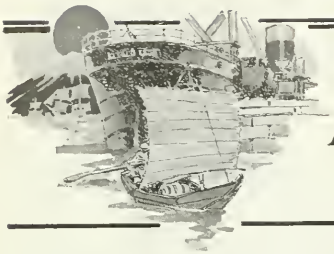
Ques.—Under what conditions should locked safety lamps be used in bituminous mines?

Ans.—This is a question that the mine inspector of the district in which the mine is located must decide in accordance with the conditions known to prevail in the mine. In general, it must be stated that locked safety lamps should only be used in mines generating gas in such quantities that the air in the workings is liable to reach a dangerous condition owing to the presence of gas or dust, or both of these combined. With proper equipment and careful supervision and inspection, it is generally preferred to depend on an adequate and efficient ventilation of the mine workings, rather than to insist on the use of locked safety lamps, which are always a hindrance to the work of the miners and serve to suggest the presence of possible danger in the mine. The use of locked safety lamps also invites tampering by curious individuals and fooling with the lamps by irresponsible boys and men. The use of locked safety lamps may also have a tendency to decrease to some extent the efficiency of the inspection of the mine. The use of locked safety lamps in pillar workings is important where gas is known to exist in the strata above or underneath the coal.

Ques.—Give in detail the duties of a miner, and state what qualifications he should possess before being given charge of a working place.

Ans.—It is the duty of a miner entering his place for work in the morning, or after a short absence, to examine carefully the condition of the roof and coal to ascertain if any danger exists. In case one or more props have been disloged by the firing of a shot in the place, it is his duty to reset the posts at once. These duties must be performed before the miner proceeds to load any coal or do other work in the place. He must also examine to see that the fireboss has left his mark on the face of the coal and not finding this, he should withdraw and report the fact to the foreman or one of his assistants. When mining the coal, the miner must set the necessary sprags and posts to protect himself from a possible fall of coal or roof. From time to time, he must examine the roof above him to see that it is safe. He must always watch for any slips that may occur in the roof.

Before being put in charge of a place, a miner must show that he has the necessary qualifications that fit him to protect himself and keep his place safe. He must be able to set timber properly and know how to mine his coal to the best advantage and with safety. When working with a locked safety lamp, the miner must understand its use and be able to detect the presence of any gas.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Chaos in British Coal Trade

Lowered Production and Attitude of Mine Workers Rushing England Toward Another Coal Famine—America's Entrance Into European Markets Feared

The *Journal of Commerce* (London) recently stated that chaotic conditions rule the coal trade of the United Kingdom. "We cannot adequately supply the demands of our Allies," reads the article. "Italy is on her knees for larger supplies, and we cannot give them to her. There is apparently no hope of our being able to do so during the next few months. We are fast hurrying to a coal famine again, and we have had departmental warnings that coal supplies for home consumption are likely to be scarce. Government interference with an hitherto highly prosperous trade has had the effect of bringing the industry to the verge of bankruptcy. The Government has tarried too long to the siren voices of those hyper-socialists who are bent upon 'the total elimination of colliery profits.'

"The present state of affairs is primarily due to the reduced outputs, and the reduction of outputs is unquestionably due to the increased wage rates of colliery workmen, for it has always been a striking fact that when the wage rates of colliers are high the output per man has decreased to an extent almost proportionate to the rise in wage rates. Sir Auckland Geddes announced in the House of Commons recently that the output of coal per person employed continues to show a decrease. In 1915 the output of coal per person employed in this country was 265 tons—a time when the most able of colliers were in the army. Patriotism was at its strongest, with the result that the output per man constituted a record. Since then the output per man has declined sharply to 257 tons in 1916, 243 tons in 1917, and to 226 tons in 1918. The output per man for the first quarter of this year has actually receded to 203 tons.

"On the basis of the first quarter's returns the output this year will be 63,000,000 tons below that of 1913! Under the Sankey recommendations in July next the hours of work in mines will be reduced to seven per day, which means that the decline in the production in the aggregate and per capita will be still further accelerated. A reduction of output entails a proportionate increase in the cost of each ton of coal. Where are we drifting?

Supply of Coal to Italy

"The Controller has advised the Italian trade generally that he has arranged in the various coal-exporting districts that from June and onward not more than 140,000 tons per month will be allocated for shipment to Italy through the Italian State Railways. The remainder of the monthly quantity of coal allocated for Italy will be done through private coal exporters and will be treated as private business and not subject to the Italian pool conditions.

"There is every indication on the part of the Board of Trade to return as quickly as possible to normal business conditions, and exporters have been asked to arrange at once for contracts with Italian buyers. Furthermore, in order to assist private enterprise, a number of vessels allocated to the Italian State Railways Commission have been released to private shippers, and apparently there is every indication of a good amount of business being done to Italy by private coal exporters. Evidently it is the British Government's intention to give as great facilities as possible to the coal export trade, their action in this respect being apparently mainly stimulated by the necessity of increasing the revenue derived from the coal export trade in order to offset the seriously increasing cost of production entailed as a consequence of their pandering to the miners' leaders.

Italy's Coal Problem

"Efforts should be made by the Government to so stimulate the production of coal that the demands of our ally, Italy, should be more adequately met. If British coals are not sent out in greater quantities, then a determined effort will be made by America to establish a regular and permanent coal trade with Italy. America is unable to do this at the present time, owing to the lack of tonnage, but this drawback is being gradually remedied, and the time will arrive when the influence of America's growing fleet of merchantmen will be felt. Furthermore, there are other factors which are likely to weigh heavily against this country in respect to the coal trade.

"At a date to be yet fixed by the Coal Mines Department of the Board of Trade, the limitation prices at which coals have been sold to Italy will cease to operate. Open market prices will be quoted, and such prices will be shillings higher than the limitation levels. At the present time, owing to heavy cost of transportation, American coals sold to Italy are much dearer than the British coals sold at the limitation prices. The abolition of the limitation prices will in all probability make British coals the most expensive, especially as the American coal exporters are preparing to make considerable reductions in order to establish a regular service of supply. The position is fraught with great possibilities for the American coal exporter, and when tonnage becomes more free a very large amount of American coal will undoubtedly be shipped to Italy. Meanwhile it is only by a veritable tour de force we can supply both France and Italy while the Board of Trade has actually issued a warning that supplies of coal for home consumption are likely to be shorter. Owing to our disabilities it is seemingly apparent that a large slice of the Italian trade must necessarily pass to America as soon as her exporters are in a position to secure a larger amount of tonnage.

"Meanwhile the disputes in the South Wales coal field and the number of miners who have absented themselves from work have reduced the output to a sharp extent.

"There is no doubt that a large number of miners have taken advantage of the fine weather to go holidaying, whilst a large proportion of the remainder are disinclined to produce the same quantity per day as was the case when wage rates were low. The Government should have insisted upon the maintenance of outputs, making the great concessions they have been given contingent upon a certain quantity of coal being raised per man employed. Some system should have been insisted upon to stamp out avoidable absenteeism on the part of workmen, and insistence upon a guarantee of a fair amount of coal being raised per month.

"The export of coal in pre-war years was a source of exceptional prosperity to the nation. With the present poor ratio of output and the probability of a still further decrease in July, when the seven hours per day operates, makes the output of 1913 a most difficult if not impossible task to surmount in the reconstruction period. Before that time America will have long since recovered from its war disabilities, and is likely to prove a powerful competitor during this country's herculean effort to recover commercial and financial stability.

"With the prospect of a further decrease in output it is necessary, as Sir Auckland Geddes has warned the nation, to choose between restricting supplies for home consumption or further reducing the quantity available for shipment to foreign countries. To reduce our coal exports is unthinkable, except to Mr. Smillie and other paid advocates of mining workmen. The reduction of our coal exports means the increase of our indebtedness to other nations; the reduction of supplies for home consumption means the restriction of our manufactures. Such is the result of the Government's reckless concessions to the miners, and their utter disregard of the fundamental economics of our most important industry."

Chinese Coal Market

Under date of May 22, Wheelock & Co., of Shanghai, China, report that there had been no new business done in Japan coal during the preceding fortnight, and now that feeling seems to be running so high among certain sections of the Chinese public over the Kiaochow question, it is doubtful whether the silk filatures, on reopening, will buy Japanese coal; but if they refuse to do so, we fail to see where they are to get their supplies from. The coal market in Japan continues strong, and although there is a fairly plentiful supply of the commoner kinds of coal the demand for the better qualities far exceeds the supply. This, of course, tends to keep prices very firm.

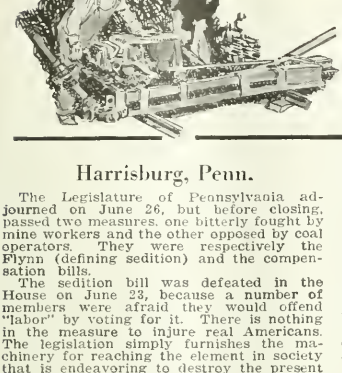
There is no change in the Fushun coal situation. Owing to a further drop in freights and the starting up of silk filatures, the Kaiping coal market has been considerably better during the period under review. Large sales in North China, Manchuria and Japan have curtailed the quantity for export, especially for the better grades, the demand for which exceeds the supply. These sales naturally strengthen the market and prices remain firm.

Coal Production in Shantung

The production of coal from the mines belonging to the Shantung Railway, Tsingtau, China, for the year ending Mar. 31, 1918, was slightly less than in the preceding year. Sales in local markets amounted to 213,030 tons, valued at 911,182 silver yen ($604,387 at exchange $0.6633), giving an average price of $2.78 per ton for all grades. Lump coal for household use sold at from $7.56 to $8.86 per ton. Exports to Shanghai, Hong-kong and Japan aggregated 129,141 tons, leaving a balance of 116,266 tons used on the railway, by the authorities, and in ways not specified. Bunker coal was supplied to vessels to the extent of 9640 tons, at an average price of $3.50 per ton. Shipping agents report that bunker coal was not available in the quantities required by vessels.

Foreign Coal Trade Opportunity

The purchase of American bunker coal is desired by a company in Italy. The terms are cash against documents. References. Further details may be obtained from the Bureau of Foreign and Domestic Commerce, or any of its branches, by referring to File No. 29640.



COAL AND COKE NEWS

Harrisburg, Penn.

The Legislature of Pennsylvania adjourned on June 26, but before closing, passed two measures, one bitterly fought by mine workers and the other opposed by coal operators. They were respectively the Flynn (defining sedition) and the compensation bills.

The sedition bill was defeated in the House on June 23, because a number of members were afraid they would offend "labor" by voting for it. There is nothing in the measure to injure real Americans. The legislation simply furnishes the machinery for reaching the element in society that is endeavoring to destroy the present form of Government. The governor knew the necessity of the proposed law and finally used the influence at his command to get the bill through the Legislature. The bill was signed on June 27.

The bill opposed by the coal operators and other employers was the one making amendments to the workmen's compensation law, which increases the schedule of compensation and provides for a bureau of rehabilitation. The governor also signed this bill on June 27. The legislation was signed in just the shape the administration desired it, all attempts to make radical changes being blocked.

The compensation bill increases the rates, making $20 a week the maximum upon which compensation is to be based. The maximum compensation to be allowed for total disability is advanced from 50 to 60 per cent. of the weekly wage. The maximum weekly amount allowed an injured employee is increased from $10 to $12 and the minimum from $5 to $6. The waiting period during which an injured employee receives no compensation is reduced from 14 to 10 days. The period for which an employer must furnish medical treatment is increased from 14 to 30 days. In case a widow receiving compensation remarries, she would be paid one-third of the compensation due, not to exceed 100 weeks. The method of computing the average weekly wage of an injured employee, as contained in the bill when it was sent to the Legislature by the attorney general, was restored before it was finally passed on the last day of the session.

The Bureau of Rehabilitation is charged with obtaining positions for those who (because of injury) have been incapacitated and whose earning power is reduced. Arrangements will be made with educational institutions for special courses for the injured for which the State will pay not more than $15 a week for 20 weeks. The bureau will furnish artificial limbs at cost to injured workers and supply special treament for those physically disabled. Visits will be made to the homes of the injured by agents of the bureau and advice and assistance given.

The fourth administration bill of the compensation class was not pushed and was allowed to die in committee. It would have levied a 2 per cent. tax on the insurance of corporations carrying their own compensation insurance. The bill creating a commission to study industrial accidents was defeated.

All other bills of interest to the mining industry were killed, among them being the Catlin bill, which would allow coal companies to remove coal under cemeteries; the Donnelly bill, which provided that the operators should deliver powder and other explosives at designated places in the mines, passed the House but died in the Senate Committee. A number of other bills pertaining to coal mines were introduced but not reported from committee. The Legislature passed bills giving substantial increases in salaries to the chief of the Department of Mines and to the 54 State Mine Inspectors.

It is learned that the governor is making a careful study of the mining industry and that at the next session of the Legislature he may introduce legislation to enlarge the powers and the scope of the Department of Mins. The governor has signed the bill creating a bureau to make a geological survey and has approved a bill giving this bureau large funds to carry out its work.

Charleston, W. Va.

While transportation conditions were somewhat improved in the southern part of West Virginia during the last half of June, yet the operation of mines to full capacity was not possible even where market conditions would otherwise have justified it, owing to the fact that sufficient cars were not available; this was true to a greater extent in the Kanawha than in the New River field. Just at a time, however, when the supply of smokeless coal was being augmented by an increased output, producers of that kind of coal learned of the order of Secretary Daniels virtually commandeering one-sixth of West Virginia's smokeless coal for the navy; this amount is said to be twice as large as the navy has heretofore been using in normal periods. This order which may be in effect for the next six months gives promise of materially shortening the supply of smokeless for general market purposes as well as preventing smokeless producers from selling their coal at prevailing market prices. Little wonder that such producers are up in arms. It means, they assert, that there will be no opportunity to supply either the domestic or foreign markets right at a time when exports are reaching handsome proportions and when, under the allocation of tonnage by the shipping board, it seemed possible to increase export. As is already known, lack of cars interrupted the flow of coal for a time to tidewater as did a strike on the Norfolk & Western R.R. which cost 100,000 tons. But during the third and fourth weeks of June coal was moving more freely, with about three-fourths of such coal going to tidewater, the remainder being divided between Lake points and inland Western markets. It is apparent that there has been a marked increase in the demand for export coal, although just at the present time gas and byproduct coal are coming into their own. The requirements of the United States navy during June have also been unusually large. Labor was somewhat more plentiful during the last half of the month. While prices underwent comparatively little change during the third week of June, there was undoubtedly a much firmer market, at least in so far as West Virginia operators were affected.

After suffering with a severe case of car shortage for several weeks, the New River district was able during the week ending June 21 to make some headway in increasing its production; the influx of additional miners into the district also tended to help production, so that there was fully a 10 per cent. larger tonnage during the third week of June than in the week immediately preceding. It was estimated that many companies were producing 85 per cent. of capacity. What with a growing export demand and the navy using a large tonnage, New River producers are finding it difficult to meet the demand for their coal, the bulk of which is now being shipped to tidewater. In fact only about 25 per cent. is being shipped to Western points including the Lakes. In the open market New River mine-run was selling around $3.00 a ton and contract $2.75 a ton. Contract lump and egg were averaging between $3.25 and $3.50 a ton.

Little or no progress was made in the Kanawha district in speeding up production, so that the total output was not over 60 or 70 per cent. at the most, making the tonnage produced during the third week in June only about 125,000 and certainly not over 150,000, this being due to a continuation of car shortage. The demand for Kanawha gas coal was stiffening considerably and there was also a somewhat more pronounced demand for ordinary steam coal, which has been lagging behind other coals in recent weeks. In fact the whole West Virginia market was much stronger than it has been at any time this year, so that operators greatly regretted the handicap of car shortage. The most marked development in the district has been in the steadily increasing shipments of Kanawha coal to tidewater as well as the increasing number of inquiries for this coal to be shipped in the same direction. Kanawha run-of-mine was still averaging during the third week of the month from $2.00 to $2.25 a ton.

Fairmont, W. Va.

While a car shortage began developing about the middle of the week ending June 21, in the northern West Virginia coal fields, it was not until June 21 that the shortage became acute. On that day the number of cars furnished was much below the average number which have in recent weeks been loaded out daily; the only factor which prevented mines from shutting down in many instances was the number of unconsigned cars on hand, but even that number has been reduced to a great extent in recent weeks. As an instance of what the car shortage means, only 740 cars were furnished the mines of the Monongah division of the Baltimore & Ohio on June 21, as against about 900 required daily. The 740 cars furnished was the lowest number since Oct. 31, 1918. The daily average of cars furnished the Monongah division up until the third week of the month was in the neighborhood of 3,000. Placements on the division on June 21 were only 600 cars. While both railroad officials and coal men have been expecting a car shortage, it arrived sooner than anticipated. For a time consumers refused to have coal shipped in gondolas, stipulating that only self-clearing cars should be used, but now consignees have reached a point where they are no longer so particular, so long as they get the coal. The demand for coal produced in the Fairmont and other West Virginia fields is steadily crawling upward to such an extent in fact that "hargain" coal is no longer obtainable and operators who entered into contracts not over 30 days ago to furnish coal at ridiculously low prices are now kicking themselves. Shipments from northern West Virginia points fluctuated in volume somewhat during the third week of the month, but by the end of the week the movement was large, the bulk of such coal going to the East. Shipments to tide dropped off slightly when the Pocahontas mines resumed shipment but by Curtis Bay was again taking a substantial tonnage. While inquiries for coal for export are daily becoming more numerous, producers find themselves unable in many instances to accept orders for delivery of coal to points where it is a difficult matter to arrange for final delivery. Lake shipments were somewhat larger at the end of the week than at its beginning. Buyers in northern West Virginia fields appeared to be in the market for a large tonnage of low sulphur gas coal and for byproduct coal as well. Resumption of operations at many iron and steel plants in West Virginia it is believed will shortly stimulate coke production.

Huntington, W. Va.

Reaching an output of 76 per cent. the Logan mining district succeeded during the week ending June 21, not only in producing the largest tonnage of the year, 232,129 tons, but in exceeeding the output for the corresponding period of 1918 by almost 1,000 tons. This result was made possible in part by a reduction in the car shortage from 18 to 9 per cent. or from 59,000 to 29,000. In other words, it was cut in half. At the same time there was a further reduction in the no market loss from 39,000 tons or from 12 to 10 per cent. Labor shortage losses were considerably less as were losses from mine disability.

The effect of these reductions was to cut the production loss from 123,000 to 73,000 tons, a difference of 50,000 tons, the

net gain in production for the week being 28,000 tons. In short the car supply was materially improved while market conditions were much better in every respect particularly as to the demand for gas coal. In fact shipments from the Logan district were heavy both to the east and west and an unprecedented run of business is anticipated.

All records for the year 1919 were smashed on the C. & O railway on coal loading for the week ending June 21. The record for the week was only a shade under the best weeks of 1918, the banner production year for the C. & O.

The comparison of the three best weeks in the history of the railroad is as follows:

	Cars
July 27, 1918	14,098
July 30, 1918	13,749
June 21, 1919	13,735

	Cars
New River	3,308
Kanawha	2,828
Coal River	1,111
Guyan Valley	4,604
Kentucky	1,094
Total	12,945
S. V. & E.	636
Long Fork	133
A. C. & T.	21
Total	13,735

There is every indication that June will be a record breaker. The figure for the first three weeks is high in tonnage and yet another week of loading is to be recorded. The total depends upon the available car supply and the railways are straining every resource to give the mines the number of cars they want.

Coal men see in figures such as those above given the renaissance of the coal industry on a parity with the best war-time period.

Bluefield, W. Va.

Notwithstanding that the strike of shopmen on the Norfolk & Western has been adjusted evidently that road had not fully recovered from the effects of the strike, for, of a total production loss of 265,000 tons during the week ending June 21 in the Pocahontas district, a car shortage was responsible for 263,000 tons, an increase of 103,000 tons from this cause in a week's time. From 196,000 tons the production of the region was cut down to 156,000 tons, a loss of 40,000 tons in the same period. The total production loss was increased 90,000 tons. There were no other losses to speak of outside of a small mine disability loss, no market losses finally disappearing. Coke production dropped 1000 tons being only 6900 tons for the week.

Canton, Ill.

The coal mine superintendents of Peoria, Fulton and Tazewell Counties, Illinois, met at this place on June 18 and perfected an organization. The purpose of the organization was to attain a standardization of conditions in the mines of the district in question; to establish closer relationship with the miners; to produce a better and cleaner coal, and to meet for discussion of mining matters. It is the intention to extend the membership to include the mine managers. This association will meet again on July 23 and will hold meetings regularly each month. The first meeting was quite successful and the 28 superintendents attending were most enthusiastic. The following officers were elected: President, T. M. Guthrie, superintendent Silver Creek Colliery Co., Farmington; vice president, H. Wilkinson, superintendent Groveland Coal Mining Co., Peoria; secretary-treasurer, Deamey, superintendent Crescent Coal Co., Peoria. The meetings are intended to have an educational benefit in the discussion of such articles as "Preparation of Bituminous Coal," a series started in the May 22, 1919, issue of *Coal Age*, and other subjects which have a bearing on the work with which the superintendents are connected.

PENNSYLVANIA

Anthracite

Port Blanchard—Fire of unknown origin destroyed the new washery at the No. 14 colliery of the Pennsylvania Coal Co., at this place.

Ashland—An explosion of gas at the Potts colliery of the Philadelphia & Reading Coal and Iron Co., on June 21, resulted in the death of two miners, and the injury to several others.

Hazleton, Penn. Many of the foreign mine workers in the Lehigh region deposited their hoarded earnings in banks during the past week—savings made during the war period. These are said to have increased bank deposits to the largest amount in the city's history.

Duryea—The electric storm of June 24 did considerable damage to the washery of Nos. 8 and 9 collieries of the Pennsylvania Coal Co. The large conveyor line running to the washery, as well as one side of the building itself, were blown down entailing a loss estimated at thousands of dollars. It is the intention of the company to immediately rebuild that portion of the washery that has been damaged.

Wilkes-Barre—The Lehigh Valley Coal Co.'s mine foremen and assistant foremen have been informed that they can expect a ten days' vacation this year. The practice of giving summer vacations to the salaried men was discontinued during the war.

The coroner's jury investigating the cause of death of 92 men in the Baltimore Tunnel on June 5 after hearing a large number of witnesses brought in its verdict on June 25. This jury refused to fix blame for the accident upon any person or persons. It did, however, make certain definite recommendations for future legislation. An account of the disaster with all pertinent obtainable details as brought out at this coroner's inquest will be printed in the next issue of Coal Age.

Bituminous

Plumville—The Consolidated Coal and Coke Co., of this place, is now building a tipple at this new mine and equipping it with machinery furnished by the Fairmont Mining Machinery Co., of Fairmont, W. Va. It is expected that the improvements will cost $30,000.

Dunbar—The work of rebuilding the tipple at the Freemont No. 2 mine of the American Manganese Co., at this place, recently destroyed by fire, has been commenced. Gangs are working overtime on the job and it is expected that the mine will be able to resume in the latter part of July.

Brownsville—Extensive repairs are being made to Lock No. 5 in the Monongahela River at this place to accommodate the rapidly increasing river traffic in coal due to the development of fields in Greene County and the upper pools on the Fayette County side. New gates are being installed and machinery repaired.

Uniontown—An attempt was made to blow up the tipple of the Peerless works of the J. M. Grey-Kramer interests shortly after a reduction of wages was put into effect. The dynamite was misplaced, however, and only slight damage resulted. The plant had been closed for repairs and had only just been reopened to fill recent orders.

Pittsburgh—The Bureau of Mines and the Carnegie Institute of Technology have arranged jointly for the erection of a research laboratory. Its principal initial use will be to test a new furnace designed to eliminate the smoke of the usual type. The laboratory will be erected between the Tech machinery hall and the power plant of the Bureau of Mines. All necessary equipment to carry on the experimental work will be supplied to test the new furnace which can be used for gas or all grades of coal, interchangeably.

WEST VIRGINIA

Kanawha City—Charleston parties will develop a coal tract in Louden district, Kanawha County, near here. They have chartered the Kanawha City Coal Co. for the purpose, with a capitalization of $50,000. The incorporators are R. E. Whittaker, A. O. B. Hogue, F. C. Koper, D. P. Reed and C. J. Cunningham, all of Charleston.

Barnstown—Fire, caused presumably by a short circuit in the dynamo room of the power plant of the old Barnstown shaft mine of the Consolidation Coal Co., resulted in a $10,000 property loss and a shutdown of the mine for a few days. The power plant was completely destroyed and a portion of the tipple was burned. The efforts of firemen saved the main part of the tipple and also prevented the flames from spreading to the mine.

MacDonald—A coal land deal which has been under negotiation for several months has been closed. Under its terms the New River Co. adds 6500 acres to its 100 sq.mi. of New River coal territory. The new acquisition is that of the Keefer Coal and Coke Co. holdings and the price paid was $324,855.25. The lands conveyed were those acquired by a Mr. Keefer, a Pittsburg capitalist, from E. B. Hawkins in 1908. The purchase price at that time was $35 an acre. The New River Co. pays $56 an acre.

Clarkesburg—The Hudson Coal Co., a recently organized concern, acquired all the coal holdings of the Prunty Real Estate and Coal Co., including three mines in this section. The Hudson company is capitalized at $1,000,000 and is said to contemplate extensive development of its coal properties. The Lewis mine at Reynoldsville, the most important of the group, taps 1004 acres of Pittsburgh seam coal; a new steel and concrete tipple will be built, to have a capacity of 2500 tons a day. The Miller mine at Wilsonburg, with a 1200-ton capacity, and the Tucker and Betty mine near Fairmont are the other properties taken over by the Hudson company. J. M. Orr is vice-president and general manager.

Williamson—Quite elaborate preparations were made by the operators of the Mingo field for the meeting and banquet of the Williamson Operators' Association held here on June 26. A number of invited guests were present among them being Governor John J. Cornwell, of West Virginia, Congressman John W. Langley, of Kentucky, and T. L. Lewis, secretary of the New River Operators' Association. The officers of the association are; G. S. Patterson, Vivian, president; W. N. Cummins Red Jacket, vice president; L. E. Armentrout, Borderland, treasurer; George Bausewine, Jr., Williamson, secretary. On the board of directors are Messrs. Patterson, Cummins, Armentrout, Morris Watts Eckman, A. R. Meisel, W. A. Hurst, Williamson; H. G. VanHoose, Majestice, Ky.

Beckley—Since the first ton of coal was mined by the E. E. White Coal Co. in West Virginia more than 5,000,000 tons in all have been mined by the company. In fact according to statistics prepared by it there has been produced at the Glen White mine 2,959,006 gross tons and at the Stoteshury mine 2,043,746 tons or in all 5,002,752 gross tons.

ILLINOIS

Springfield—Mine rescue teams from all parts of the state will compete at the arsenal here September 7-19. The five teams making the best showing will represent Illinois at the national contest to be held in Pittsburgh the latter part of September. Plans for the state contest were outlined by Director J. C. Thompson of the department of Mines and Minerals. The federal mine rescue car was stationed here recently for a few days, demonstrations being made for the benefit of the public.

La Salle—The Marquette mine, one of the landmarks of eastern Bureau County, is being dismantled and the buildings and other material sold. This property was considerably damaged by fire a few years ago and has not been operated since that time. The coal rights on the south side of the Illinois River are said to have been sold to the La Salle County Carbon Coal Co., whose property adjoins, and a new shaft may be sunk on the Putnam County side of the river.

MONTANA

Fromberg—The Equity Coal Co. has leased lands near here and it is stated will make preparations for an active campaign this year. A new tipple is being built and a side track constructed. W. E. Pinkney, president of the company, states that a six-foot seam of coal is being developed and that shipments of coal should be made by fall.

ALABAMA

Birmingham—The first shipment of coal started down the Warrior River early in June under the new tariff sheet of the Railroad Administration. This shipment included 2000 tons of coal from the Lipsey mines. While the rate is the same as that of the rail route, loading and unloading of the coal is absorbed and storage room for the coal is furnished free at New Orleans on these shipments. The development of the terminals is being pushed; the terminals, together with the railroad connection of the river and the city costing upward of $1,000,000. The river at Mobile is to be dredged for further depth, a 30-ft. channel being sought. The object of these developments is to facilitate the export of coal from the mines of the Birmingham district.

Personals

A. D. Robinson has been appointed manager of the tidewater sales office of the Fayette Smokeless Fuel Co., at Norfolk, W. Va. For the last six years he has been connected with the general office of the company at Mt. Hope, W. Va.

C. F. Bashore has been placed in charge of the operations of the Randal Coal Co., on Scott's Run in West Virginia, as manager. Until recently Mr. Bashore was the superintendent of the New England Fuel and Transportation Co. at Grant Town, W. Va.

Dr. J. B. Umbleby, of the U. S. Geological Survey, returned recently from Europe where he was called to advise the peace commissioners upon the mineral resources of Germany and the German colonies. He related evidences of the grave danger to Europe from coal famine, citing the reduced production in several countries from labor disturbances.

Major Charles E. Sholes has recently been elected vice president, director and general sales manager of the Edison Storage Battery Co. Major Sholes succeeds Harrison G. Thompson, who resigned to organize and conduct the Transportation Engineering Corporation, of New York. Major Sholes has heretofore been identified with the construction, operation and

CHARLES E. SHOLES

management of chemical industries; he was the active member of the creditors' committee of the Aetna Explosives, Inc., during the receivership, which is ending so creditably. During the war he served as major in the ordnance branch of the service. He is honorary chairman of the Society of Chemical Industry and a member of many other scientific societies.

A. R. Montgomery, who for several years has been the general superintendent of the Boone County Coal Corporation, with headquarters at Clothier, Boone County, W. Va., has resigned to locate in Peoria, Ill., where he will, with others, engage in a general road contracting business. Inasmuch as he is leaving West Virginia he has also tendered his resignation as a member of the state senate, to which he was elected in 1916.

Trade Catalogs

Producer Gas Costs. Steere Engineering Co., Detroit, Mich. Pp. 1; 9 x 11 in.; unillustrated. Table on cardboard for hanging up.

Link-Belt Locomotive Cranes. Link-Belt Co., Chicago, Ill. Book No. 370. Pp. 68; 6 x 9 in.; illustrated. Description of locomotive type of crane and copious illustrations showing installations in various industries.

Standard Reinforced Spiral Pipe. Standard Spiral Pipe Works, Chicago, Ill. Catalog No. 7. Pp. 40; 8 x 10½ in.; illustrated. Notes details of construction and cites installation of spiral pipe and various fittings and supplies.

Direct Current Motors and Generators. Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 1096-A. Pp. 20; 8 x 10½ in.; illustrated. Description of types "K" and "KC" and application to various industries noted.

Copes System of Boiler Feed Control. Northern Equipment Co., Erie, Penn. Bulletin. Pp. 8; 8½ x 11 in.; illustrated; convenient for filing. A proposal and specifications for the Copes system of boiler feed regulation.

Whiting Railroad Equipment—Whiting Foundry Equipment Co., Harvey, Ill. Catalog No. 145. Pp. 36; 8½ x 11 in.; illustrated. This publication brings before railroad men the advantages and labor saving features of the company's various railroad specialties such as screw jack hoists, cranes, etc.

Imperial Incandescent Headlight for Mining Locomotives. Ohio Brass Company, Mansfield, Ohio—exclusive sales agents. Crouse-Hinds Co., Syracuse, N. Y.—manufacturers. Bulletin No. 202A. Pp. 12; 6 x 9 in.; illustrated. Describes the various types of headlights made by the Crouse-Hinds company, also other allied equipment—headlight parts listed.

Works and Products. Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 137. Pp. 62; 5 x 6½ in.; illustrated. A description of Allis-Chalmers company and its capacity for producing a great variety of machinery including some of the largest and most powerful prime movers and electrical machinery in the world—details of the company's plants and products.

Industrial News

Lackey, Ky.—The Wells-Elkhorn Coal Co., C. O. Messenger, manager, Paintsville, plans development on 2000 acres with daily capacity of 20 cars.

Ambler, Penn.—The Eastern Foundry and Machine Co. is now operating its new plant at this place. The general sales office of this company is in the Liberty Building, Philadelphia, Penn. B. M. Morrison, general sales manager.

Boston, Mass.—Frederick & Co., Inc., of this place has an option on 1200 acres in the Fairmont field, near Farmington, W. Va., and has incorporated with a capital of $1,500,000. Fred A. Sesler, of Wilkinsburg, Penn., is at the head of the enterprise.

Chattanooga, Tenn.—A large coal deal was consummated in east Tennessee recently when the Montlake Coal Co. was absorbed by the Buck Creek Coal Co., an organization capitalized at $350,000. The new company has acquired 25,000 acres of land around Buck Creek Gulch.

Edwardsville, Ill.—Edward Gaertner, of Pittsburg, has taken options on 12,000 acres of coal lands in this vicinity. He is understood to represent Pittsburgh capitalists who contemplate opening a large mine on the northern edge of the town. It is announced that test borings will soon be made.

Sharples, W. Va. The Boone County Coal Corporation has purchased the stock of the D. C. Thomas Coal Co., of Columbus, Ohio, and has transferred the property to the first named corporation. The D. C. Thomas Coal Co. is now in process of dissolution. The Boone County Coal Corporation is a large producer of Chilton coal, used for byproduct and gas purposes.

Columbus, Ohio—F. E. Falk, head of the Falk Coal Co., of this place, has acquired all of the capital stock of the Penn-X mine, located at Orbiston, near Murray City. He expects to improve and operate the property, which consists of a large acreage of virgin coal. The selling offices will be in Columbus. The mine was formerly operated by the Western Fuel Co., of Nelsonville.

Crellen, Md.—The Turner Douglas Coal Co., Goff Building, Clarksburg, W. Va., is understood to be planning for the development of additional coal properties in the Crellen district in connection with its present holdings comprising about 340 acres. It is proposed to have a daily capacity of about 500 tons. W. B. Carmichael, 420 Stark Street, Saginaw, Mich., is manager.

Carpenter Creek, Mont.—The Montana-Wyoming Coal Co. expects to exercise its option and purchase lands near here. The property is said to be underlaid by a nine-foot seam of coal which will be developed. When the lines of the Montana Power Co. are extended to this place, it is stated that the development of the several coal properties here will be on a larger scale than at present.

Charleston, W. Va.—There is to be further development of coal lands in the Louden district of Kanawha County by the Kanawha City Coal Co. just organized by Charleston people. This company has an authorized capital of $50,000 and its plant will be near Kanawha city. Leading figures in the formation of the new company were D. P. Reed, C. J. Cunningham, F. C. Koper, A. O. B. Hogue and R. E. Whittaker, all of Charleston.

Erie, Penn.—The Ball Engine Co. of this place, builders of the Erie steam shovel, let a contract on June 18 for building an addition to their shovel erecting shop. The new building will be approximately 175 by 125 ft., which will nearly double the present area and capacity of the shop in question. Other additions to the Erie shovel plant, totaling $350,000, are contemplated, as present business warrants further extensions.

Charleston, W. Va.—Charles Willis Ward and wife deeded to The Kelly's Creek Collieries Co. a one-sixth interest in a tract of 8000 acres located on Kelly's and Hughes Creeks both of which are tributaries of the Kanawha River.

The other five-sixths of the tract are still held by members of the Ward family, it is stated, though an effort has been made by the owners of the Kelly's Creek company to purchase the entire tract. The price paid for the interest sold was $115,000.

St. Louis, Mo.—The Phillipsburg Mining Co., with offices in the Security Bldg., here, is making extensive developments at its mines in Montana to determine as to the condition of the coal at lower levels. The shaft, which is to be sunk to a depth of 1000 ft., is now down about 650 ft. The company expects to expend $100,000 for development and for additional equipment including a hoist. J. P. Meyer is president and Engineer McCracken has charge of operations.

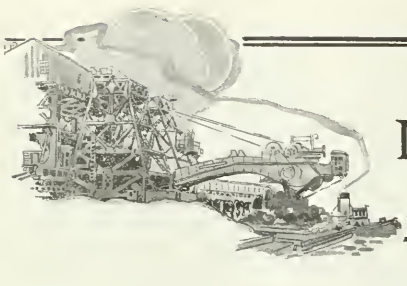
New York, N. Y.—W. N. Brown, an examiner of the Interstate Commerce Commission, began a series of hearings in the question of demurrage charges on June 26. These hearings were arranged by Charles S. Allen, secretary of the Wholesale Coal Trade Association, of New York City. In the meantime the Railroad Administration has agreed to suspend the collection of all unpaid demurrage charges which have accrued on coal at the local ports between December 1 and May 1 until the Interstate Commerce Commission decides whether a reduction of the present rates is possible. These unpaid bills at this port to date are believed to total about $223,000.

Knoxville, Tenn.—Plans are now under way for forming an export corporation with a capital of from $500,000 to $1,000,000 for shipping coal to Latin-America and to Europe.

The Southern Appalachian Coal Association, national banking interests and the Manufacturers' Association of America are promoting the enterprise. It is stated that New York bankers who have investigated the opportunities for shipping coal to foreign countries have agreed to finance the corporation.

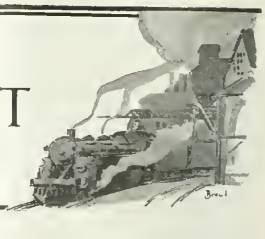
This corporation will handle bunker and export coal from the southern Appalachian fields.

Salt Lake City, Utah—Consolidation of the Eccles and Wattis coal interests is to be perfected in the near future according to report. The new concern, which will be known as the Lion Coal Co., is expected to have a capitalization of $5,000,000. Among the incorporators are David Eccles, president of the Eccles estate, W. H. and E. O. Wattis, of the Utah Construction Co. and M. S. and J. M. Browning, the inventors of the machine gun of that name. The property of the new company will include the Wattis interests in Carbon, representing over $1,500,000 and the Eccles interests in Wyoming, valued at more than $2,000,000. The combined output of the two companies is estimated at 600,000 tons. D. H. Pape, general manager of the Eccles coal interests, will assume the management of the new company. J. H. Hill will act as sales manager of the new corporation.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Public Will Have Itself to Blame for Coal Scarcity This Fall and Winter—Necessity Exists for Speeding Up Soft Coal Output—Anthracite Coals for Domestic Purposes Are Scarce, While Steam Coals Are Drug on Market

NO CONSUMER of bituminous coal can blame anyone but himself if he fails to obtain sufficient coal for use this fall and winter. Everything possible is being done by both producers and dealers to acquaint the public with the true state of affairs insofar as coal is concerned.

If a coal shortage is to be averted this year, consumers must buy their fuel now, for in order to meet the estimated requirements of the country, which are placed at 530,000,000 net tons for the year, the production of soft coal must be increased 2,775,000 net tons each week for the next thirty weeks; in other words, an output of 10,900,000 net tons weekly.

During the week ended June 21 the output of soft coal totalled only 8,689,000 net tons. At this rate, which has been maintained since the middle of May, the production of bituminous is about neck and neck with the rate of consumption. There is no reserve being built up. Labor shortage and car scarcity are even now affecting the output of soft coal, and these handicaps will become even more evident as the weeks go by. The time to buy coal is now.

The undertone to the soft coal market is decidedly more encouraging. The select grades of bituminous coal are not easily obtainable, while prices on the better grades are going up. Steam coals are moving slowly. In the Middle West many operations are forced to close down for days at a time, owing to the inability to dispose of the small sizes.

If anything, consumers are more eager just now to procure the domestic sizes of anthracite. So insistent are the requests for stove and egg coal that some producers are breaking larger coals into these two sizes in order to appease the trade. The product of the so-called Independent operators is bringing premiums on prompt shipments of hard coal to the West and to Canada, while the large companies are adhering closely to their regular schedule. This called for another advance of ten cents a ton on egg, stove, chestnut and pea coals on July 1, and the prices on these coals at the mine are accordingly that much higher. Chestnut is becoming increasingly hard to obtain, though the shortage of this size is not so evident as on the egg and stove sizes.

Contrasted with the activity in the demand for domestic coals is the utter lack of interest shown in the anthracite steam coals. Buckwheat, however, is moving somewhat more easily than either rice or barley. Prices have been cut on the two latter sizes.

During the week ended June 21 the anthracite operators produced 1,748,000 net tons of coal, a gain of 63,000 net tons over the output of the week ended June 4. For the calendar year to June 21 the production of anthracite is estimated at nearly 37,000,000 net tons, or about 10,000,000 net tons below the output of the corresponding period of 1918.

WEEKLY COAL PRODUCTION

A slight increase in the production of bituminous coal in the week ended June 2, but a decrease compared with the week ended June 7, is indicated by the latest estimates. The production in the week ended June 21 was 8,689,000 net tons compared with 8,487,000 net tons in the week ended June 14 and 8,927,000 net tons in the week ended June 7. The uniformity in the rate of production in the last seven weeks, or since the middle of May, the production averaging around eight and three-quarter million net tons per week, is noteworthy. The evidence available indicates that this represents the rate of consumption at the present time and that little or no stocking is taking place. The production for the calendar year to June 21 is estimated at 203,434,000 net tons, and is nearly 70,000,000 net tons or 26 per cent. below the production in 1918.

The production of anthracite for the week ended June 21 is estimated at 1,748,000 net tons, a gain of 63,000 net tons over the week ended June 14, but a decrease compared with 2,034,000 net tons for the corresponding week of last year. The production of anthracite for the calendar year to June 21 is estimated at nearly 37,000,000 net tons, or about 10,000 net tons below the production for the same period in last year.

Returns from operators for the week ended June 14 show that the drop in production that week compared with the week ended June 7 was due to an increase in less because of no market from 32.1 per cent. to 34.7 per cent. which occurred mainly in Illinois, Indiana, southern Ohio and western Kentucky, and in part to an increase in the less of running time because of car shortage, notably in the Pocahontas and high volatile fields of southern West Virginia.

The production of beehive coal in the week ended June 21 is estimated at 285,140 net tons compared with 285,688 net tons in the week ended June 14 and 633,162 net tons in the week ended June 22, 1918. The production of beehive coke in the calendar year to date is estimated at 9,323,000 net tons compared with 14,526,400 net tons for the same period in 1918.

Bituminous coal dumped at lower Lake Erie ports in the week ended June 14 was 959,265 net tons compared with 1,073,952 in the week ended June 7 and compared with 912,954 net tons in the week of June 15, 1918. This season to date the dumpings aggregate 7,076,328 net tons, or 1,200,000 net tons greater than last year.

BUSINESS OPINIONS

The Iron Age—Production is now at about 60 per cent. of ingot capacity, and June's output will probably be fully 10 per cent. more than May's. The greater activity in pipe, wire and sheets is offset by the still relatively small demand for bars, plates and shapes. Orders are coming in faster than the shipment rate, and some accumulation of bookings is the tangible evidence of the continued improvement. Large sales of coke for last-half delivery have been made in the Pittsburgh district, and prices are stiffer, with foundry coke 25c. higher.

Dry Goods Economist—The movement of practically all lines of seasonable goods in dry goods and department stores continues excellent in every section of the country. Roadmen are sending in a continuous stream of orders accompanied by optimistic statements regarding the conditions they find in their respective territories. Scarcity is the rule in woolen and worsted dress fabrics. This is due in part to the lack of wools earlier in the season, and also to problems of manufacture. Stocks of both manufacturers and distributors are light, but there is no absolute famine as some people have asserted.

American Wool and Cotton Reporter—It is not expected that any decline in the wool market will take place this year, and the general outlook for business seems good for a long time ahead. It is predicted that as the season progresses the market will stiffen rather than otherwise. The general trend of the trade is to sell as fast as possible. Mills are ready to buy, and they want wools for immediate consumption. The cotton market during the week under review has been the quietest for some time. The cotton goods market has been somewhat disturbed by the slow production of mills. Many mills are so closely booked ahead that they will be unable to complete present contracts until late fall.

Atlantic Seaboard

BOSTON

Signs of output falling behind. Prices, however, without material change. Buyers show more interest in current market. Rejection of Navy bids leaves many shippers "in the air." Lack of contract orders may mean steady supply of spot coal later. Hampton Roads coals without new developments. Receipts on same basis as for several months. Anthracite demand still insistent.

Bituminous—More and more is being heard of cases where operators are obliged to decline business because they are unable to produce coal fast enough to meet the current demand. This is especially true of operations where mining is more difficult. Mine workers show no disposition to leave places where the seams are thin in favor of mines carrying thicker veins, and this shifting of labor, particularly in central Pennsylvania, is already causing a lot of anxiety.

The long expected upward swing in prices, however, is not in evidence. A few shippers of quality coals have made spot sales at slightly higher prices for July than for June, but the market is still heavy and labors under the conditions that prevailed all through the spring. There has been so much anxiety to sell coal since January that buyers find it very hard to understand the present drift and that prices now asked for deferred delivery. This territory, therefore, is still very slow responding. While a good many interests have stopped selling there are yet enough who are eager to take on spot business to give the impression that conditions continue practically the same. The result is that prices remain about on the same level as a fortnight ago.

There is distinctly more interest, however, on the part of buyers than was the case a month ago. The textile mills are seeing farther ahead and are more inclined to take on coal for the winter months. In some directions there has been something of a spurt on this account and the current market is that much improved. It has been only within a few weeks that some of the large manufacturers who accumulated heavy stocks last year began buying enough coal to meet boiler requirements from week to week, and now the same people are showing their inclination even to stock coal on top of the reserves they have been carrying.

For many of the Pennsylvania shippers the outlook has become further complicated through the rejection of bids submitted to the Navy Department. They are still unable to get from the authorities the approximate shipments they will be called upon to furnish. In other years there were few of the Pennsylvania coals certified for Navy use, but now that the number of mines on the acceptable list has been greatly enlarged it is impossible to figure the outcome.

Should output show an increase between now and October, and there are many who think it will, it will be shown that operators have taken far less contracts than usual. It is quite possible that there may then be a steady supply of spot coal at prices not much higher than the present range, for the fact that the coal people have avoided contracts to a considerable extent may easily mean that coal will not be so hard to get as many have predicted. New England is not likely to increase very much its present requirements, at least not between now and Jan. 1, and unless output is to be reduced the boom market will have to be the result of increased needs in other parts of the country.

This is perfactly true in the case of the smokeless coals that have their largest outlet through Hampton Roads. Improved conditions as to price, etc., will be the reaction of the export or bunker trade, rather than from any marked influence of buying in this territory. Now that peace is actually signed it is likely there will be rapid developments the next few weeks as to the volume of coal for Italy and other countries, but so far there has been ample coal for all comers. Prices have been firmer on the basis of $2.75 per net ton f.o.b. mines, this being the figure at which coal is now being taken for use of the Navy, but spot sales for New England are still few and far between.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.75@3.35
F.o.b. Philadelphia, gross tons	4.27@4.95	4.95@5.50
F.o.b. New York, gross tons	4.62@5.29	5.29@5.85
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.35

Gas slack from the Greensburg district is quoted at $1.60@1.75 per net ton, with 25c. more for gas nut and slack.

Georges Creek is still quoted at $3.20 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $5.04@5.24 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $7.24@7.44, and on cars Boston and Providence at from $7.50@7.90 per gross ton, the latter being the contract price f.o.b. cars for deliveries to Apr. 1.

Anthracite—There is no let-up in the demand for domestic sizes. All the regular shippers are swamped with orders, and if certain independent operators are not selling in advance it is because they are hoping for higher spot prices later. The movement of anthracite barges is much hampered by restrictions of one kind and another, and many of the coal factors are looking forward longingly to a time when the railroads will be returned to private control and normal policies can be pursued without undue interference. It is plain, also, that the average householder is trying to put in more coal than ever before. The retail demand in the cities, especially, shows no signs of relaxing and there continues a tremendous pressure from all quarters to get coal forward. Without doubt this demand will continue through to next April. There are a few hopeful shippers who feel that the demand is sure to ease up later on, but experience shows that once there develops the usual fall demand from centers like New York and Philadelphia the chances for New England supply are materially diminished.

NEW YORK

Demand for domestic coals shows no signs of letting up. Some companies are breaking broken coal to relieve the other sizes. Chestnut coal becoming scarcer. Pea in good demand along the line. The buckwheats showing up better. The bituminous situation shows slight improvement. Contract coal moving rapidly but spot demand is slow. Tradesmen continue to be optimists.

Anthracite—The call for the domestic coals continues insistent and, if anything, it appears as if the scarcity is becoming more acute. That no let-up in the call for stove and egg is expected may be taken from the attitude of some of the companies who are breaking broken size into the next two smaller coals.

In this city the retail dealers complain more of the lack of coal than of the lack of orders. The latter, however, were not received as early in the season as usual because of the belief there would be a reduction in the price of coal and on that account dealers were not able to begin their spring deliveries as early as they have been in the habit of doing. Now everybody wants their coal immediately, but the dealers are not able to obtain it from the producers.

Another factor in the local situation last week was the partial tie up of tugs and boats which, however, was shortlived, the men claiming that their employers were not living up to the new agreement recently adopted. However, there was a shortage of boats carrying around 500 tons and some shippers found it difficult to procure such boats for their business.

While not so much has been heard locally of premiums to be paid and offered for so-called independent coal and for quick deliveries, there were reports of premiums being offered for quick shipments to the West and to Canada. The large companies are sticking close to their regular schedule, which was advanced 10c. per ton for egg, stove, chestnut and pea coals on July 1. Although the demand for chestnut is not so strong as for egg and stove, it, too, is becoming short.

Pea coal is in much better demand along the line than in this city, and for that reason the shippers are curtailing shipments to this market as far as possible. However, dealers here are taking a goodly proportion of the output if they can secure some of the larger sizes as well. It is said that some of the companies are storing large quantities of pea coal.

The anthracite steam sizes are in no demand. Buckwheat is moving a trifle better than either rice or barley. There are reports that prices are easy for the two latter sizes.

Current quotations, white ash, per gross ton at the mines and f.o.b. at tidewater, at the lower ports, according to company schedule, are as follows:

	Mine	Tidewater
Broken	$5 95	$7 80
Egg	6 15	8 00
Stove	6 40	8 25
Chestnut	6 50	8 35
Pea	5 10	6 85
Buckwheat	3 40	5 15
Rice	2 75	4 50
Barley	2 25	4 00

Bituminous—The situation here is more encouraging, but so far the movement has not gained. However, the general situation appears to be improved and the trade is hopeful.

As with anthracite, users of bituminous are being urged to buy now while transportation facilities are good. Consumers are being told that production is about on a basis of what it was in 1910 and that this indicates a shortage of about 40,000,000 tons. Another factor that should be considered by the public is the vast number of mine workers who have gone back to their native country, many of whom will never return here to work in the mines. Hordes of these foreigners are taking with them their savings of the past four years, and until the tide of migration sets in their places will remain unfilled. Efforts are being made to reduce this tide of emigration but now with the peace treaty signed the authorities may find it hard to unearth any means which might put a temporary stop to the outgo. This condition has struck the bituminous fields worse than the anthracite, and the operators are complaining seriously of the lack of labor. They also call attention to the difficulty that might be experienced if there was a heavy demand for coal now. As it is the mine workers prefer to take things easy, working only when they please and remaining at home when they desire.

A feature of the market is the heavy shipment of contract coal, which has gone a long way toward keeping the stocks at the local docks down. It is also noticeable that many dealers who could receive their coal supplies by water are giving preference to all-rail shipments, although the cost is greater.

Following are quotations on various coals, per net ton at mine:

South Forks (Best)	$2.95@3.25
Cambria (Best)	2.75@2.95
Cambria (Ordinary)	2.35@2.50
Clearfield (Best)	2.75@2.95
Clearfield (Ordioary)	2.35@2.50
Reynoldsville	2.50@2.75
Quemahoning	2.75@2.95
Somerset (Best)	2.75@2.95
Somerset (Poor)	2.15@2.35
Western Maryland	2.25@2.50
Fairmont	1.75@2.00
Latrobe	2.10@2.25
Greensburg	2.25@2.35
Westmoreland ¾ in	2.60@2.75
Westmoreland run-of-mine	2.35@2.50

PHILADELPHIA

Anthracite demand continues heavy. Local receipts light. Egg very scarce, with stove in chief demand, nut hard to get, but pea plentiful. School closing makes some customers anxious for fuel. July company increase in effect. Individuals all ask advance over circular. Retailers face increased costs. Advertising campaign continued. Bituminous holding ground. Good grades stronger. Slight price changes.

Anthracite—There is not the least slackening in the demand for coal of the domestic sizes in this market. Unfortunately for the dealers, the shipments since the early part of the month have been most meager. Among the retailers the general impression is that the companies are shipping heavily to the West, especially to districts which were entirely restricted from receiving hard coal last year.

The demand continues to center on the three domestic sizes—egg, stove and nut. The situation as to egg is really remarkable and no one in the trade can recall a time when the call for this size was so heavy. Heretofore on such days as the dealers had for this size they simply filled at their leisure, feeling they could get it at any time they wanted it or had time to make delivery. Usually after the April reduction, when coal was at its lowest, the retailers delivered the largest proportion of this coal.

Now this is all changed, and the dealers are being hard pressed by their customers for this size. If anything, the anxiety of the trade to get stove coal has increased and many yards are entirely empty of this size, closely followed by nut; as a matter of fact there are occasional instances where dealers are more anxious for nut than for stove.

As has been the case for the past two weeks all dealers are well supplied with pea coal, with most of them adding more to their stocks than they are turning out. No one shows any desire to stop shipments of this size, for they fully realize they will have a demand for every pound they can tuck away in their yards.

Concurrently with the increase in the company circular the individual shippers maintained the relative increase above this circular, until all the smaller companies are now asking premiums on family sizes except pea. During the past week the most conservative firm among the independent shippers sent out a notice to its customers that the July prices would be 15c. higher than company coal. In addi-

tion to this it is the general impression that the smaller shippers are getting even higher prices in outside markets, which would seem to account for the small receipts by their customers in this city.

Despite all their efforts to increase production we have been informed by representatives of the big companies that they are still unable to approach the maximum of last year. All mines could use many more inside workers, and even many of the men who are working have no particular incentive to turn out a heavy production. They have been running under high pressure for such a long time that they seem inclined to ease up, at least that is the opinion of a very well informed operator. As winter approaches they have hopes that much of this lethargy can be overcome, but they are then faced with the likelihood of a car shortage. All of these facts are coming to the attention of the general public and at this time is stirring them to renewed energy to have their coal put in now.

The retail trade is also having some anxious moments in regard to a possible increased cost in the delivery of their coal due to the demands which drivers are making in various sections of the city. At this time it cannot be seen how an increase in wages can be avoided, and the retailers dread adding anything to the retail price of coal, especially in midsummer. If this increase can be staved off until late fall most of them will be satisfied.

In the hopes that they will soon receive greatly augmented tonnages all the progressive dealers are continuing their advertising, urging consumers to put in coal this summer. Even with the tonnage already placed and delivered, there still remains a large percentage of summer business that has not come in and must be cared for before it can be said that the city will be entirely out of danger of a fuel shortage next fall and winter.

It is believed that in the steam coal buckwheat No. 1 has gained some strength recently, and so far as we can learn no large company is compelled to place any of this size in storage. Of course, there may be occasional cars, but on the whole it can be said that the entire production is being absorbed and the indications are that within a few weeks the demand will be greater than the supply. There has also been a slightly better movement of rice, but heavy quantities of this size still continue to move toward the storage yards. Barley is also being stored heavily and there has been no perceptible change noticeable in this size for weeks, nor is there expected to be for some weeks yet. From those concerns who are anxious to make broken coal for manufacturing purposes comes the report that there is much strengthening in this size, which can be traced to improvement in the iron trade.

As to the matter of collections, all shippers report improvement in this respect, and while the conditions have not as yet approached those of war times, it is only a question of a month or six weeks until all shippers will require exact compliance with their terms by shutting off shipments.

With the increase of 10c. per ton on July 1 the prices per gross ton f.o.b. cars at mines for line shipment and f.o.b. Port Richmond for tide are as follows:

	Line	Tide		Line	Tide
Broken ...	$5 95	$7 80	Buckwheat.	$3 40	$4 45
Egg.	6 15	8 00	Rice	2 75	3 65
Stove	6 40	8 25	Boiler..	2 50	3 50
Nut	6 50	8 35	Barley	2 25	3 15
Pea	5 10	6 70			

Bituminous—The soft-coal trade holds its own quite well. Of course the average working time is only about 50 per cent., but the production mined is well taken care of. A significant straw lately is that there has been an occasional report of a car shortage here and there in the region. Producers hesitate to predict what the situation will be in the fall when the railroads will be feeling the impetus of crop movement and renewed industrial activity. The real demand just now is for the high-grade coals, and the price position of such coal has improved to some degree. The demand for prompt shipment is really less than the supply. There is much spot coal offered of the ordinary grades and some fair movement of the same. While the general situation is not near what could be wished for, it is still believed that the tendency is toward improvement and that not far distant. Operators are not at all anxious to contract their output, many of them signing up for only 60 per cent. of their capacity.

With slight price changes recently the quotations ruling in this market are about as follows:

Georges Creek Big Vein	$2 95 @ $3.05
South Fork Miller Vein	2.95 @ 3.05
Clearfield (ordinary)	2.70 @ 2.85
Somerset (ordinary)	2.65 @ 2.75
Fairmont Lump	2.50 @ 2.60
Fairmont mine-run	2.35 @ 2.50
Fairmont slack	1.90 @ 2.05
Fairmont lump (ordinary)	2.25 @ 2.35
Fairmont mine-run (ordinary)	2.00 @ 2.15
Fairmont slack (ordinary)	1.70 @ 1.80

BALTIMORE

Export situation improving. Domestic demand light. Anthracite receipts small; some dealers paying premiums.

While the domestic business is light here the export situation continues to show fine improvement and this trading is the bright spot in the local situation. There were plenty of queries and many chasings for business into quarters that appeared bright, but which did not bring about results after investigation. Many of the leads that looked tempting and appeared to be ready for closing held off when an attempt was made to pin down the buyers. Spot business continued to be all that was done here, although there were reports that seve a contracts had been consummated. In the open market $2.75 was the top price for the best grade of coals, while some of this grade sold down as low as $2.50. For medium grade fuels the price ranged about $2.30, with $2 and as low as $1.90 for the low grade of fuels. There was very little demand for the cheap grade of fuels.

June appears to be headed for a record in exporting at this port and in 21 days of the month 28 vessels have left this port for European and South American ports carrying 145,245 tons cargo and 13,992 tons bunker. Italy, Switzerland and Holland each had four vessels, and Sweden nine ships, South American ports had six ships Argentina, three; Brazil, two, and Peru one. Cuba was the destination of one ship Indications are that the last week of the month will also show heavy shipments.

Anthracite dealers are still worrying along with light receipts and no prospects of obtaining any larger amount of coals unless they pay heavy premiums. Several dealers, however, took advantage of figures quoted by independent operators and paid premiums over what they have been paying and thus were able to get about a dozen carloads of coal. Announcement is expected before the close of the month of an increase to householders, 25c. or more per ton, over the April schedule, which is still in force. There is likelihood of a meeting of the Baltimore Coal Exchange this week.

Lake Markets

PITTSBURGH

Some higher circular prices quoted. Heavy lake shipments. Prompt coal steadier.

Some Pittsburgh district operators have advanced circular prices, making mine-run $2.50 instead of $2.35, ¾-in. $2.75 and 1¼-in. $2.90, but as they had already stopped selling for the remainder of the coal year at the old prices this is largely an incident. Nearly all the contracting that could be expected had already been done, all producers being disposed to limit their commitments on account of operating uncertainties and feeling that consumers should be content to buy their remaining coal from month to month, paying whatever the situation might warrant. No regular contract market is quotable.

Lake shipments continue heavy. The last Geological Survey report shows dumpings at lake ports, including vessel fuel, at 6,117,063 tons thus far in the season, against 4,966,868 tons in the same period last year. This Pittsburgh district has contributed its full quota to the increase. It is probable that the movement will taper off earlier than usual and this seems necessary as the railroads, in their present condition, could hardly stand up under the rush that usually occurs toward the end of the season.

Prompt coal is somewhat stiffer, there being less coal than formerly available at minimum prices while on the other hand the full $2.35 price on mine-run is more frequently obtained. Only Panhandle coal could probably be picked up at $2, and if this price has been done on Connellsville it was altogether exceptional. For prompt shipment we continue to quote: Best grades gas coal: Mine-run, $2.35; slack, $1.65@1.85; screened, $2.60@2.70; Steam: Slack, $1.40@1.70; mine-run, $2@2.35, per net ton at mine, Pittsburgh district.

BUFFALO

Some report of bituminous improvement. Many jobbers fail to see any. All agree that it is not far off. Anthracite going fast again by lake. Stove size scarce.

Bituminous—The sellers of soft coal do not yet agree as to the condition of the trade. Some find the demand increasing, some do not. It is conceded, though, tha the consumer is now eager to make contracts, and that means he is convinced that the prices have reached the bottom; so the seller is inclined to hold off. Why sell coal at going prices on long delivery when the only change possible is an advance? T reasoning is good and it is likely to be acted on. While it is easier to handle the bulk of the coal on contract than by single orders, it would not be safe to sell it for less than it costs.

The word from the mines is all one of confidence. The future stands for a good trade at good prices. Everybody is saying that. Some jobbers are wondering how much of this prediction is born of a wish to that effect, but they agree that a confident feeling is proper and say nothing against it. Trade must come back before long, and the moment it sets in the big sale of coal will begin. At the same time it will do no good to attempt forcing the market, so the shipper waits for it to move of its own accord, believing that he will not have to wait long.

Shippers are careful not to forestall the advance by crowding coal forward. Buffalo has little or no coal on track unsold, and the plan seems to be general not to pretend an improvement is here till it comes. At the same time the reasons for a better trade are quite out of the coal trade proper and it will have to wait for them The waiting time has been long and should be close to the end.

Bituminous prices are stronger, but have not changed much of late, the basis being $4.55 for thin-vein Allegheny Valley, $4.45 for Pittsburgh and No. 8 lump, $4.30 for same three-quarter, $4.05 for mine run, $3.65 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The demand is still in excess of the supply, but is not very insistent. Shippers hope that by the return of cool weather they can meet it again, in spite of the shortage in mining. It is expected that July will turn out more than June has The stove size is especially short and it will continue so till the fall demand for chestnut sets in.

The shipments to the lakes are heavier than they were, being for the week 133,647 net tons, of which 49,600 tons cleared for Duluth and Superior; 34,800 tons for Chicago; 31,700 tons for Milwaukee; 3700 tons for Green Bay; 3500 tons for Sault, Can.; 3486 tons for Ashland; 2500 tons for Manitowoc, 1611 tons for Sheboygan; 1000 tons for Racine and 950 tons for Hancock.

Freight rates remain at 60c. to Chicago, 57½c. to Racine, 50c. to the Sault, 47½c. to Milwaukee, 42c. to Duluth, Green Bay, Hancock, Manitowoc and Sheboygan.

CLEVELAND

Ohio coal operators are feeling the effects of a car shortage. Combined with labor shortage, this has kept the mines from being operated at more than 55 to 60 per cent., on an average. Demand for all grades except domestic bituminous continues good.

Bituminous—With the lake trade taking just about all that the mines can forward, and steam-coal consumers showing increased interest in the market, southern and eastern Ohio operators are finding themselves face to face with a serious car shortage. Despite the large surplus of cars reported month by month by the Federal Railroad Administration, the supplies at Ohio mines the last ten days have been quite restricted. It is believed so many cars have been kept in service beyond normal length that excluding all cars badly in need of repairs, the administration has not near the number that will be needed the coming winter.

All this is taken by operators to make it doubly advisable for coal consumers to stock now. A goodly number are buying, but a surprising number still scoff at talk of a shortage. Meanwhile, every week sees prices stiffening. Coal may be said to be plentiful in that all needs are being met, but the southern and eastern Ohio mines now are not producing much more

coal, if any, than is actually being used. Thus no opportunity for stocking exists, and if the larger steam-coal users start into next winter with no more stocks than they have now or show signs of laying in, operators cannot see anything but a serious pinch.

The labor trouble at the mines continues, but for the present it is overshadowed by the car shortage. While some operators are inclined to contract freely and take what they call a safe and fair profit, many of others are leaning toward the side of doing as little contracting as possible. The only difference among operators is on how high coal will advance next winter. It is reported that a fair-sized block of slack has been contracted for at $2.10, while another user has taken mine-run at $2.20. This last deal is supposed to involve quite a sizable tonnage.

Plenty of anthracite and Pocahontas is being laid in, but the larger domestic users of bituminous, such as apartment houses, hospitals and the like, are averse to buying now. They say last winter's experience with the "stock early" advice was disastrous, and they are quite gun-shy at present. Supplies of anthracite and Pocahontas are increasingly difficult to obtain.

Lake Trade—Car shortage at the mines has slowed up the movement toward the lakes, but despite this the supply on hand at Lake Erie ports is somewhat larger. Increase in the number of consignments this season is the explanation. Efforts are being made to release the cars now being held at lake ports. Barring this temporary condition, the lake trade may be said to be taking all the bituminous it can get. So far this season shipments are about 30 per cent. ahead of a year ago this time.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg	$10.85 to 11.05
Chestnut	11.15 to 11.35
Grate	11.05
Stove	11.05 to 11.25
Pocahontas:	
Forked	9.00
Lump	8.25
Mine-run	7.20
Domestic bituminous:	
West Virginia splint	7.75 to 8.00
No. 8 Pittsburgh	6.10 to 6.35
Massillon lump	7.30 to 7.40
Steam coal:	
No. 6 slack	4.20 to 4.40
No. 8 slack	4.70 to 4.95
Youghiogheny slack	4.85 to 5.15
No. 8 2-in. lump	5.40 to 5.55
No. 6 mine-run	4.40 to 4.50
No. 8 mine-run	4.80 to 4.95

DETROIT

Bituminous coal buyers are pursuing a waiting policy and shipments are light, with prices rather steady.

Bituminous—Efforts of wholesalers and jobbers have so far failed to impress Detroit consumers of steam coal with the advisability of placing orders promptly to assure obtaining an adequate supply. Many of the buyers are withholding orders and some are buying on a hand-to-mouth basis evidently desiring to be in position to take advantage of any lowering of prices that may occur.

The jobbers are holding out no encouragement that coal will be cheaper. They insist that price revisions are more likely to be upward than downward, due to labor conditions and curtailed production, and express surprise that large employers of labor here seem unable to appreciate that the mines are as greatly handicapped in getting men as are other lines of industry.

Shipments are not of large volume at present. Reports are coming to the jobbers, however that seem to indicate the matter of car supply is soon likely to assume a troublesome aspect. Certain types of car desired by some Detroit buyers to facilitate unloading are said to be almost unobtainable.

With the reduction of the amount of coal on tracks, prices are taking a steadier appearance. Hocking domestic lump is quoted at $2.75, net ton, f.o.b. mines, with freight and Government tax added for delivery in Detroit. Mine-run from the same district is $2 and slack $1.50, while other leading varieties of Ohio coal used in Detroit carry about the same quotations.

West Virginia gas or splint lump is quoted $3 to $3.25, while two-inch lump is offered at $2.85, mine-run at $2.10 to $2.15, and slack at about $1.75.

Anthracite—With shipments of anthracite of small size retailers seem well supplied for present requirements, while household consumers are postponing buying to assure provision for winter requirements.

Lake Trade—Increase of slow distribution from docks at the head of the lakes shipments are likely to be curtailed soon by lack of storage space. For the week ending June 21 vessels loaded 1,037,499 tons, of which 993,602 tons were cargo coal. Adjustment of labor troubles at the Canadian head of the lakes permits resumption of shipments there, which in part have been diverted to other ports.

COLUMBUS

The coal trade in Ohio is running along steadily with production at about 70 per cent. of normal. There is a better demand for domestic grades. Steam business is quiet while take trade is becoming fairly active.

The best feature of the Ohio coal trade is the better demand for domestic grades. This is especially noticeable in the fancy grades where the demand is especially strong. As a result prices for Pocahontas and West Virginia splints are stronger. Pocahontas is selling around $4.75 to $5 at the mines while splints are quoted around $3. Retailers are taking advantage of the time to stock up preparatory to the stocking-up period, which has now about arrived. Householders are showing a disposition to buy although some are holding off for lower prices. Generally speaking, the domestic trade is later than usual in showing activity, and only a small amount of the retail business has been booked.

There is a better demand for steam sizes, although that branch of the trade is not developing so fast as was expected. Steam users are buying off the open market and are showing little disposition to contract. This is especially true of users of screenings, which are still a drag on the market. Iron and steel plants are not buying to any great extent although business in that line is expanding. Reserve stocks are being depleted, which is one of the best signs of the trade. General manufacturing appears to be improving, judging from increased fuel purchases.

The lake trade is showing considerable activity, although the Hocking Valley field is not sharing in the activity to any great extent. Pomeroy Bend is benefiting and the same is true of eastern Ohio. Practically all of the lake fuel agreements have been made and thus those who have not shared in the business will be cut out for the season. Vessels are plentiful and dock interests are rushing a good tonnage to the head of the lakes. No congestion on the upper lake docks is reported as there is a good movement to the interior.

Production is holding up fairly well although little increase is reported during the past week. In the eastern Ohio field the output is estimated at 75 per cent. and the figures from Pomeroy Bend are 70 per cent. The Hocking Valley is producing between 60 and 65 per cent. of normal. Other fields are not showing up any better than formerly.

CINCINNATI

Local coal dealers optimistic of future. Smokeless coals hard to obtain.

Local coal users still maintain an indifferent air as regards the forecasted shortage for next winter and continue to refuse to lay in their winter supply. However, dealers and operators both are optimistic and look for a brightening of the conditions in the very near future.

Bituminous coal is selling to consumers in this city at $6 a ton in the downtown section and $6.25 a ton on the hilltops. Dealers predict this price will increase and that many of the householders will be disappointed if they wait until late in the summer before placing their orders. Pocahontas is out of the question, there being little in this market. Many domestic users have been waiting to lay in a supply of the smokeless coal, their patience with the soft product during the years of the war having worn out. There are some who were fortunate to get in a supply of smokeless coal early this spring, but local dealers are not promising to supply any more this summer.

The smokeless product is up to $7.50 a ton delivered, with no prospect of immediate delivery, with the Navy taking almost every lump in sight. Cincinnati retail dealers can get little smokeless coal. The lump coal situation is stiff, few orders being placed by the industrial users; but the market on run-of-mine showed much improvement during the past week.

Car shortages to all mining districts in this vicinity are reported the shortage along the Louisville & Nashville in Kentucky being most pronounced.

BIRMINGHAM

Steam market showing more strength, with indications pointing to steady improvement. Domestic still strong and supply restricted.

A more optimistic spirit is prevalent among the coal men in this market, and there is a general feeling that there will be a steady increase in the demand for steam coal from now on. The delay of the railroads in awarding contracts for fuel for the year beginning July 1 is still somewhat of a disturbing factor. While it is understood that several lines have closed for the tonnage they will take from this district, so far as is known the Frisco is the only line which has signed contracts, taking around 220,000 tons of Walker County coal for the twelve months beginning July 1 at Government prices for the grades taken. The general commercial trade has improved some and some contracts are being closed at Government prices, and slightly better for best grades.

Brokers report a continued strong inquiry for domestic grades, lump being almost unobtainable in the open market. Spot quotations are about as follows per net ton mines:

Cahaba	$4.50@5.00
Carbon Hill	3.25@3.50
Big Seam	3.60
Chimax and Montevallo	5.00
Black Creek	4.00@4.50
Corona	3.75@4.00

Indications point to an increase in coal production in the near future, as several furnaces are being made ready for service and will be placed in blast within the next week or two. Some labor is leaving the district, and there is a disposition on the part of the men to drift from one operation to another owing to the short working schedule.

Coke

CONNELLSVILLE

Bulk of contract furnace coke business concluded, together with nearly all foundry coke business. Prompt prices stiffen.

Except for some eastern furnaces, the furnaces now in blast have nearly all covered for coke needed in the second half of the year. One eastern furnace interest has closed for a round tonnage, but others are considering byproduct coke made in the east, and may indeed have closed already in that quarter. Several furnaces now idle are negotiating for coke, but operators are shy about taking such contracts as that looks too much like giving an option. The furnaces might stay idle as long as it was hard to sell coke and get into blast only when coke would sell itself. Reports are that two or three furnaces may blow in sooner than they would like to do, merely to enable them to cover in coke for the remainder of the year. Contracts made on this movement probably aggregate between 125,000 and 150,000 tons a month, chiefly on a sliding scale basis, the coke being priced from month to month at 1 to 6¼ against basic pig iron at valley furnaces, whereby with pig iron at $25.75, as it is now quoted, the coke would be invoiced at $4.12. Some operators express a preference for holding their coke and selling from month to month on the theory that they may be able to secure higher prices late in the year even if pig iron does not advance.

Foundry coke is now well under contract for the second half, at $5 to $5.50, depending on brand, and also upon the kind of service operators furnished during the war. One coke has sold at a lower relative price than it usually commands by reason of indifferent deliveries made last year.

Spot and prompt coke is stronger. Concessions from $4 for furnace coke, formerly the rule, are now exceptional if made at all, while a quotation of $4.25 is common. Foundry coke is not quotable at a higher range, but the tonnage to be picked up at the $4.50 minimum lately quoted has become very small. We quote spot and prompt furnace coke at $4@4.25, spot and prompt foundry at $4.50@5 and foundry on contract for the second half of the year at $5@5.50, all per net ton at ovens.

Buffalo—The market is slightly stronger, as the furnaces increase in activity. Prices have not changed from former quotations, being $7.25 to $7.60 for 72-hour Connellsville foundry, $6.60 to $7 for 48-hour furnace and $6.10 for off grades. The situation slowly improves all around. Iron ore is coming in much more freely, though not

enough yet to give business to the entire fleet. The amount received for the week was 163,380 gross tons. It averaged above 200,000 tons a week last season.

Middle West

GENERAL REVIEW

Domestic sizes scarce, while steam sizes are a drug on market. Publicity campaign to warn public of coal shortage.

The coal market shows practically no improvement to speak of. Screenings and steam sizes continue to be a drag, while prepared domestic sizes are in strong demand. The difficulty the operators are encountering in selling screenings hinders the prompt filling of domestic orders, and as a result operators are behind on one grade of coal and are industriously hunting for a market for the other grades. The delay in filling domestic orders is causing the retailer some worry because he realizes that if he cannot get prompt shipments now, conditions during the fall and winter will not be much better.

Operators and distributors alike were hoping that conditions in the coal industry would go back to something near normal this summer. The contrary is the case, however. During an ordinary summer, screenings are at a premium practically from April to July, and prepared sizes for the domestic trade are never in demand until after July. This season conditions have been the reverse, with a strong demand since last March on prepared sizes and no demand to speak of for screenings and steam sizes in general.

Operators are making a strong fight to obtain contracts. Large buyers of coal appear interested in contract prices, but do not care to sign up at this time, preferring, it seems, to purchase what little coal they are buying on the open market. Practically all of the coal operators' associations are keenly alive to the present situation and are doing everything they can in the way of publicity to back their members in staring up public interest and in getting business. With so much steam coal available it seems hard to realize that there is a shortage of coal today. We are referring to Southern Illinois 3 x 2-in. nut or small egg. All of the large companies are from four to six weeks behind on this size, and the dealers in this territory are beginning to feel worried about their future supp. of this particular grade of coal.

It has been said that one of the Franklin County operators is sold up on all sizes for the month of July. Furthermore, prices on prepared sizes for July are quoted by this company at 15c. higher than the rest of the county. In other words, this company has sold all of its domestic coal on a basis of $3.10, and is getting good prices for all other sizes. This company makes a specialty of preparing all its coal, and as a result has no screenings or mine-run to offer. The coal under 2 in. in size is graded into various nut sizes, down to practically dust. These smaller sizes of nut are used by small factories, where the greatest efficiency must be obtained from fuel. The dust is used by cement plants. This coal being of such an excellent quality explains why this company is sold up, while other companies are looking around for more business.

The writer does not believe there will be much change in the market in the next one or two weeks, although there are a number of operators who predict that the signing of peace will bring about a strong demand from the manufacturers.

CHICAGO

No change in market conditions. Predicted that lump coal will be harder to get.

There has been little change in the coal trade. The demand for steam coals is even less than the demand in the country, although domestic orders from Chicago and suburbs continue to come in to operators and jobbers.

Prices have been advanced, effective July 1 on eastern coals. Anthracite coal has, of course, advanced its usual 10c. per ton, although dealers are showing a willingness to pay a premium of 25c. or more for prompt shipment.

Pocahontas mine-run, moving on contract to the retail trade, continues to come in well, although not fast enough to satisfy the retailer. Pocahontas lump and egg is moving, roughly speaking, from $4 to $5 per ton f.o.b. mines. When we say Pocahontas, we are referring to both Pocahontas and New River coal.

The demand for southeastern Kentucky coal increases steadily, as this product has grown more and more in favor because of its excellent preparation. Hazard coal is moving freely at from $3.50 to $4 f.o.b. mines, for the block sizes. Harland coal is moving at about the same figures. Hazard coal at the present writing seems to be a little more in demand because it contains less soot, is a harder coal, and will stand rough treatment without losing its preparation.

The domestic coals from Indiana and Illinois are moving freely to Chicago, although the most popular size from either state is the 3 x 2 in. small egg. It is predicted that lump coal will be harder to get when the mines begin to receive orders from the country where lump coal is used for threshing.

Current prices are as follows:

ILLINOIS

Southern Illinois Franklin, Saline and Williamson Counties	F.o.b. Mines per Ton	Rate to Chicago
Prepared sizes	$2 65@$3 10	$1 55
Mine-run	2 20@ 2 50	1 50
Screenings	1 90@ 2 30	1.50
Central Illinois Springfield District		
Prepared sizes	2 55@ 2 85	1.32
Mine-run	2 00 2.45	1.32
Screenings	1.85 2 20	1.32
Northern Illinois		
Prepared sizes	3.00@ 3.50	1.24
Mine-run	3 00	1.24
Screenings	2 75	1.24

INDIANA

Clinton 4th Vein District		
Prepared sizes	2 65@ 2.95	1.27
Mine-run	2 35	1.27
Screenings	2.00@ 2.15	1.27
Knox County 5th Vein		
Prepared sizes	2.40@ 3.25	1.37
Mine-run	2 20@ 2 35	1.37
Screenings	1.70@ 2.10	1.37

EASTERN COAL

New River and Pocahontas		
Prepared sizes	4 50@ 5.00	2.60
Mine-run	3.00@ 3 25	2.60
West Virginia Splint		
Prepared sizes	2.50@ 2.75	2.60
Mine-run	2.00@ 2.45	2.60
Pennsylvania Smokeless		
Prepared sizes	3 75@ 4.25	2.60
Mine-run	2 75@ 3.00	2.60
Hazard, Ky.		
Prepared sizes	3.50@ 4.00	2.45
Mine-run	2 65@ 3.15	2.45
Nut, pea and slack	1.85@ 2.30	2.45
Harlan, Ky.		
Prepared sizes	3.25@ 4.00	2.45
Mine-run	2.55@ 3.00	2.45
Cannel	3 00@ 3.50	2.45
Smithing coal	2.75@ 3.25	2.60

MILWAUKEE

Coal market quiet, with a moderate run of business. Contracts let for coal supplies for city institutions.

Summer quiet prevails in the coal market, but deliveries continue to increase as the season advances. The demand from the interior is only fair, however, and stocks are accumulating in consequence. Coke is moving slowly. The June schedule of prices is upheld, and it is expected that the usual advance of 10c. per ton will materialize on July 1, despite the protest of the Milwaukee Association of Commerce that coal is high enough at present.

The city authorities have just awarded contracts for about 65,000 tons of coal for delivery to various municipal institutions during the coming year, at the following prices: Anthracite stove, $11.80; egg, $11.60; nut, $11.90; buckwheat, $9.25; semi-bituminous lumps, $7.25; mine run, $6.40; bituminous lump, $5.75 to $6.25; hand-picked N. U. splint lump, $7.25; smithy coal, $8.10. The successful bidders furnish eastern coal. The offers to furnish western bituminous screenings ranged from $4.77 to $5.11. The city contract aggregates $342,017.95, a saving of about $50,000 on last year's coal bill. The authorities of Milwaukee County awarded a contract for 1,500 tons of Indiana screenings for use at the courthouse at $5.47 per ton. Up to date 231,896 tons of anthracite and 1,047,869 tons of bituminous coal have been landed on the docks at Milwaukee, against 157,389 tons of the former and 749,785 tons of the latter during the same period last year.

The Callaway Fuel Co., which has been operating a hoist of obsolete character, is installing an improved steel bridge to increase the unloading facilities of the yard.

ST. LOUIS

Local conditions show some improvement, with indications of general betterment. Domestic business is picking up, but steam sizes are heavy and producing conditions hard to contend with.

The local situation shows a rapidly changing condition. Within the past week or ten days the retail situation has shown a marked improvement in the ordering of storage coal. This, however, is chiefly on the better grades of coal such as anthracite, smokeless, Carterville coal and coke. Standard and Mt. Olive is not in demand at all.

The country demand seems to be picking up a little on domestic sizes, but on steam coals the situation remains unchanged and, if anything, begins to grow worse. This is on account of the increased tonnage of domestic sizes being produced, making a greater tonnage of steam sizes for which there it no market. All the available equipment and storage room at the mines and the vicinity thereof is loaded with steam sizes and many mines still continue to dump these sizes on the ground.

The industrial depression in the St. Louis district is unusually severe. It is far-reaching in many ways least expected. An electric power plant that used to consume two or three cars a day seems to be able to get along on one car of screenings now, and many of the smaller plants in the St. Louis manufacturing district have been and are being equipped with electric power. In some sections there has been an offset on the decreased demand for the smaller sizes by the fact that some railroads have locomotive equipment that calls for stoker-size coal, but this does not help the situation to any great extent.

In the Standard field there is an overproduction of everything, chiefly of steam sizes. Some mines have been idle for many weeks. Others having been working one and two days a week and coal is selling below cost. The railroad tonnage is light.

In the Mt. Olive field the situation shows considerable improvement, but most of this coal moves to outside markets, whereas Standard is confined chiefly to St. Louis. The railroad tonnage in the Mt. Olive field is fairly good.

In the Williamson and Franklin County field the steam sizes are the stumbling block. Many mines are still idle in this field and many are working only one and two days a week because they cannot move steam coal. Others are piling it up on the ground.

The miners still continue to leave all the fields for other employment and the foreigners are arranging to go to Europe. The tonnage in nearly all the mines shows a decrease on this account.

Cars at the present time are plentiful, and the movement is fairly good. The railroad tonnage from the Carterville field is good, everything considered.

Conditions in the Du Quoin field are similar to those in the Carterville field with the exception that the prices are not maintained.

Effective the first of the month the Carterville field operators in nearly every instance advanced their price from $2.85 to $2.95 at the mine, with the exception of one Franklin County operator who is asking $3.10 on account of having more domestic orders than he can take care of. The independent operators are getting from $2.55 to $2.70.

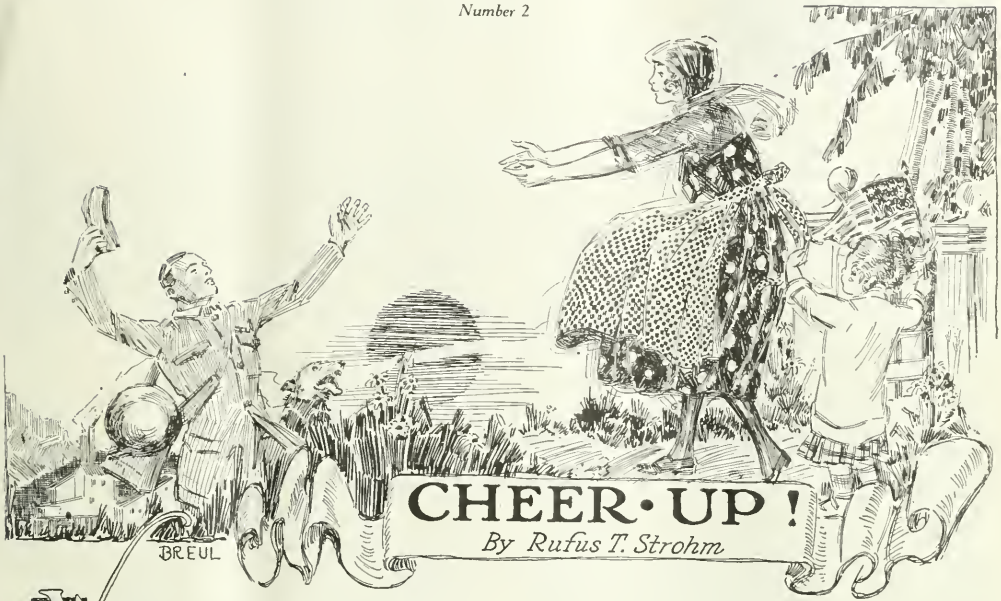
The prevailing circular is per net ton f. o. b. mine:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
Association:			
Lump, egg and nut	$2 95	.....	.. ..
Washed Nos. 1 and 2 nut	2.95	.....	.. ..
Independent:			Lump $2.00 & up
Lump, egg and nut	2 70	$2.55 Egg	1 75
Washed Nos. 1 and 2 nut	2.95	.....	.....
Mine-run	2.45	2 20	1 60@ 1.70
Screenings	2 20	2 05	1 35@ 1.50
3-in. lump	.....	2.30	.....
2-in. lump	.....	.....	1 75
2x6 egg	.....	.....	1 75 & up

Williamson-Franklin County rate to St. Louis is $1.07½; other rates, $0.92½.

COAL AGE

New York, July 10, 1919
Volume 16
Number 2

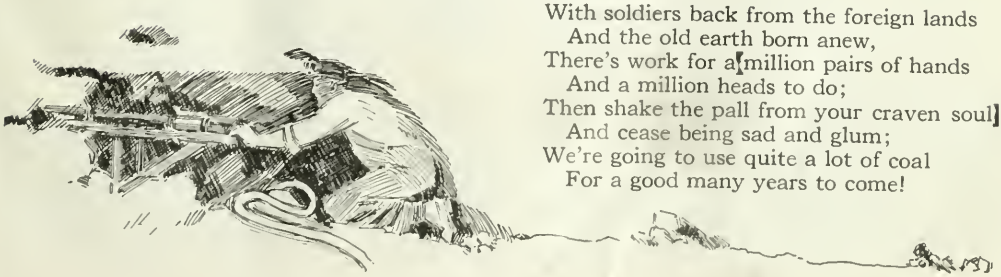


CHEER·UP!

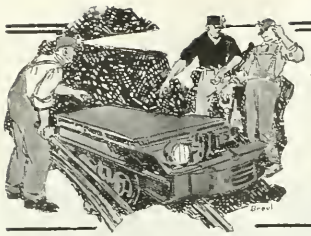
By Rufus T. Strohm

We've all been hectored and sorely tried
By the war's demands, it's true,
But we've met them all, and we've gained, besides,
From the service we've gone through;
For we've put an end to the cannon's roll
And the beating of the drum;
Now let's dig in to supply the coal
For the bang-up years to come!

The world's been shorn of its wonted trade
Till its shelves are standing bare,
And the countless products that must be made
Call for labor everywhere;
So can the grief and the gloom and dole;
Away with the twiddling thumb;
We're bound to burn quite a bit of coal
For a good many years to come.



With soldiers back from the foreign lands
And the old earth born anew,
There's work for a million pairs of hands
And a million heads to do;
Then shake the pall from your craven soul
And cease being sad and glum;
We're going to use quite a lot of coal
For a good many years to come!



IDEAS AND SUGGESTIONS

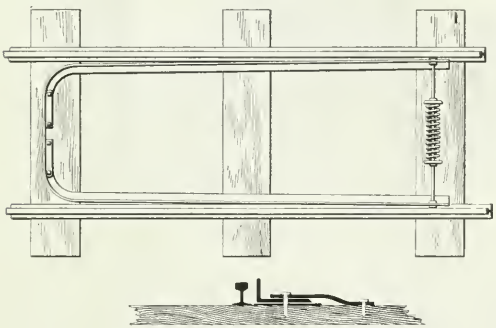
PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

An Efficient Car Retarder

BY RALPH L. MAYER
California, Penn.

The La Belle Coal and Coke Co. uses an efficient car retarder at the mine which it operates a short distance above Brownsville, Penn., on the Monongahela River. This device is placed directly below the cross-over dump to prevent the cars from striking the kickback with too much force. It is made from pieces of L-shaped angle iron about 8 ft. long placed on the inside of each rail.

The end from which the car approaches is bent for a foot of its length at a slight angle. A pivot, or bolt,



DEVICE PREVENTS CARS FROM STRIKING KICKBACK WITH TOO MUCH FORCE

passes through a hole made near its end, and down into the tie upon which it rests. An iron plate is placed between the tie and the angle iron, to prevent wear. The pivot passes through this plate as well as through a brace placed on top of the angle iron. This brace is made long enough to extend out beyond the side of the angle iron, where it is bent down and spiked fast to the tie. The space between it and the tie should be sufficient to allow free movement of the angle iron.

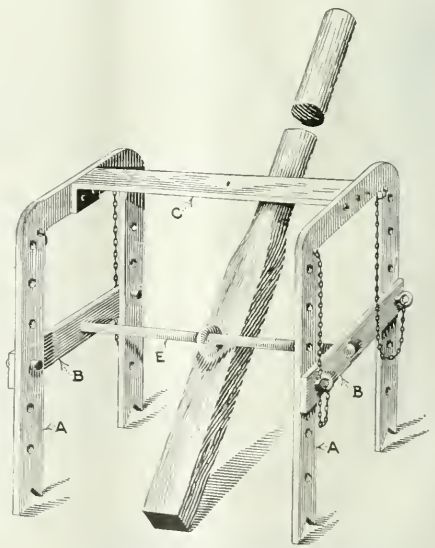
The free ends of the angle irons have iron rods fastened rigidly to them. The length of these rods should be about one-third the width of the track gage, and their free ends should be threaded for nuts. A stiff spiral spring is placed between these two rods, the ends of the rods entering the center of the spring coil. The tension of the spring is regulated by the nuts on the ends of the rods. Between the spring and the nut are placed washers large enough to prevent the coil from passing over the nut. A tie should be located under this spring and the rods.

The size of the L-shaped iron will depend upon the height of the car axle above the track rail. Its upright leg should reach nearly to the axle of the car, but should not touch it. The car is retarded by this upright leg crowding against the inside of the car wheel. The spiral spring holds the ends of the angle irons apart, and if necessary tightly up against the track rail. The tension on this spring is determined by the grade of the incline and the amount that it is necessary to retard the car. This also determines the distance from the rail that the hinged end of the angle iron is placed. If the grade is heavy, the angle iron is placed close to the rail; if light, farther away. The strength of the material used will also depend upon the weight of the cars to be retarded. The material employed should be much stronger than is absolutely necessary, as its first cost is small.

Lever or Road Jack

BY RICHARD BOWEN
West Pittston, Penn.

The accompanying illustration shows a simple, yet safe and powerful lever or road jack that has been found useful at the foot of a shaft and on turnouts. Here it is used to replace loaded or empty cars that have been derailed. The standards *A*, the movable parts *B*, and the brace *C*, are made of $\frac{1}{2}$ x 2-in. iron. The movable



ROAD JACK FOR USE AT TURNOUTS

parts *B* are joined together by the $1\frac{1}{4}$-in. round iron bar *E*, which passes through a 1-in. eyebolt running through the lever. A washer is placed between the eye of the bolt and the lever, and another is placed below the nut on the under side of lever. The eye of the bolt fits loosely over the $1\frac{1}{4}$-in. bar, thus permitting the lever to slide along it.

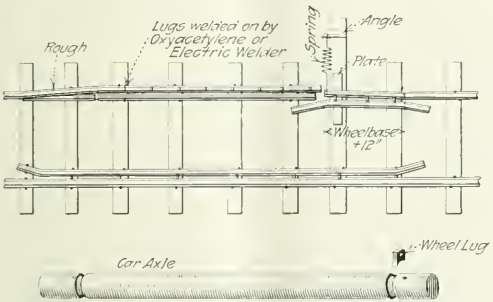
The movable device can be adjusted at any height on the standards by means of pins, which are hung in place by small chains that should be the same length as the height of the standard. The distance between the standards should not be greater than the width between the bumpers of the cars. This permits the device to be placed as close against the car as possible. The lever can be made any length, but the weight arm should not exceed 18 inches.

Tester for Loose Car Wheels

By E. E. Jones
Stotesbury, W. Va.

The illustration shows what might be called a "tester for loose car wheels." So far as I know, this is an entirely new idea and might have possibilities from a patent standpoint; but since it is almost entirely a safety idea, I am going to pass it along.

It might be of interest to those connected with mining to know that on 450 mine cars put through



DETAILS OF A CAR-WHEEL TESTER

this device 125 loose wheels were found. Also that before this device was installed it was common to have expensive delays due to wheels coming off when cars were passing over frogs and switches, and that wrecks arising from this cause were common. This tester should be installed in such a way that cars coming from the dump will pass over the section of track on which the device is located.

It will be noticed that I have marked one of the rails as "rough rail." The idea of this is that car wheels passing over this rough rail will make sufficient noise to attract attention, thus allowing the bad car to be switched out of the trip. It will also be noticed that the car is not derailed, but passes back on to the main line and can thus be switched out on the siding for cripple cars.

It might be mentioned that this tester is only one of the many good things to be found around the E. E. White Coal Co.'s plants which have gone far toward making them the most prosperous and "up to the minute" plants in the United States.

Many different kinds of coal have been tested and analyzed by the Bureau of Mines in its investigations relating to the purchase and use of fuel by the government and to safety in coal mining. Advantage has been taken of the opportunity thus afforded to obtain information as to the differences in weight of the various coals. A study of conditions indicates that heavier weights may be expected for coals of high fixed carbon than for those of low carbon content.

Rearranging the Terminal Block

By Machine Runner
Sullivan, Ind.

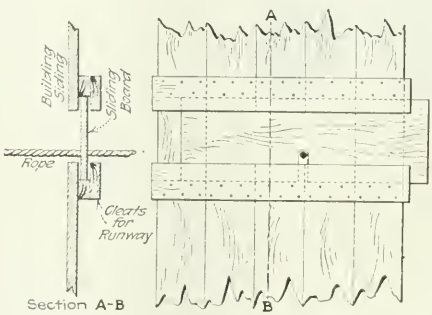
When a certain well known make of coal cutter comes from the factory the fuse or terminal block is directly on top of the gear case, where all the dirt and bits of slate which fly while the ratchet jack is being set fall on the block. This soon becomes full of dirt if not cleaned off frequently and causes the negative and positive terminals to arc, thereby burning the terminal clamps and clamp screens. Another disadvantage arising from this location of the terminal block on top of the gear case is the danger of coming in contact with the positive terminal while operating the different levers located near the block.

Better results have been secured after the electrician was persuaded to move the terminal block around on the right-hand side directly over the resistance. Two ½-in. holes drilled and tapped into the motor casing is all that is necessary to make the change. The cable is then brought into the machine through the original cable clamp, but passes on over the top of the motor casing to the new location of the terminal block. When the block is bolted in place a piece of tin is inserted behind it, and after the bolts are tightened down to hold the block in place the tin is bent in such a manner as to form a shield for the block, thus preventing any substance from falling directly upon the terminals.

Sliding Door for Rope Opening

By E. P. Humphrey
Upper Lehigh, Penn.

To keep the cold wind from blowing into an engine room the device here shown is a winner. The light sliding board is notched and slipped over the rope, loose



DETAILS OF A SLIDING DOOR FOR USE IN ENGINE ROOM

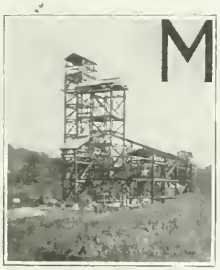
runways built and the problem is solved. Of course, the board must be long enough to cover the opening when the rope is at either end of its lateral travel.

In numerous instances about mines the increasing burden on a retaining wall threatens its collapse. The Pennsylvania R.R. recently successfully solved a problem of this kind as follows: The bulging retaining dry wall was strengthened by a series of buttresses each 4 ft. wide placed 18 ft. apart. The buttresses were connected at the top by a concrete wall built on top of the dry wall. The base of the buttresses rested on a substantialy constructed masonry wall. This method cannot always be carried out on account of lack of space for the buttresses, but the plan is effective where practicable.

Modern Shaft Mine at Amsterdam, Ohio

Shaft Operation in the Lower Freeport Seam—Coal Contains Some Sulphur and Quite a Little Bone, Though Analysis Shows That It Is a Good Fuel for Both Steam and Domestic Use—Present Capacity of the Mine Is 800 Tons a Day

By Jack L. Ball
Amsterdam, Ohio



MODERN power facilities, simplicity, thoroughness in the design of the tipple (especially its screening and loading equipment) and economical operation—this was the goal desired by the Youghiogheny and Ohio Coal Co. when opening its Amsterdam mine No. 2, at Amsterdam, Ohio. Foreseeing difficulties in the way of transportation, ventilation and the transmission of electrical energy in working this large virgin block of coal from Amsterdam mine No. 1, surveys were made and preliminary plans drawn several years before the sinking of the shaft at Mine No. 2 was begun in October, 1916.

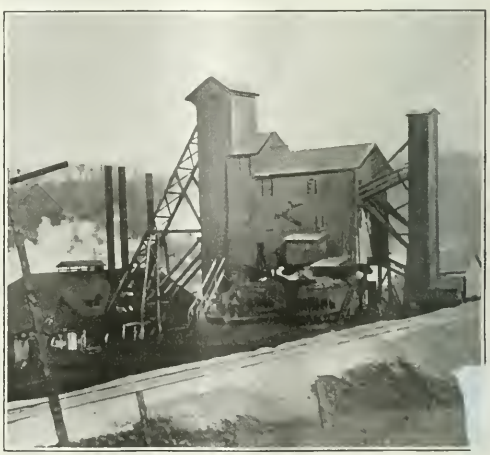
Amsterdam No. 2 is a shaft mine, 243 ft. deep, and opens into what was 12-west of No. 1 mine. The coal is the Lower Freeport seam, is free from irregularities and runs from 3 ft. 8 in. to 5 ft. 6 in. in thickness. Some sulphur and quite a little bone are found in this coal. However, it averages high in heat units and is an exceptionally good fuel for both steam and domestic use, as shown by the following proximate analysis by the U. S. Geological Survey:

Sample	Moisture	Volatile Matter	Fixed Carbon	Ash	Sulphur	B.t.u.
No. 1.....	3.7	37.4	51.2	7.7	3.07	13,220
No. 2.....	...	42.2	57.8	...	3.47	14,910

The new shaft has two hoisting compartments and two compartments for the intake and exhaust of the air. The mine at the present time is ventilated through No. 1 mine by means of an engine-driven, 4 x 10-ft. Jeffrey fan (located at No. 1 mine) and assisted by a small booster fan. Double and triple entry systems are used.

. The shaft is 22 ft. 6 in. by 11 ft. 6 in., and the lining is of solid concrete construction, the walls having a minimum thickness of 22 in. and terminating in an arch on each side of the shaft bottom. Wooden guides, 8 x 9 in., are used; and the guides are fastened to wooden buntings the ends of which are concreted solidly in the walls of the shaft.

The bottom is so arranged that coal is caged from one side of the shaft by automatic cagers, which are supplied by trip feeders having a speed of 30 ft. per minute. The feeders are driven by a 7½-hp. direct-current motor. Six mining machines of the Goodman shortwall type are used to undercut the coal. Coal is



GENERAL VIEW OF AMSTERDAM MINE NO. 1

gathered mainly from the working places by two 6-ton Goodman electric locomotives, but a few mules are also used. The wooden mine cars, having a track gage of 44 in., are equipped with Watt wheels and hold approximately 4500 pounds.

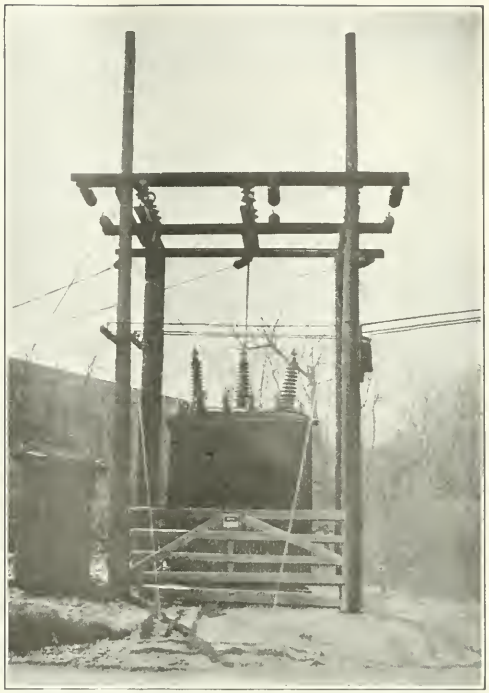
All mine water is handled by a 5½ x 8-in. Deming triplex plunger pump driven by a 45-hp., 250-volt, direct-current motor. The 4-in. discharge line of this pump is run from the coal to the surface through a 6-in. borehole. As a safeguard against excessive seepage, pulsation and deterioration of the pipe, the clearance was filled with concrete.

The prevailing high price of structural steel and the uncertainty of delivery made it necessary to construct a wooden tipple. The plan throughout has been to make a liberal allowance in the size of the material used as a safeguard against maximum strains. Posts rest on concrete piers, and every precaution has been taken at this point to guard against deterioration due to moisture.

Coal is dumped by self-dumping cages (1⅛-in. steel hoisting rope being used) directly into a 4-ton weigh hopper. From the weigh pan the coal is dropped to an 8-ton hopper. Run-of-mine can be sent to a bin and then to the railroad cars; or if prepared sizes are desired, the coal is fed from the hopper by a 4½ x 9-ft. conveyor to the shaking screens; from here it goes to the picking band and then to the loading boom. Refuse discarded from the picking band is carried to the dirt bin by an 18-in. conveyor. To drive the main conveyor, shaking screens, picking band and loading boom, and the 18-in. dirt conveyor, two 25-hp. and one 7½-hp. 220-volt, alternating-current induction motors are used respectively. The tipple is of the common four-track type, the railroad cars being placed by gravity. Screening and loading are so arranged that the coal can be loaded as follows: No. 1 track, slack or run-of-mine; No. 2 track, nut, or nut and slack; No. 3 track, egg, egg and nut, or egg, nut and slack; No. 4 track, 6-in. 1½-in., or run-of-mine.

The power house is a brick building 28 x 62 ft. in dimension. Power is furnished by the Central Power Co. at 66,000 volts from a substation at Dillonvale, Ohio. Primarily the power supplied is generated at the famous plant of the Windsor Power Co., Windsor, W. Va. From 66,000 volts the voltage is stepped down to 4000 volts at a small substation located at the mine. This in turn is stepped down by another transformer in the power house to 440 and 220 volts respectively. A 200-kw. synchronous converter furnishes direct current for the mine at 250 volts. The transmission lines into the mine run through 2-in. conduit embedded in the wall of the shaft.

A 6-ft. Lidgerwood hoist is driven by a 300-hp., 230-volt, variable-speed induction motor having a maximum speed of 600 r.p.m. A modern 32 x 65-ft. shop with ample equipment for blacksmith, electric and car repairs is also conveniently located near the shaft. Ample provision was made in a well equipped office building for the storage of small supplies; also a large building was constructed of hollow tile for the storage of feed for the mine stock, for oil and for sand. The present capacity of this mine is 800 tons a day; when sufficient territory is developed it is expected the capacity will be about 1200 tons.



OUTDOOR TRANSFORMER AND SUBSTATION AT AMSTERDAM MINE NO. 2

Acknowledgment is here made to Amos Jones, superintendent of the Amsterdam mine, for information and data supplied for this article.

Organizing for Mine-Rescue Work

To make rescue work in a mine efficient, there must be coöperation and harmonious relations between all forces, and there must be an organization that will push to quick completion the work of exploring the mine. A satisfactory organization may be outlined as follows: The general manager or superintendent assumes full charge of obtaining all necessary materials and men for the prosecution of the work; the state inspector assumes or accepts authority for the rescue and recovery procedure; the general manager or superintendent and the mine inspector select the foremen of shifts and other foremen who report to them or their representatives at the close of the shift, stating what has been accomplished. The rescue crews should be in charge of a chief of the rescue organization, to whom each crew should report. The chief of the rescue organization should report to the mine inspector in charge of the rescue and recovery operations or to some other official in charge of the underground work. When sufficient men are available the recovery crews should be arranged in 6-hour or 8-hour shifts; that is, they should work for 6 or 8 hours.

Electrical Transmission of Power in and About Coal Mines*

Six Methods of Electrical Power Distribution, Embracing the All-Direct Current, the All-Alternating Current and Four Other Combinations of These Two, With or Without Storage-Battery Haulage, Are Available in the Mine

By S. W. Farnham
Chicago, Illinois

IN SOME instances, when selecting the type of current for underground work, I think too much emphasis has been placed on the machine load. Articles have been written treating principally this one phase of the subject and considering the haulage as secondary. We sometimes hear that the storage battery will, in all probability, sooner or later emerge from its present obscure but valuable work as a gathering element, and expand into main haulage service; or, that a successful alternating-current main-haul locomotive is sure to be developed. Those who advocate the use of alternating current at the mine faces claim that we should decide the question from the standpoint of the machine load; the locomotives should be installed according to any convenient plan, not letting their problems affect the decision as to the general transmission system to be employed. The improvements that are certain to come will cause a change in the haulage system later, they say. A broad review of the conditions hardly justifies such conclusions.

In this age of invention and rapid development, it is, of course, unwise to assert that certain changes and improvements will never be made; but the operator and engineer must deal with existing facts, demonstrated through successful practice. New things must be tried and proved before allowing their possibilities to affect decisions on other equipments or systems.

Choice of Power Depends on Conditions

It is not within the province of this paper to express an opinion as to whether the direct-current or the alternating-current mining machine is the better; or whether the storage-battery type or reel-and-trolley type locomotive should be used for gathering. Each type of equipment has its champions; each has its advantages and disadvantages. Some conditions unquestionably favor one type, and other conditions another.

An alternating-current locomotive has been tried in Illinois mining work, and discarded. No one has had the temerity to try one since. In railroad practice, one large manufacturer advocates the direct current; another, the alternating current. But the control apparatus on the alternating-current locomotives, using single-phase current, looks too complicated and takes up too much space to be used in mine work.

Street cars have tried the alternating-current motors, in a few instances, but the practice is practically "dead." It is safe to place the alternating-current mine locomotive in the remote future possibility class.

As to the storage-battery locomotive for main haulage, the heaviest battery locomotive now built has about eight tons of weight on the driving wheels, and is of moderate speed, with limited radius of action because of battery capacity. Light main haulage, restricted in tonnage and distance, can be served by battery locomotives.

Main-haulage locomotives in Illinois may be said to average 12 or 13 tons in weight, and most of the later purchases are of at least 15 tons. Something radically different must be developed before such sizes of battery locomotives could be used. Furthermore, the present cost of batteries would make such locomotives commercially prohibitive.

The trolley locomotive for main haulage underground is to be with us for a long time; there is no sign of anything else to take its place. It should receive due consideration in the selection of any electric transmission system.

In fully developed Illinois mines, the locomotives on the average may be said to represent approximately one-half the total load on the circuit. Furnishing power to the locomotive may therefore be considered equally as important as furnishing it to machines, aside from the fact that the machine load is at a greater distance from the power source and requires better voltage regulation.

Types of Mine Loads To Be Considered

The following types of mine loads must be considered: Main-haulage locomotives, receiving power from the trolley; gathering locomotives, receiving power from the trolley or from a storage battery, or both; mining machines, operated either by direct or alternating current. In various mines we have to consider combinations of one, two or three of the loads mentioned. As to methods of transmission, we have the following:

All Direct Current.—While 600 volts maximum, medium pressure, is used in some places in the East, we do not have to consider it here, as the Central-Western coal fields use 300-volt maximum, low pressure, direct current.

All Alternating Current.—This is used only where alternating current or gathering locomotives, mining machines, or both, are installed and no trolley locomotive is used.

Combinations of Direct and Alternating Current.—(a) Alternating-current machines and direct-current main-haulage, with reel-and-trolley gathering locomotives. (b) Direct-current mining machines and locomotives with alternating current used only for transmission into the mines to convenient points, where it is converted into direct current by means of motor-generator sets or by transformers and rotary converters. (c) Similar to (a)—alternating-current mining machines, storage-battery gathering locomotives and

*Abstract of paper read before the Illinois Mining Institute, May 22, 1919.

direct-current trolley main-haulage locomotives. (d) Alternating-current mining machines and storage-battery locomotives—this last combination being practicable only where the locomotive work is light.

In Illinois and Indiana, the great majority of the installations are of the "all-direct-current" type, and the combination of direct and alternating is in use in some of the newer operations, as described in (a) and (c); one of the latest mines in Illinois is being projected with combination (b).

The combinations (a) and (c), while well known in Illinois, are almost unknown in the larger Eastern coal fields—not only in the old installations, but in the new. Where alternating current is used there it is almost exclusively for high-pressure transmission, and the entire current is changed over at suitable substations in the mines for the use both of mining machines and locomotives. The latest mine to be developed in Illinois is being opened with this plan in view.

Objections to Alternating Current Unfortunate

One occasionally hears objections made to the use of alternating current in any form underground. This is most unfortunate. The use of this form of power for high-pressure transmission in modern mines, with large tonnage and long distance of transmission, is essential.

It has been used for a number of years in England and Australia, and is permitted by Government sanction and regulation. Circular No. 23, "Standardization of Electrical Practice in Mines," published in 1910 by the Bureau of Standards at Washington, refers to the use of alternating current underground on pages 13 and 14, and prescribes rules for its safe installation. I quote in part from this bulletin: "A higher pressure than a medium pressure (600 volts) shall not be used for portable motors; nor for any other purpose underground, except for alternating-current transmission; or for application to alternating-current apparatus in which the whole of the high-pressure circuit is stationary. For work underground taking higher pressure than a medium pressure all transformers shall be of the oil-installation type and the motor shall not be of less normal rating than 20 brake-horsepower."

A rule for safety which applies to both direct and alternating apparatus specifies that all metallic coverings or armoring of cables, and frames and bed plates of generators, transformers and motors, and the metallic covering of switches, fuses and circuit breakers, shall be efficiently grounded.

I have observed where grounding as described above has been properly installed originally it has not always been maintained. Where the grounding wires pass through floors or partitions they should be incased or protected by pipe or conduit, since otherwise they are liable to break. In fact, they often do break. The importance of frequent inspection of grounding wires cannot be emphasized too strongly.

Voltages up to 3300 have been used, and there is no apparent reason why 6600 volts could not be employed with confidence underground, when installed according to the proper rules and regulations. The current is carried in three-phase armored or otherwise protected cables, usually placed in trenches. These cables extend from the surface to substations at strategic points near the working faces.

It will be noted that alternating current not above medium pressure may be used underground on portable motors, or on the moving parts of any stationary motor. This limits the pressure to be used on cutting machines to below 600 volts. It does not limit the voltages that can be used for the stationary part of the properly installed circuits in the same mine. There are few alternating-current machines, however, that are above low pressure (300 volts). Current is supplied to them from transformer stations, and the secondary circuits to the machines are either 220 or 250 volts, and the transformers are usually provided with 10 per cent. high taps, so that 275 volts can be supplied to the machine circuit if desired, from the 250-volt transformers, and 240 volts can be supplied from the 230-volt transformers.

Direct current is used for machines and locomotives not only in the old mines, but in a majority of the new operations. Alternating-current mining machines, while installed to a greater extent in the Central Interior field than elsewhere, are comparatively rare in Pennsylvania, West Virginia and eastern Kentucky operations.

Some of the larger mines are so arranged as to have the entire electric load on the day shift. A second group, by using battery gathering locomotives and charging them at night, places part of the load on the night shift, thereby reducing the maximum peak load on the generators, transmission lines and substations, if any. Others place part of the machine load on the night shift and thereby reduce the peak load.

Data have been accumulated of a few of the larger operations in Illinois where the conditions affecting the transmission problem may be said to be fairly similar. In one mine everything is placed on the day shift and planned for maximum production. Shortwall cutting machines, reel-and-trolley gathering locomotives and main-haul trolley locomotives, all of the direct-current type, are used.

The distance from the station switchboard aboveground to the distribution board near the foot of the shaft is 1250 ft. The total capacity of copper conductor used on the outgoing circuit is 3,000,000 circ.mil, and a conductor of equal size is employed for the return. The main haulage track, when well bonded, should have a resistance about equal to that of an 850,000-circ.mil cable.

Outgoing and Return Feeder Circuits

The outgoing circuits are of about the same carrying capacity as the return. The roadways go in two directions from the main shaft, with branch entries to the right and left, while panels are turned to the right and left from the latter. This splits the current about in half at the shaft bottom, and the company will probably strengthen both the outgoing and return feeder circuits on the two main entries, later on putting in alternating current for the purpose of transmission of power to motor-generator or rotary converter substations near the faces. At the present time the tonnage has expanded to a point where the voltage drop is such as to make additional feeders desirable.

In order to compare some installations, I have estimated the cost of the circuit material and the installation at different mines, based on present labor and material expense, using the same basis of cost for each operation.

The circuits have been subdivided into groups. The first comprises transmission from the surface station to the distribution point at the bottom of the shaft, trolley transmission from the shaft bottom to the main-haul parting, feeder circuits from the shaft bottom to the main-haul partings, and trolley transmission from partings to faces where gathering trolley locomotives are used. The second group consists of machine circuits or feeders for machines and gathering locomotives.

At the mine under consideration the estimated circuit costs are as follows:

Circuits from power house to shaft bottom	$5,145
Trolley lines, bottom to main haulage	15,314
Feeders (trolley and machine to partings)	10,645
Gathering locomotives, trolley equipment	11,290
Inside feeders	3,124
Total	$45,518

The average capacity of the mine is about 5000 tons, and the maximum output over 6000. It operates its own electric plant.

The next mine under consideration is one using alternating-current shortwall machines, storage-battery gathering locomotives, and main-haul trolley locomotives, all of the load being on the day shift, except the charging of the gathering locomotives. The distances from the shaft bottom to the faces are much shorter in this mine than in the first one. The tonnage has been up to 4500 and now averages about 3500 tons. The circuit costs are estimated as follows:

Circuits to shaft bottom	$1,630
Trolley wire, track bonding, etc.	4,323
Alternating-current feeders, including transformer substation	9,675
Secondary circuits, machine lines	16,290
Total	$31,918

There are some rather interesting points brought out by this detail. In the alternating-current installation the cost of the secondary circuits, feeding power to the mining machines only, including the transformers, is a little greater than the cost of the trolley circuit inside the partings and their feeders in the other mine. In other words, taking these two mines as a basis of comparison, there is no saving effected by using battery locomotives for gathering and alternating-current machines, so far as the cost of the circuits from substation locations or inside partings to the faces is concerned.

In making this statement it must also be taken into consideration that the tonnage of the direct-current mine is considerably greater than that of the alternating-current operation with which it is compared, and the distance of transmission is longer. It will also be noted that as the mine stands today the cost of feeders from the shaft bottom to the substation is about the same. The point where alternating current shows less first cost is in the transmission of power from the surface to the shaft bottom, and in the future the alternating-current feeders will simply have to be lengthened; whereas, in the direct-current installation, they will not only have to be lengthened but increased in capacity.

This analysis would indicate that in the largest operations the use of alternating current for purposes of transmission becomes essential by the time the mine reaches its full capacity, and the distance of transmission reaches, say, a mile and a half. This, of course, would vary with the conditions in different operations. This statement is made without reference to the type of equipment used from substations to the inside.

The advocates of storage-battery gathering, as compared to reel-and-trolley, claim the advantage of reducing the size of the station required for furnishing power on account of the fact that their load comes on the night shift. This results in maintaining better voltage for the balance of the equipment or using lighter circuits for feeders, etc. They, of course, claim other advantages, which have no direct bearing on the transmission problem.

Those in favor of the reel-and-trolley haulage claim that the addition of the locomotive load to the circuits does not increase the necessary station and wiring capacity in direct proportion, because, with the greater number of operating units, the load factor can be reduced. They also claim operating advantages in simplicity and ample capacity, as well as a simplification of maintenance on the inside circuits, because the same wiring can be used for both machines and locomotives.

Before leaving the subject of comparison between mine circuit costs, analysis of a circuit of a mine using direct-current breast machines and main-haul locomotives, but no gathering locomotives, will be interesting:

Circuits from power house to shaft bottom	$2,746
Trolley lines, bottom to main-haul parting	13,514
Feeder lines	10,310
Inside feeders, machine lines	8,774
Total	$35,444

The output of this mine averages 4200 tons, with a maximum a little in excess of 4500.

In this mine the feeder lines for trolley and machines are connected by switches on the inside of the mine, so that in event of a short-circuit occurring on one system, the switch can be thrown out and the other system continued without delay.

Roof conditions make it desirable to segregate circuits in many mines, so that a fall of rock or other occurrence disturbing one will not affect the other. At the same time it is desirable to tie the lines together so that a better average voltage can be obtained by reason of the maximum voltage not being on one circuit at the same time that it is on the other, except at rare intervals.

Automatic Reclosing Circuit Breakers

There are on the market today automatic reclosing circuit breakers, of a type that can be installed in the mines, that will automatically keep the connections between the two circuits open until the short-circuit on one section has been removed. They will then reclose, throwing the two circuits together for coöperative feeding.

One factor that helps the direct-current transmission is bonding of the tracks. Another factor that favors the use of direct current to a greater distance from the mine entrance in the Western Interior coal fields than elsewhere is that practically all of the openings are shafts and the workings radiate in all directions from them, splitting up the electric current at the shaft bottom and reducing the amount to be carried to each section. All of the mines of any consequence have electric locomotive haulage, and this requires a sub-

stantial track. I think it is safe to assume that the average weight of rail on main haulage roads in Illinois is at least 40 lb. per yard. This rail must be bonded to offer a suitable return for the trolley locomotive current. A track that is properly bonded for main haulage has under average conditions a carrying capacity for a much greater load than that represented by the mine locomotive. The extra capacity is utilized for the return for direct-current machines, as well as the motors.

In order to secure a thorough knowledge of the mine circuits, it is recommended that the well-known short-circuit method of testing be used. By this means the total resistance of the entire circuit from the power house to the various points in the mine can be determined accurately, and these tests should be made frequently in order to detect any change in the resistance of the circuits. By calculating the resistance of the copper conductor and subtracting it from the total resistance obtained by test, the result of the track return resistance can be measured much more quickly than by testing individual bonds. When the ohmic resistance of the circuit increases beyond a certain point, that circuit should be gone over with a bond tester.

A log may well be kept of these tests and comparisons made with calculations as to what the resistance should be. With this information the operator can determine where to strengthen his circuits.

From a review of the operating conditions, and the sizes of circuits used in various mines, we find that the feeder distribution from partings to machines, where direct current is used, has about standardized on the 2/0 size of wire, with occasional strengthening with 4/0 feeders where the distance becomes unusually long. In alternating-current machine practice the 2/0 size of wire (three wires to a circuit) seems to have become standard near the faces, but three 4/0 lines are frequently used on at least part of the longer circuits.

I think it is safe to assume that the amount of wire in the secondary circuits for alternating machines is at least 50 per cent. greater than the amount used for direct-current machines on the circuits in the corresponding parts of the mine. Another factor that has to be considered is that the distance at which the current can be conveyed over these inner circuits to the direct-current machines is greater than it can be conveyed conveniently by the low voltage used on the alternating-current machines. To the 50 per cent, additional cost of the secondary circuit must be added the cost of underground transformers.

Where power is furnished to the mine by an outside company, it has to be converted to direct current for the locomotives, and also for mining machines, if the direct-current type is used. This conversion, because the substation operates at partial load most of the time, may be said to result in at least a 25 per cent. loss in power. This factor is an attractive one to the advocates of the alternating-current machines.

Some operators claim that the extra wear and tear on alternating-current machine cables as compared with the direct-current cables, added to the inconvenience in moving the alternating-current machine along entries, as compared with the direct-current machines, coupled with the advantageous characteristics of the direct-current motor as compared with the alternating-current motor, more than offsets the saving in power by the use of the alternating current.

There is no question but that from the standpoint of mine circuits, considered solely by itself, the simplest proposition is to use direct current up to a point where the load and distance make it impracticable. Where it is known in advance that the operation will ultimately exceed the limits of direct-current transmission, a converter or motor-generator substation can be installed when convenient, with high-tension alternating current going to it, and low-pressure direct current leading to the direct-current mining machines and locomotives underground. This gives the simple direct current near the working faces.

With a better understanding of bond maintenance, and with the installation of better tracks that follow the use of large cars, it is easier to maintain the direct-current circuits than has been the case before.

This paper has purposely dealt with types of transmission, leaving it to a discussion by the advocates of various systems as to which type should be employed under conditions prevailing in the Illinois field.

Legal Department

Personal Injury Award Not Excessive—$11,686 was not an excessive award for injury to a mine employee resulting in loss of a leg by amputation. (Pennsylvania Supreme Court, Ford, vs. Philadelphia & Reading Coal and Iron Co., 105 Atlantic Reporter, 885.)

Injury Risk Not Assumed by Stevedore—Conceding that a stevedore employed in loading coal into buckets in the hold of a vessel assumed the ordinary risk from the occasional falling of a lump of coal, he did not assume the risk of spilling of a large quantity into the hold through negligence of the hatch tender. (United States Circuit Court of Appeals, Ninth Circuit; Garcia vs. Western Fuel Co., 255 Federal Reporter, 817.)

Scope of Rights Under Coal Deed—A clause in a deed to coal in place, conferring on the grantee the "free and unrestricted right to remove and carry away, under said described premises, other coal belonging to or that may hereafter belong to" the grantee, gave no right to transport coal from adjacent lands over the surface of the land of the grantor. (Pennsylvania Supreme Court, Shaulis vs. Quemahoning Creek Coal Co., 105 Atlantic Reporter, 826.)

Kansas Mining Laws—The Kansas statute, which forbids use of dynamite or other detonating explosives in coal mines, excepting under rules and regulations agreed upon by an employer and his employees and approved by the state mine inspector, is constitutional, and not invalid as delegating legislative power to operators and miners. The act applies to strip-pit coal mines. A shotfirer using dynamite in violation of provisions of the act cannot recover damages for injuries sustained by him in consequence. (Kansas Supreme Court, Richards vs. Fleming Coal Co., 179 Pacific Reporter, 380.)

Rights Under Coal Deeds and Contracts—Where an owner of land gave an option for the purchase of 167 acres of coal in place, with mining rights, and afterward delivered a deed for only 150 acres, under an oral modification of the agreement, no mining rights could be exercised over the 17 acres not deeded. A deed made in full execution of a contract for the sale of land merges the provisions of the contract, including all prior negotiations and agreements leading up to the execution of the deed. Where a deed to coal in place provides a specific means of access to it for mining purposes, the grantee can claim no other way, howsoever convenient another way may be. (Pennsylvania Supreme Court, Titus vs. Poland Coal Co., 106 Atlantic Reporter, 90.)

Electric Arc Welding in Mines

By John G. Kjellgren
Cleveland, Ohio

Coal-mine officials are appreciating more and more the possibilities of electric arc welding as a means of increasing the general efficiency of the mine equipment. Just where the limit of the welding process lies, it is impossible to state at present. New uses are found for it every day. Electric welding has become not only a problem of repairing broken parts, but rather one of prolonging the life of the equipment and, at times, even creating working parts from the scrap heap.

Electric arc welding comprises two methods, one employing the carbon arc and the other the metallic arc. In the carbon arc the work is one electrode and a carbon rod forms the other. The current is drawn between these electrodes and the arc heats up both the carbon rod and the work. When the latter has changed to a liquid state, a metallic filling rod is introduced into the arc. This metallic rod quickly melts and joins with the molten metal in the work.

The metallic arc employs a filling rod of iron or steel as one electrode. The metal is carried by the arc from the rod to the work, which has been preheated by the arc itself just at the spot where it is desired that the metal should be deposited. The carbon arc corresponds in its action to the flame used in gas welding. It is not so convenient in handling as the metallic arc, and is mostly used for cutting, also for welding certain nonferrous metals. The metallic arc employs a short actual arc, preferably not over $\frac{1}{8}$ in. in length; therefore the heat is more localized and can be concentrated at any desired spot. This makes it possible to weld a piece without preheating and without much internal stress. Because of the fact that the metal is carried by the arc, welding can be done in any position.

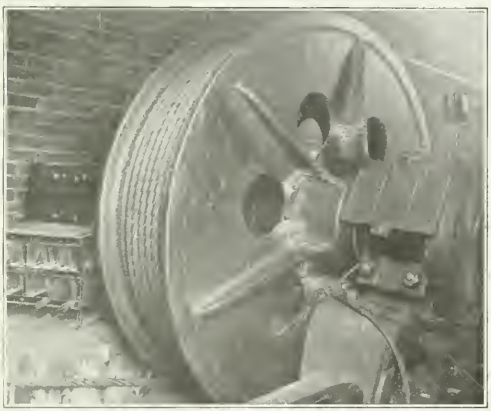


FIG. 1. WELD ON A CAST-IRON HOISTING SHEAVE

Electric welding is especially adapted for the treatment of steel and iron with perfect results. The better grades of cast iron are readily welded by it, but the welding metal will not adhere to the poorer grades that contain much slag or other impurities. It requires a more experienced operator to weld cast iron than steel. The cast iron is usually of more complicated shapes; it therefore necessitates more perfect control of the current and more careful setting up. However, this is not a difficult thing to learn, especially if personal instruction of an experienced operator is given at the beginning.

The 300-hp. hoisting sheave shown in Fig. 1 is an example of a weld on cast iron. All the spokes were broken entirely through; they were prepared and welded in position. The photograph was taken before the work was finished. The welding equipment is shown at the left and the welding rod in the holder at the right. The great advantage of arc welding will be appreciated by comparison with the preparation for welding by some other process. In such a case the tension on the rope would have to be relieved, the flange taken off, the rope and rings removed, bearing caps taken off, and the shaft removed from the hubs. After the sheave was separated and placed for preheating, the hub would have to be lined up both with the keyways and the holes in the flange. The whole thing would then be preheated, welded, and slowly cooled. Fig. 2 shows another example of an electric arc weld on cast iron. The locomotive shown was in a collision and the frame broke just above the front wheel. It was taken to the "bottom" and welded on the following day; that afternoon it was again in service. This shows how quickly repairs can be made by electric arc welding.

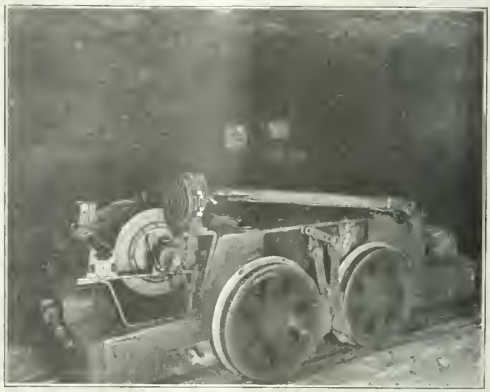


FIG. 2. CAST-IRON LOCOMOTIVE REPAIRED BY WELDING

Great as the field is for mending broken parts, it is small compared with that embracing the prolongation of the life of mine equipment. With some types of equipment, a certain detail of a part has to withstand constant wear; often it cannot be repaired by ordinary methods, and the whole piece must accordingly be thrown away. In such a case the worn place is simply built up by means of the electric arc and is then machined. Thus machine shafts, clutch parts, guides, car axles, wheels, etc., can be worked over and be made as good as new. By using different kinds of welding rods the built-up material can be made soft for machining or of any desired hardness for grinding. Leaking pipes, boilers, condensors, tanks, etc., can also be repaired readily. The extent to which such welding can be used in the mine depends much upon the operator; the more experience he has had the greater will be the use he will make of the equipment.

Rail bonding is often considered a more or less necessary evil, when in reality it is an important factor in

reducing the cost of maintenance and increasing production. With poor bonding there is always a great direct loss of energy, but a greater loss, however, is incurred in the shape of increased motor troubles, both in machines and locomotives. Machinemen are usually the first to notice any improvement in the bonding. Mechanical bonds, as illustrated in the plug and driven pin type, are now being rapidly replaced with electric welded bonds, which give a better and more permanent return at a lower cost. To successfully weld copper to iron requires rather complicated and cumbersome apparatus, and although such equipment has been used on electric railways to apply bonds, it has not been suited for mine work. When this was realized by the manufacturers, a bond provided with an iron casting was brought out. This type of bond could be applied by ordinary metallic arc welding. When the bond is welded to the rail it becomes an integral part thereof, and will even stand up under the stress of derailed cars.

A welding equipment that will be of the greatest value to the mine is consequently one that can be used both for general arc welding and for bonding; at the same time it should be so light that it can be taken to any part of the workings. The outfit shown to the left in Fig. 1 fulfills this requirement in an admirable manner, being both inexpensive and light in weight. It was furnished by the Electric Railway Improvement Co., of Cleveland, Ohio. The total weight with leads, etc., is about 50 lb., which may easily be carried by one man. It is always ready for service and will withstand an unusual amount of abuse.

The Moffat Brothers' Mine

Operated for Years by Steam and Mule Power, the Antiquated Methods at This Mine Have Been Replaced, in Part at Least, by Something More Modern—Results Fully Warranted the Cost of Making the Changes

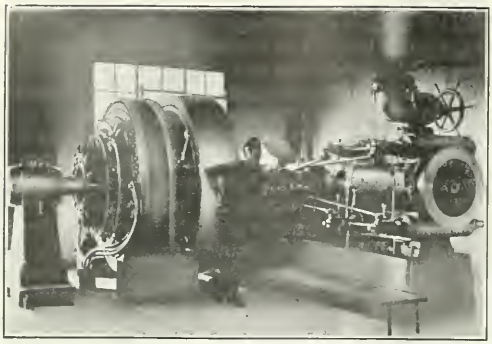
By W. P. Potter
Iron Mountain, Michigan

MOFFAT BROTHERS' COAL MINE, TIPPLE AND ENGINE HOUSE

THE Moffat Brothers' coal mine, one of the largest and best equipped coal operations in southern Illinois, is located at Sparta, 54 miles south of East St. Louis, on the Mobile & Ohio R.R. It is owned and operated by the Moffat Brothers and has been in successful operation for years. Only recently, however, has it been electrically equipped, and mules discarded from the main haulage.

This mine employs an average of 250 men and hoists about 1100 tons of coal daily, the greater part of which finds its way to the St. Louis market, where the company's main office is in charge of J. D. Moffat. R. D. Moffat, superintendent of the mine, has charge of the Sparta office.

In equipping this mine with electricity 166 tons of steel rails were laid, or nearly 30,000 ft. of track for the main haulage. Eleven mules were retained to haul the coal from the different rooms or apartments to the main haulage system, where two 10-ton G. E. electric motors complete the delivery to the foot of the shaft. These locomotives are provided with powerful electric arcs which project a strong beam of light along the main haulage system to warn of the locomotive's approach and give the motormen time to stop in case of obstructions. All feeder lines and wiring are installed on porcelain or glass insulators. In the overhead suspension of the power wires the height of the trolley is regulated by extension hangers. The



STEAM-ELECTRIC GENERATOR AT MOFFAT OPERATION

track is of course used as a return circuit. The rails on the main-line haulage system are bonded with a short flexible bond of copper wire securely compressed into holes drilled close to the end of the rails.

The use of steam underground has always been costly as well as dangerous. Furthermore, the naturally increasing distance between the working faces and the delivery points has made necessary a system more efficient than steam, compressed air or mules.

The superiority of the underground electric locomotive for mine haulage has caused it to supplant almost all other means of transportation in coal mines. It is simple, dependable and compact in underground operations, and capable of a much greater speed than any other method of transportation. Furthermore, it can operate the entire 24 hours of the day without fatigue.

The installation of improved modern electrical machinery, adapted to the special power requirements of the coal mine, has resulted in a greatly increased output and a much more economical consumption of power, at a time when mines could not be operated economically by the older methods.

The Moffat mine has a reliable telephone system that materially lessens the work of the operator in supervising the efforts of the men. The mine is so well ventilated by fans that there is little if any danger from gas, although to a certain extent gas is always present. The ventilating doors, practically automatic in operation, easily swing either way at the touch of the motorman's hand, and no trapper-boys are necessary when a "trip" of coal is on its way to the hoisting shaft.

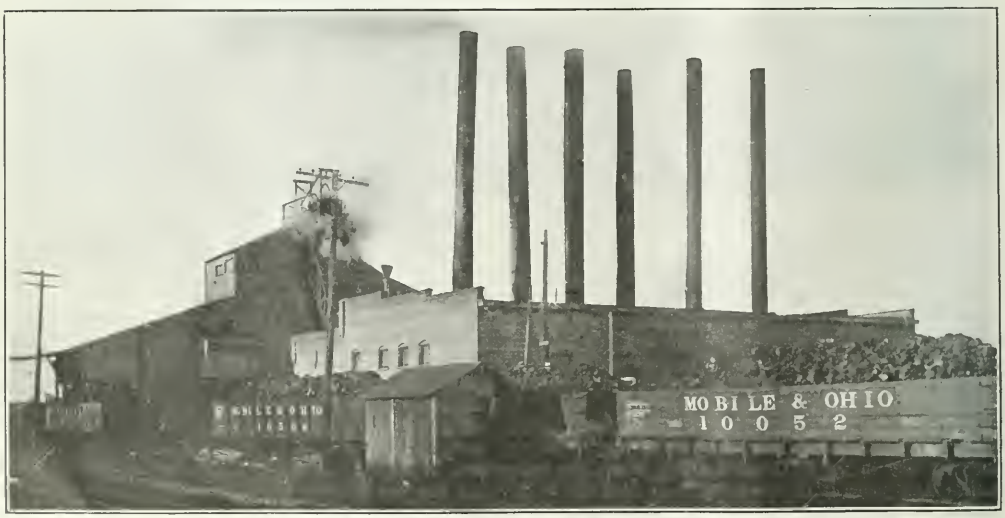
The steam hoist is still used and is operated by a Crawford-McCrimmon engine. The company keeps a large supply of spare parts on hand to prevent shutting down when machinery breaks or gives out.

Eight undercutting shortwall mining machines are used. These have lowered the cost and increased the production of coal. They comprise five Goodman 12AA type and three Sullivan iron-clad type. The coal is loaded by hand. Two new 150-hp. boilers have been added, making six boilers in all. Two steam-driven electric generators are in use, one a 200-kw. generator and the other a 150-kw. machine.

Young Soldier Gets a New Start

Enlisted at fifteen, disabled in the Marne sector at sixteen, now a student at the Carnegie Institute taking architectural drafting, carpentry and mathematics, is the record of one young veteran. With only a meager education, never having done anything more worth while than working in a coal tipple, this disabled soldier has so won the interest and approval of the Federal Board for Vocational Education that the determination has been reached to give him a thorough trade training and a three-year course in building construction has been advised for him.

Do you happen to know of any other veterans, young or old, who would like to make a new start? If so tell them to communicate with the Federal Board for Vocational Education, 200 New Jersey Avenue, Washington, D. C., or write to the board about them yourself.



ANOTHER VIEW OF THE TIPPLE AND ENGINE HOUSE OF THE MOFFAT MINE

The Baltimore Tunnel Disaster

By Frank H. Kneeland
Associate Editor, *Coal Age*

THE Baltimore Tunnel, in the eastern outskirts of the City of Wilkes-Barre, Penn., on the morning of June 5 last was the scene of one of the most disastrous as well as one of the most peculiar accidents that ever took place in the history of anthracite mining. The accident was peculiar in that 92 men lost their lives, mostly by suffocation, while within 150 ft. of open air with normal ventilation flowing in the passage in which these men were caught.

The Baltimore Tunnel was opened in 1862, long before electricity was seriously thought of as a motive force for coal mining or anything else. It has been in operation continuously ever since with the result that at present the workings are extensive and far flung, some working faces being well over two miles from the portal. Today, therefore, this tunnel is much like a short narrow neck on a big bottle.

In former years it was the practice for the men to walk to their working places carrying their powder or other explosives with them. About a year ago a number of the men approached the underground mine foreman with a request that a man trip be provided. After hearing the men, the foreman informed them that if they would send the grievance (or pit) committee to him, he would gladly take the man-trip proposition up with its members in the regular manner.

The pit committee accordingly waited upon the foreman and urged the inauguration of the man trip on the ground that the working faces were so remote from the tunnel entrance that the men lost much time in walking to and from their work; also, that many of them were in the habit of laying in wait within the tunnel and "jumping" the first trip of empties going in in the morning. It appeared, therefore, to the members of this committee that it would be much safer and more satisfactory both to the men and to the management if a man trip was inaugurated.

An agreement was accordingly reached whereby the men were permitted to ride upon the first trip of cars to enter the mine each morning. This permission was, however, subject to three distinct and well understood provisos. These were in substance as follows: (a) No dynamite, blasting caps, detonators, or any form of explosives whatever other than black powder, were to be transported anywhere, in any container or by any means, upon this trip. (b) All powder was to be placed in the rear car of the trip and in this car only; furthermore, this car must contain nothing else. The rear car was to be separated from the rest of the trip or from those cars carrying men by an empty car; that is, one containing neither men, powder nor tools. (c) The pit committee must see to it that each and both of the foregoing provisions were strictly adhered to, responsibility for their enforcement resting jointly upon the members of this committee and upon the mine foreman and his assistants.

By the terms of this agreement, it will be seen that, since the foreman and his assistants seldom traveled on the man trip, the motorman pulling the trip would be responsible for its safe progress, while if anyone aside from the individual men themselves were responsible for their deeds in transit it would be the members of the pit committee. This committee appeared to be, and was believed by the management to be, active, conscientious and reliable. The inspection of the cars and responsibility for seeing that powder was placed only in the rear or powder car was often left entirely to it.

Once, and once only, between the time of the inauguration of the man trip and June 5 last did the mine foreman have any difficulty with any of the men regarding

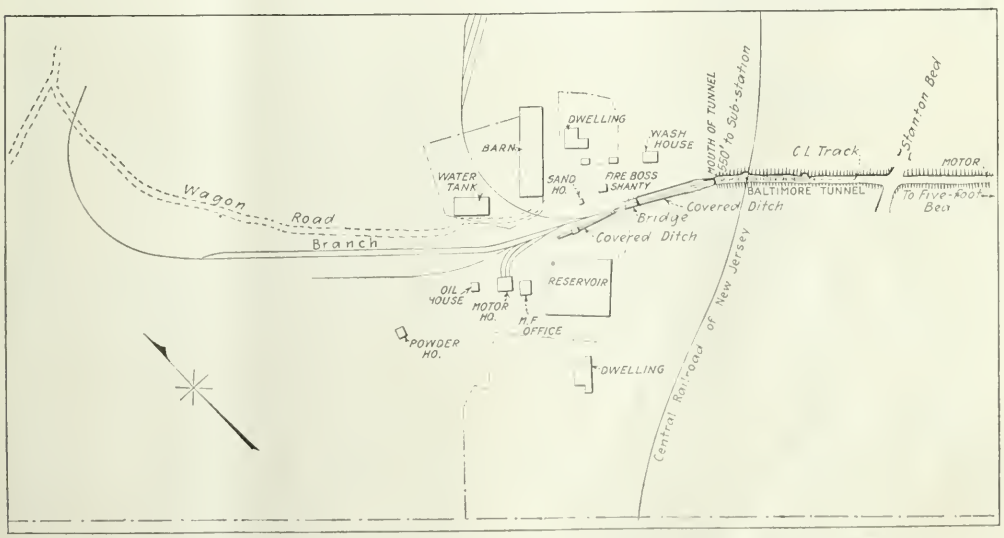


FIG. 1. SHOWING POSITION OF TUNNEL MOUTH AND LOCATION OF VARIOUS BUILDINGS NEARBY

their riding on this trip. Upon this occasion, some time about the middle of March of the present year, two men coming to work late jumped upon the powder car after the trip had started. The foreman yelled to them to get off. One of them complied, while the other refused to budge. The foreman therefore ran after and overtook the trip after it had entered the mine. He reiterated his command that the man get off the trip, and upon his refusal to do so jerked him off with some violence. This man was promptly discharged by his immediate superior.

In the accompanying illustrations, Fig. 1 shows the tunnel mouth and the relative positions of the various buildings nearby. It is in reality a map of the locality round about the drift mouth. Fig. 2 shows the tunnel in greater detail. From the cross-section of the tunnel here shown, which is viewed from the inside looking out, it will be observed that this tunnel is comparatively small in cross-section. The tunnel itself is single-tracked, while close alongside on the right-hand side going in runs a drainage ditch about 3½ ft. wide and from 12 to 15 or possibly in places 18 in. deep. This ditch, which contains from 3 to 5 in. of water strongly impregnated with sulphur, is spanned at intervals of from about 12 to 18 ft. with long track ties that butt against the right rib or are let into shallow nitches cut therein. These serve to keep the track in place and prevent it from sliding sidewise into the ditch.

As will be observed, about 260 ft. from the portal the tunnel crosses the "G" bed. Here a passage is turned right and left. On the morning of the accident, and under normal conditions, the air moved in through the tunnel as far as the "G" vein. Here the inward-moving current meets and mingles with two other currents of air, one moving outward through the tunnel and the other coming in from one of the side passages. All three currents mingle together, then pass on through the other side chamber. In the outer portion of the tunnel the air is sluggish, its velocity probably not exceeding 100 ft. per minute. Thus, although two fans are employed elsewhere in the workings, the ventilation in the outer portion of the tunnel is inward and but little more than natural.

From the maze of evidence presented to the coroner's jury sitting it Wilkes-Barre on June 23, 24 and 25, examining something like 30 witnesses, survivors of the accident of June 5 or those who were in or near the mine at the time of the disaster or shortly afterward, some facts may be gleaned. Much, however, is still unknown, and will doubtless always remain so. Those who may have known the exact cause of the accident, if any there were, do not now live. On this point circumstantial evidence only is available.

No one who heard the motorman who drove the locomotive hauling the man trip into the Baltimore Tunnel on the morning of June 5 testify before the coroner's jury could doubt either his veracity, his proficiency, his care, his experience or his courage. On that morning he coupled his locomotive to a string of ten waiting empties. He then backed these cars up somewhat and coupled onto three more cars. He then proceeded to the sand-house near the tunnel portal, where he stopped, sanded up and started for inside. Just within the tunnel he was flagged and stopped by a foreman tracklayer who had been working on the night shift and was just then coming out. This man warned him that a trolley hanger at about the "G" vein was loose.

Now, under many circumstances, as everyone knows, one broken trolley hanger in the mine is of no particular consequence whatever. Coal and men may be hauled in and out past it for days, if necessary, with perfect impunity. In this case, however, the motorman deemed it hardly safe to pull a trip of cars loaded with sky-larking men and boys past this broken hanger. Under normal conditions the trolley clears the right-hand side of the car by only about 8 to 12 in. and hangs almost directly over the right-hand side. When sagged down by a broken hanger, the trolley would clear the car at best only a few inches, and the motorman did not consider it wise to pull his trip past this point without making a careful examination. Accordingly, after proceeding a short distance, he stopped his trip, uncoupled the locomotive, and proceeded to a point in the tunnel slightly beyond the broken hanger. Here he stopped and began his inspection.

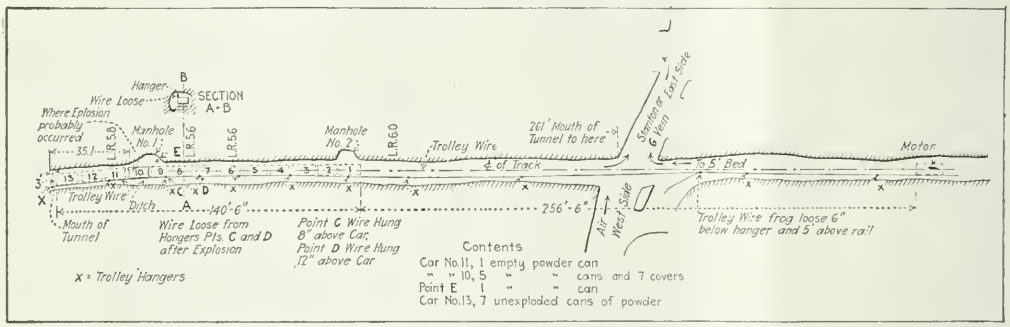


FIG. 2. PLAN AND CROSS-SECTION OF THE BALTIMORE TUNNEL, VIEWED FROM THE INSIDE LOOKING OUT

While the first (or man) trip had been proceeding inside, the second trip, which was composed entirely of empties, was being made up. After the man trip had stopped inside the tunnel, the second trip came up behind it. For some reason or other the load on the motor-generator set in the substation supplying power to the mine, the direction and distance of which from the tunnel portal is indicated in Fig. 1, had built up to such degree that the circuit breaker went out. Thus, when the motorman on the second trip tried to stop his trip by reversing the motor, he found that his machine was "dead," and he had to use his hand brake. He stopped his trip, however, with the front end of his locomotive about 5 ft. from the rear end of the last car of the man trip.

It was at this juncture, with the man trip just within and the second trip just without the tunnel, and the trolley wire over both trips dead, that the ignition of seven cans of powder in the tenth car of the man trip from the locomotive took place. What followed this ignition was not an explosion in any sense of the word. All the evidence presented on this subject, as well as the condition of the cars, powder cans and tunnel, would go to show that what took place was practically a flare-up or series of gigantic fire fountains similar to those used as fireworks on the Fourth of July. While the powder in burning created a considerable blast of air sufficient to project smoke out of the tunnel portal against the existing air current, no detonation of any great audibility was produced.

Up to this point, the testimony and depositions of all witnesses were strongly concurrent. One survivor stated that he heard three or four distinct detonations

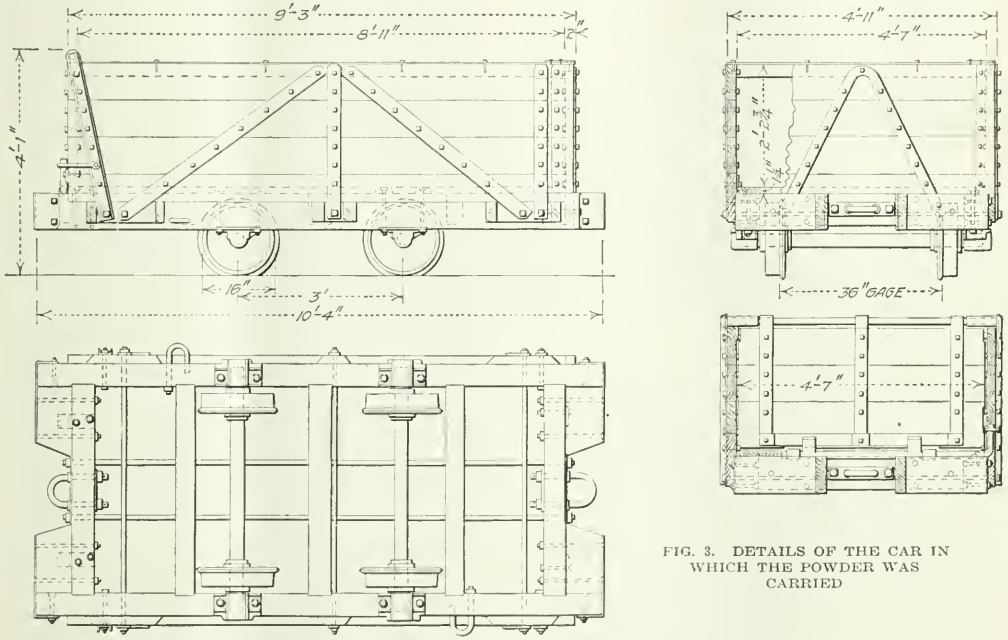


FIG. 3. DETAILS OF THE CAR IN WHICH THE POWDER WAS CARRIED

or puffs. Others noticed only one. One man insisted that he saw "electricity falling in balls from the trolley wire into one of the cars." Since this man barely escaped with his life, and is not yet out of the hospital, it is possible that his recollections of his experience on the morning of June 5 may be somewhat confused. Several of the witnesses stated that some of the men had their lamps lighted and in their caps while on the trip. While none admitted that he was smoking at the time, many were free to acknowledge that smoking on the man trip was not uncommon.

The clearance between the side of the car and the left-hand rib (facing inward) varies from 26 to 30 in.; that from the edge of the car to the roof or roof timbers from 21 in. upward, the roof being quite uneven. Those who attempted to rescue survivors and carry out the dead stated that they found men piled in places five deep between the left-hand side of the trip and the left-hand rib. While one or two bodies were found in the ditch on the right-hand side of the trip, it is not believed that these men drowned, but that they died either from burns or from suffocation, or both.

Just exactly what caused the accident no man will probably ever know. Here, circumstantial evidence is stronger than the verbal evidence presented before the coroner's jury. In the tenth car of the trip from the front, there was found after all bodies had been removed five empty powder cans and seven can covers, five dinner pails, two or three teapot oil lamps, one squib box and one tobacco pipe. The interior of this car was badly scorched. In the eleventh car there were found, in addition to dinner pails and oil lamps, one powder can, the contents of which had ignited and burned. In the manhole or refuse space, opposite cars Nos. 9 and 10, was also found one powder can.

None of these cans was blown to pieces or showed signs of excessive internal stress. One was split for a short distance from the end and several were badly dented and dinged. All were made of sheet iron, were about 6 in. in diameter and 24 to 26 in. long with slip-on covers. They originally contained 25 lb. of Du-Pont FF or FFF black powder made up into paper sausages about 1¾ to 2 in. in diameter. No can, even upon minute examination, showed any marks whatever of fusing of the metal at any point as would have been the case had the cans been short-circuited between the trolley and some portion of the car.

It would appear normally possible that the powder on a trip of cars might become ignited from one of two sources: either by ignition from the electric current in some manner or other or through coming in contact with either a flame or spark from one of the oil lamps or from a pipe.

It was established at the inquest with a fair degree of certainty that no current was flowing in the trolley wire at the time of the accident. However, in order

that there might be no doubt whatever on the subject of the powder's ignition, tests were made by disinterested mine inspectors. These tests failed utterly to ignite powder. The theory that return current sufficient to ignite powder might be shunted across a bad rail joint when this point was spanned by the wheels of the car, such a current passing upward through the wheel, through the journal box, through the bolts to the bottom of the car, thence through a powder can to the boxing bolt of the other wheel, and thence back to the rail, seems to be entirely erroneous. Tests on empty cans placed across bolt heads in the bottom of the car (a detail of which is shown in Fig. 3) that had been carefully cleaned for the purpose with the car spanning the worst joint that could be found at the scene of the accident and the trolley wire taken down and laid against the rails some distance inside the point where the car was located failed to increase the temperature of the can to any appreciable extent and also failed to produce sparking at its connection with the bolt heads.

Verdict of the Coroner's Jury

The coroner's jury, after hearing all evidence and carefully reviewing it, refused to fix the blame for the accident upon any individual or set of individuals. As may be seen from their verdict, which follows, these men made certain definite and specific recommendations for improving the laws concerning mining in the State of Pennsylvania and bringing them more nearly up to date. Their aim doubtless was that should these recommendations be adopted they would tend to advance the statutes to a point comparable to the advancement that has been made in mining practice since the present statutes were placed upon the books. The verdict of the coroner's jury was as follows:

An inquisition taken and indented at Wilkes-Barre in Luzerne County, before Charles L. Ashley, coroner of said country, this 23d, 24th and 25th day of June, 1919, pursuant to a notice from Thomas J. Williams, inspector of mines of the Eleventh District, attached to and made a part of this return upon view of the body of James J. McClosky, then and there lying dead, and upon the oaths of W. F. Otto, C. C. Simons, James Ashman, T. F. Barry, David Davis, and Casimir Sieminski, six good and lawful men of the country aforesaid and at least four of them having had practical experience in and about the mines and none of them at present being employed in or about the mines where the accident happened, nor being personally interested, charged to inquire on the part of the Commonwealth of Pennsylvania, when and where and by what means the said James J. McClosky came to his death, and upon their respective oaths do say that it appears from the view of the body and from the evidence produced before them, that said James J. McClosky came to his death on the fifth day of June A. D., 1919, at Wilkes-Barre, about 6:40 o'clock a.m., in the Baltimore Tunnel No. 5 of the Hudson Coal Co., as a result of being burned or suffocated from the effects of an explosion of blasting powder which was being carried in the same mine car with workmen, and after a careful inspection of the scene of the accident and examination of all witnesses who seemed to have any knowledge of the facts, it is decided that the powder became ignited in a manner unknown to the jury.

The jury has heard all the witnesses that survived the accident and some of them state they saw lighted lamps on the trip of cars. We also heard the testimony of the results of the tests made by the mine inspectors and electrical experts who show that it was impossible to reproduce the explosion by bringing a keg of powder in contact with the wire under varying conditions, such as prevailed ordinarily in the mines. The testimony shows that the disaster occurred so quickly that the eye could not possibly detect the cause of the explosion. The tunnel itself is low and the wire must be a few inches lower than the roof of the tunnel. The phrase "The wire is hot," is a typical reference heard around the mines to warn men not to touch the wire.

In view of the testimony given by the survivors it is impossible to determine the exact manner in which the disaster occurred. As the witnesses were practically all in total darkness, much of the evidence is a matter of conjecture which makes it impossible to fix the direct cause of the explosion.

We, therefore, do recommend (1) that in order to minimize dangers from blasting powders and explosives carried in the workings of the mines, all powder or explosives shall be transported in separate and distinct trains; that in no case shall it be permitted that men ride in the same cars or in the same train with said powder or explosives.

2. Where electric motive power is used, the powder should be encased in containers of non-conducting and non-combustible material, and that the only persons permitted to accompany said powder or explosives on cars or trains, supplied with such motive power, shall be the persons necessary to man the mechanism employed.

3. Where powder or explosives are to be taken down a shaft by carriage, we recommend that after said powder or explosives has been removed from the protection provided for its storage, it shall be deposited a safe distance from the point at which men are gathered for entrance to the mine carriage. After such powder or explosives is placed at the shaft, or at the entrance to the various veins, a mine foreman or other qualified person shall see that the men do not call collectively for their powder or explosives, but that each shall be served separately.

4. We recommend that the miners' boxes shall not be assembled in any one place; that at least 50 ft. shall separate any two of said boxes where powder is stored, this to prevent the assemblage of men in the direct vicinity of a dangerous quantity of powder or explosives.

5. Powder containers should be inspected before they are distributed to men to be carried by them to their places of labor.

6. In the carrying of dynamite by men, we discover a very dangerous practice in that the high explosive is put into boxes and so carried by said men. We recommend that dynamite shall be deposited in canvas bags, reinforced by leather, with two catches to fasten cover, a hook or ring to hold the miner's ticket, and a long strap to place over the shoulder, for convenience in carrying. A competent man at the powder house shall place such dynamite in such container. Carrying by box should be stopped immediatedly.

7. All powder or explosives should be issued by a mine foreman or qualified person, keeping himself posted on the supplies of the men, who shall see to it that no man shall obtain or have at one time, a sufficient quantity of explosives to create a menace to himself or to others in the same or nearby working places, nor shall he issue powder to anyone but a qualified miner.

8. Mining laws of the State of Pennsylvania we do find are rendered obsolete by the progress in mining methods and the failure of properly constituted legislative forces to enact safeguards timed to the developments as they occur. We recommend to Governor William C. Sproul that he authorize the chief of the state department of mines to proceed at once in appointment of experts who will revise the mining laws and regulations, particularly as to such new equipment as has been introduced. Electricity as a factor in mining is wholly ignored by such laws as exist. We ask immediate action for amelioration of these omissions.

A committee of electrical engineers, mining engineers, and practical mining men should be appointed to confer at once with the state department of mines and to draft all such additional regulations as will fit the present conditions of mining and meet the problems that miners of this day must face. Continual reference to mining practice and comparative attention to the laws governing the industry should be the rule of caution from this time forward.

The Texas Lignite Industry

By Bruce Gentry

State Inspector of Mines, Rockdale, Tex.

The recent appropriation by the United States Government of $100,000 for the establishment of a lignite experimental demonstration plant will doubtless create an interest in the minds of many in regard to this fuel. It is proposed to locate the experimental plant in Texas or North Dakota, as these states contain the largest deposits of lignite. It is probable that the plant will be located in some one of the larger cities near the mines.

The principal lignite deposits distributed throughout the United States have been estimated to be approximately as follows:

	Square Miles
Alabama	6,000
Arkansas	5,900
Kentucky	500
Louisiana	8,800
Mississippi	3,000
Montana	7,000
North Dakota	31,000
South Dakota	4,000
Tennessee	1,000
Texas	50,000
Total	117,200

In addition to the lignite areas given, Alaska contains vast deposits, while adjacent to North Dakota across the Canadian border is a large area underlain with this fuel, in the Saskatchewan province.

There are a great variety of lignites, some of which range from carbonized wood to a semi-bituminous coal. In appearance and weight lignite is somewhat similar to bituminous coal. As they come from the mines there it little difference in the size and shape of the lumps of these two fuels, the principal difference in appearance being that the lignite lacks the gloss or luster common to bituminous coals. Lignite has been termed "brown coal," but as a matter of fact the color of the different varieties ranges from a reddish brown to a jet black. On account of the high moisture content, lignite slacks or breaks into small pieces upon being exposed to the weather for any considerable length of time.

The average Texas lignite weighs about 83 lb. per cu.ft. Texas has almost every known variety of lignite, the best of which shows about the following analysis:

	Per Cent.
Moisture	31
Volatile combustible matter	32
Fixed carbon	29
Ash	8
Sulphur	1
B.t.u. per lb. of fuel	8,000

The Texas lignite fields, which constitute almost one-half of the known lignite area of the United States, are estimated to have originally contained approximately 30,000,000,000 tons; the total tonnage mined to date is probably 18,000,000 tons. The average annual output for the past two or three years has been about 1,500,000 tons. The lignite-bearing formations of Texas comprise a belt with a length of over 600 miles by a width of 50 miles or more. This belt begins near the Red River in the northeastern corner of the state and extends entirely across in a southwesterly direction to the Rio Grande or Mexican border. This belt is parallel to the Gulf coast line, lying from 100 to 150 miles inland. Geologically these deposits belong to the Eocene series of the Tertiary period.

The principal mining operations are at present carried on near the following towns: Rockdale, Milam County; Bastrop, Bastrop County; Calvert, Robertson County; Jewett, Leon County; Crockett, Houston County; Malakoff, Henderson County; Alba, Wood County; and Como, Hopkins County. Thirty-eight lignite mines were in operation in Texas at the beginning of the year 1919. Most of these operations are shaft mines; these mines are worked on the room-and-pillar plan. No strip-pit mines have been operated in the lignite fields to date.

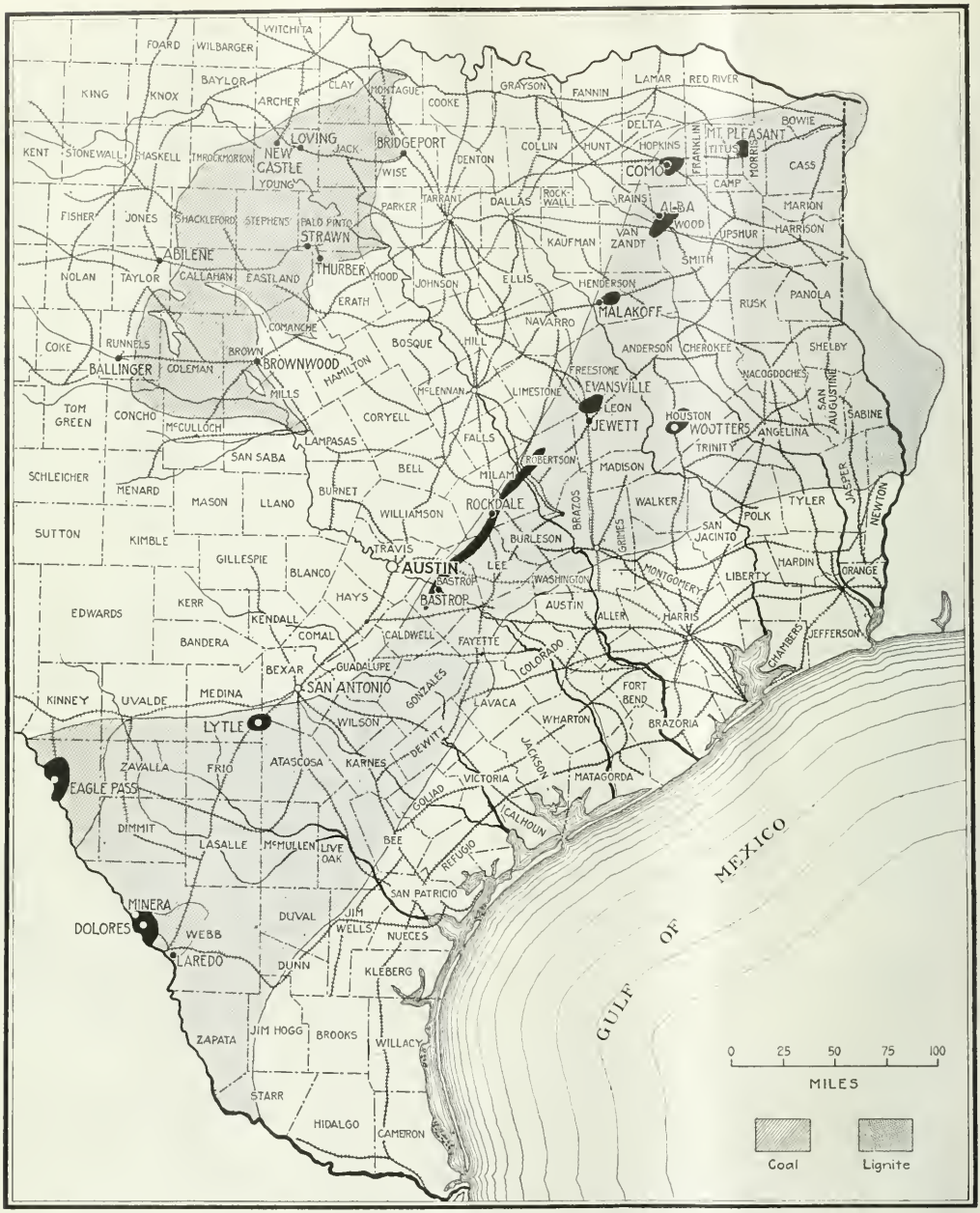
Most of the mining in Texas up to the present time has been along or near the outcrop of the various seams, the depth being between 40 and 150 ft. In several parts of the state there are two or more workable seams, one overlying the other. In thickness the seams are from a few inches to 20 ft.; the overburden running from 20 to 800 ft. At the present time no seam is mined where the thickness of the bed is less than 5 ft., and in the majority of the mines the seam worked runs from 7 to 12 ft. in thickness. The lignite deposits have not been well explored, most of the exploration having been accomplished by some system of hand-drilling or by power-driven churn drill. It is doubtful whether a core drill has been used in any part of the lignite field. In some parts of the state quite thin seams have been mined for years, while there was a thick seam only 75 to 100 ft. below, the location of which was unknown to the operators of that district.

Mines Are Worked on Room-and-Pillar Plan

As stated these mines are worked on the room-and-pillar plan, usually on the double-entry system. Mule haulage is almost universal, though a few operators use electric or gasoline-motor haulage. The track gage runs from 30 to 36 in., while ton pit-cars are used. Many of the mine tipples are equipped with self-dumping cages, though many still employ the hand dump. The roof conditions of these mines are fairly good, and where the height of the seam is sufficient to leave even a few inches of lignite overhead no timbering is necessary. The pillars are usually drawn after the mine has been worked to the property limits. The lignite extraction varies, of course, according to conditions, but 50 to 75 per cent. is about the average. As the depth to the lignite seams is shallow, the mining operations usually cause a subsidence of the surface. Quite often this subsidence causes open breaks and deep holes, while in other instances the settlement is over large areas, the surface sinking without any great disturbance. Most of the land overlying the lignite belt is good for agricultural purposes, and farming operations are extensive throughout this section.

Gas is never encountered in the lignite mines of Texas. Open carbide lights are used almost exclusively. Most of the lignite is pick-mined, though it is blasted in some parts of the state. Serious accidents are almost unknown. At the present time there are probably not to exceed 3500 men employed at the mines, most of these miners being Mexicans.

The fluctuating market and competition with crude oil has tended to hamper the full development of the lignite industry. Crude oil is no longer the keen competitor of a few years ago, and lignite is becoming better known, its use is increasing, and the market is improving. The development of the lignite industry will doubtless be similar to that of the oil industry, and will only be complete when the lignite, like the oil, is passed through processes of refining and the valuable



MAP SHOWING LOCATION OF LIGNITE AND BITUMINOUS COAL AREAS IN TEXAS

byproducts are recovered. The byproducts of the lignite, like the byproducts of the oil, will be greater in value than the original fuel. The lignites of Europe, which are similar to ours, have for years been used to produce more concentrated fuels and made to yield their byproducts.

Texas lignites have been used quite successfully in making producer gas. As compared with bituminous coal the value of this lignite for producer gas, for use in gas engines, is practically in direct ratio to the B.t.u.'s per pound of the respective fuels. The extra weight of lignite required to develop a given power does not necessitate a proportionately larger producer than required for bituminous coal, and in a suitable type of producer

Texas lignite can be utilized as conveniently and efficiently in proportion to its actual thermal value as any fuel.[1] It would seem that Texas offers an attractive field for the location of large central power plants. In these plants the lignite could be converted into gas. This gas could be used in internal combustion engines, and so converted into electrical energy. This electricity could be distributed to the surrounding cities and territory over transmission lines. Surplus gas could also be sold to the nearby cities. In such plants the byproducts such as tars, oils, etc., could be recovered while the residue could be converted into briquets, furnishing a fuel the equal of if not superior to anthracite coal.

At the present time practically all of the lignite mined is used under boilers in its raw state. Near the mines lignite is used quite successfully for domestic purposes. In the raw state it is a satisfactory fuel. But the perfection of a method of extracting the byproducts and the briqueting of the carbonized lignite into a more concentrated fuel would mean a better fuel supply to Texas and the surrounding states; therefore the people are much interested in the plant that will be erected by the Government. There can be no doubt that the successful termination of the experiment will see many similar plants erected by private capital.

[1]See University of Texas Bulletin No. 307.

First Reinforced-Concrete Railroad Car

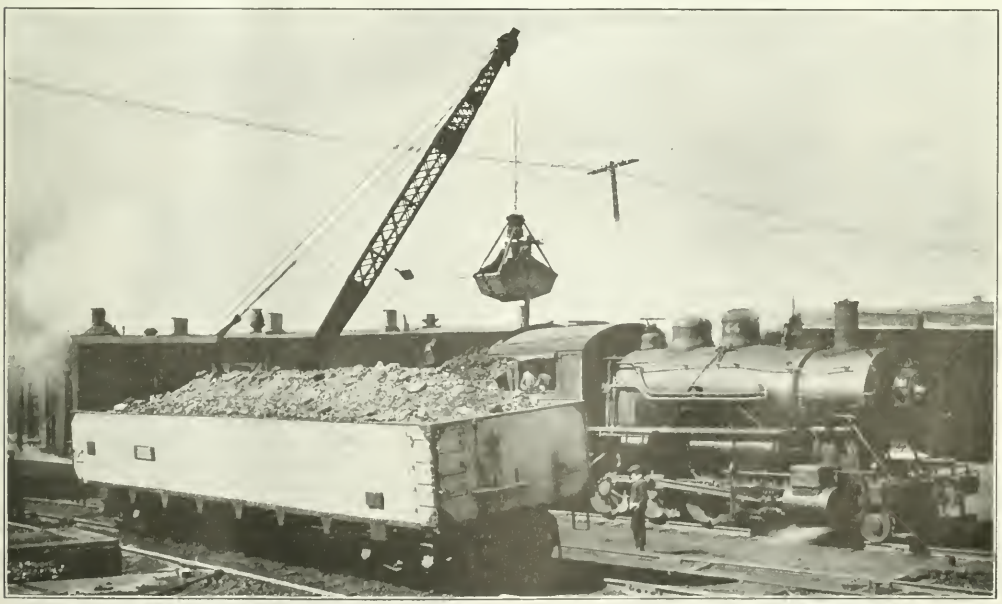
The accompanying illustration shows the first reinforced-concrete railroad car built in this country. It was constructed under the supervision of the U. S. Railroad Administration and was turned over to the Illinois Central R.R. on Mar. 17 last. Since then the car has been subjected to the severe usage entailed by railroad freight service. As the object in view was to test the car thoroughly, it was not spared in the least but was subjected to treatment rather more severe than that given the ordinary freight car.

In spite of its rough handling, the car passed successfully through all tests and was recently turned over to the Pennsylvania R.R. for service upon its lines. Immediately following the transfer the car was sent from Chicago to Loraine, Ohio, with a load of steel billets. This trip resembled a continuous ceremony, as the car was placed upon exhibition in and was visited and inspected by the citizens of the towns passed through. The photograph here reproduced shows the car loaded with coal just before it was turned over by the Illinois Central to the Pennsylvania Railroad.

Protecting Pumps Against Acid Mine Water

By Harry Goodnow
Du Quoin, Illinois

A simple, cheap and efficient method of protecting mine pumps from the corrosive action of some particularly bad mine water was recently tried out successfully at Herrin, Ill. After five pumps had been put on the scrap pile one after the other, Elmer Mayor, the top boss, conceived the idea of using beeswax on the parts of the pump exposed to the action of the water. Accordingly, he took apart a new pump, carefully wiped off all grease and dirt from the faces and even from the bolts that clamped the parts together. After carefully heating the clean surfaces he applied the melted beeswax to form an even, thin coating and bolted all the parts together with similarly treated bolts. The pump was then installed and has run without any further attention except the regular oiling. Before the beeswax was tried the pumps lasted from one to three days. The treated pump has been running for several months.



VIEW OF THE FIRST REINFORCED-CONCRETE RAILROAD CAR BUILT IN THE UNITED STATES

COAL AGE

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The Baltimore Tunnel Disaster

WE PRINT on page 55 of this issue the facts, as nearly as they could be learned, concerning the occurrence of the powder flare in the Baltimore Tunnel at Wilkes-Barre on June 5 last, also the verdict of the coroner's jury. Because the impaneled men in this case failed to name a specific cause for the accident does not signify that its occurrence was an act of Providence beyond the power of man to prevent. That the accident in the Baltimore Tunnel could not have been averted no one attempts to assert.

Men who survived the horrors of the disaster on the morning of June 5 last state that they had, and still have, absolute confidence in the carefulness and conscientious thoroughness of the underground foreman. As one of the men who passed through the flare-up expressed it to a *Coal Age* representative: "There ain't no carefuller man in this valley anywhere than that foreman, and yet he had to have that accident." All of which goes to show that the care and pains taken by one man amounts to little if many are involved.

Of all the explosives, of all the dangerous chemical mixtures and compounds man has yet devised, black powder is probably the most universally known. A man's acquaintance with it usually begins when he shoots his first firecracker at the age of five or six, or possibly less. Few, indeed, are the persons who reach mature years ignorant of the behavior of black gunpowder when touched by fire or raised to the temperature of ignition. It was certainly not because of ignorance of probable consequences on the part of anyone that the powder carried on the man trip in the Baltimore Tunnel became ignited.

It is sometimes said that it ill becomes a living person to hide behind a dead man's corpse. By the same token the survivor of any accident should not fail to profit by and pass on to others the experience gained in the loss of his less fortunate companions.

The flare-up in the Baltimore Tunnel demonstrated no new, unknown or occult property of explosives. It was rather a convincing, albeit a tremendously costly, demonstration of the fact that black powder and flaming pit lamps or smoldering pipes form a bad combination. The price of safety in mining is eternal vigilance and painstaking self-sacrifice on the part, not of any one man or any one class or set of men, but upon the part of every living soul in the mine workings.

Well has the union argued that the operator on making the next contract should not seek to enforce a lower wage on the mine worker even if times are bad. The wheel has turned, meanwhile, and the new contract comes with steady work and with a labor shortage in prospect. The mine worker should realize that the moderation with which he counseled the operator he should now exhibit himself.

The Coal Operator's Largest Customer

AT LAST the railroad problem is seen in its true perspective. This, the most important of the country's public utilities, is the arterial system through which flows the lifeblood of the nation. To coal men the railroads are of peculiar interest. Not only would mining be practically paralyzed without rail transportation, but these same public servants constitute the coal industry's best customer. If facts are needed to substantiate these claims the evidence is furnished in a recent report of the U. S. Railroad Administration giving a summary of locomotive fuel performance for 1916, 1917 and 1918.

The three years covered by this report include the stormiest period of the railroads' existence, the culmination of a long siege of public criticism, adverse statutes and Federal and State Commission regulation. Owing to the disturbing influences of the war and Government control and operation, the time is not opportune for the most satisfactory analysis of railroad performance. The favorable aspects of the situation are unity of control and the successful operation under a management able to inaugurate reforms long desired by practical railroad men but impossible of adoption under existing legislation. The report in question was compiled by the Fuel Conservation Section of the Railroad Administration under the management of Eugene McAuliffe, who is prominently connected with important coal interests in the Middle West.

This summary of locomotive fuel performance has to do with both freight- and passenger-train service, and the railroads of the country are included in seven natural groups or regions. In comparing the results attained a number of factors should be considered such as the topography of the country traversed by the roads, extent of territory and the nature of the traffic handled. In round numbers 233,000 miles of the country's railroads were taken over by the Administration, of which mileage some 229,000 are covered by this report. Full information is not available for all the roads represented and two sections are omitted in some totals for this reason. However, an average of 67 per cent. of all regions is reported and thus the conclusions drawn should have some weight.

Considering freight-train service, the average gross ton-miles per locomotive-mile for all the regions considered are 1317, 1297 and 1345 for the years 1916, 1917 and 1918 respectively. It is to be regretted that the Pocahontas region division is not here considered, as the Virginian Ry. with its fine equipment and roadbed makes the best showing with an average of 2364 for the three years noted. The tons of coal consumed during 1916, 1917 and 1918 are, in round millions, 79½, 86¾ and 86⅔ respectively. These are significant figures and show that during 1918 about 12½ per cent. of the total coal mined (689,652,110 tons) in the United States was consumed in rail freight transportation. During the same three years, 192, 201 and 200 lb., respectively, of coal per 1000 gross ton-miles were consumed. These figures show an increase of 4.6 per cent. for 1917 compared with 1916, while there is a decrease of 0.6 per cent. for 1918 compared with 1917.

In passenger-train service an average of 31,215,811 tons of coal were consumed for each of the years 1916, 1917 and 1918. Taking the total of the average amount of coal used for both freight and passenger service dur-

ing each of the past three years, we find that it represents 16.7 per cent. of all coal mined in this country in 1918. A customer who will take one-sixth of our total production is worthy of consideration, but hardly to the extent of mining at a loss in order to supply him with fuel for power to run a business to which we contribute a big slice.

By recognizing, in legislation, the justice of automatically increasing salaries to accord with cost of living, the nation and the various states might keep within their service those faithful servitors who have become fitted, largely at the expense of the state, for the services they rendered. The labor turnover in government departments is one of the most distressing features of the conduct of their affairs.

Motor Trucks in the Mine Fields

LARGE though the sales of automobiles have been in the mining fields, the motor truck appears to be comparatively slow of introduction. The motor truck and automobile are such complements that one would imagine both would be found at the mines together. Where one can run, the other can find its way. The motor truck, no more than the automobile, is kept back by bad roads. Both ran around shell holes and ambled over corduroy in France.

It is true that a motor car cannot do full service on a poor road, but the same may be truthfully said regarding a horse-drawn wagon. We may have to ease the burden to both in order to suit the roads, but even under those circumstances the motor truck is well worth while, whether it is delivering goods from the store, timber for the tipple, props, oil, and rails for the mine or men to various construction jobs. Some operators have put bodies on motor trucks so that they can be made to carry several men. With these vehicles they have run a busline, carrying those of their men who resided in a distant town, forth and back, morning and evening. The uses of the motor truck are endless and when once properly introduced the "gas wagon" will be regarded as essential as any other piece of mining equipment.

He who awards justice may rightly claim justice, but those who do nothing unless they are compelled to such action cannot expect others to show any sense of restraint. Either an equitable wage or a wage of violence and competition, it needs must be. If we choose the last we must not regard ourselves—workmen or capitalists—as unduly injured if the wage game runs against us.

Defective Powder Kegs

IT IS almost impossible to prevent those who have to handle powder kegs from doing it without proper care. Kegs of powder should not be rolled on a steep grade or thrown from hand to hand. Many men climb into moving cars with a keg tucked under one arm and are liable in doing so to jar the keg so that it leaks powder. Every foreman in states which permit of kegs being taken into the mine should try either by his own action or by that of his assistants to find out whether kegs are reaching the working places in a defective condition. He should look over the arriving kegs occasionally to find out if they are tight. The matter is one not to be overlooked. Where the defects prove that someone is carelessly handling the kegs every effort should be made to find out who it is and to compel him to use more caution.

Defective kegs of powder can be found in storehouses the country over, for men will not use care in handling powder. A man who risks his own life is taking a chance on what belongs to himself. If he is a single man, he may be forgiven for his carelessness. But the man who tosses a powder keg or rolls it so that it is liable to be dented is taking on himself to expose the other fellow to risk. So likewise the man who, seeing a defective keg, fails to report it. Such doings as these, to say the least, are most unchivalrous acts, for every man owes a duty to his neighbor that he cannot lightly overlook.

In order to be successful in foreign coal markets it is necessary that American exporters have some degree of direct contact with the trade, as foreign coal buyers have certain peculiarities individually and locally which are perhaps more linked up with tradition and custom than is true of coal buyers in this country.

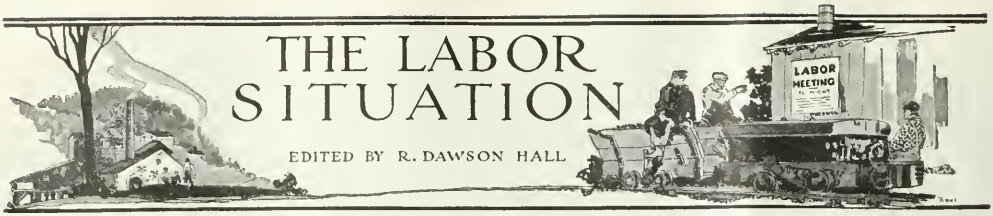
Accelerated Obsolescence

YEARS ago nothing became so hopelessly ancient as to be regarded as useless. So long as a machine would function, however inadequately, and no matter with what waste it turned potential into actual energy, it was still kept in service. Regardless of the progress of invention, the old machine or the old factory was maintained, new parts, duplicates of the old, replacing old parts when rust, fatigue or accident rendered such reconstruction necessary. Nothing was ever pulled down. If it crumbled, and it did not pay to repair it, it was nevertheless allowed to stand in memory of the fleeting years. Art was truly longer than life. The machine might fail to respond to the call made upon it, but as an exponent at least of the art at the time of its creation it was still permitted to exist.

Nothing has marked the progress of the American people more clearly than the willingness of our nationals to recognize obsolescence and to fearlessly cast out anything that newer invention had rendered useless. The metal-mining engineer will replace machinery almost before it is used if the progress of the art demands the change. Does a new development revolutionize the industry, a mill awaiting completion may be torn almost to the ground and be in great measure rebuilt so as to utilize the new method.

The speed of the obsolescence rapidly increases. There was a time when obsolescence could be permitted to hide behind the ample skirts of depreciation, for prosperity decayed sooner than invention dispossessed. But it is not so today. Obsolescence is getting to be a first charge on all kinds of equipment. Just as a change of style shelves clothing quicker even than wear, so a change in engineering practice causes the discarding of a machine even before its bearings have had to be turned.

Miners are coming to realize that most accidents are unnecessary, but they have not learned that sickness is just as preventable as accident. With proper care sickness can be avoided as easily as accidents.



General Labor Review

Canada does not appear to be so greatly troubled by would-be nationalizers of industry as does Great Britain (or should it not rather be said as was Great Britain at the close of the war?), for a change seems to have taken place. The House of Commons of Canada received on July 1 a report from the Commission on Industrial Relations in which many reforms are suggested, but among them does not appear nationalization of industry.

The majority of the body favors the eight-hour working day, the principle of collective bargaining, the unqualified approval of the right of workmen to organize, a weekly rest of not less than 24 hours, a minimum wage (especially for women, girls and unskilled labor), public works to relieve unemployment, government aid in building workers' homes, full liberty of speech and press, the establishment of industrial councils and state insurance against sickness, unemployment and old age. Apparently, nothing is said as to nationalization of industry. It is not popular in Canada, and in England 200 conservatives in the House of Commons who have been keeping very quiet for fear of appearing to antagonize the coalition ministry are determined to keep silence no longer, as there is now no enemy in the field. They have met Andrew Bonar Law, their representative in the cabinet, and have received assurances from him that he does not believe in nationalization of the railroads. He denies that the question of nationalization is bound up in the Government's transport bill and affirms that he believes that nationalization is an evil. "Stand by the Premier," is no longer an effective slogan in Great Britain, and Lloyd George's wishes are no longer the nation's laws.

> The following significant statement appeared in the Industrial Relations Commission's Majority Report to the House of Commons in the Dominion of Canada: "The commission believes that the day has passed when an employer should deny his employees the right to organize—a right claimed by employers themselves and not denied by the workers. Employers gain nothing by opposition because the employees organize anyway, and refusal only leaves in their minds a rankling sense of injustice. The prudent employer will recognize such organization and deal with its duly accredited representatives."

The matter of nationalization in Great Britain and in Canada needs our careful attention. Many of our labor leaders are of British birth, and while they are thoroughly naturalized they are nevertheless disposed to look to Great Britain for suggestions as to the conduct of labor matters. If Great Britain should turn toward nationalization, there would be not a few labor leaders of British extraction who would like the United States to show similar bad judgment.

In the anthracite region the mine workers seem to desire to make the eight-hour day secure by obtaining it for everybody, even those who merely put in their time watching a pump or a fan. Running a fan, especially, is the very job for which the word "sinecure" should have been coined. The contemplative philosophers who have this job to perform hardly turn a hand from the time they go on the job till the time they quit. All they have to do in many cases is to see that the fan keeps turning all the time. The only sacrifice they make is abstention from home, family pleasures and domestic duties.

The contemplation of the beauties of nature may be extended to long hours without putting undue stress on the unsophisticated contemplator. But the mine workers want all men held down to eight hours whether they toil or thumb-twiddle.

As has been said, the mine workers and operators of the New River district have been meeting in the hope of writing a new agreement, and they have made good progress as far as working and wage conditions are concerned. The rock on which they split is the check-off. They want only small wage concessions, but they are adamant on their declaration that the operators take the names of members of the union from the local secretaries and check off on the pay rolls the dues of all those thus named.

The operators say this is illegal, that they cannot deduct the check-off without an order from the employee himself, specifically ordering or at least permitting it. The men want a closed shop. They don't care if a man votes as a union man, so long as he pays the taxes the union imposes.

The conferences started at Atlantic City and commenced anew at Charleston on June 26, ending at an early hour on Saturday morning, June 28. The scale committee representing the operators consisted of C. C. Beury, G. H. Caperton, H. M. Bertolet, S. A. Scott and William McKell, while that representing the mine workers consisted of J. R. Gilmore, Adam Wilkinson, Robert Gilmore, Lawrence Dwyer, L. M. McNeil, Mote Thompson, Lawrence Peppard, C. L. Noble, Alfred Lindner, Nick Geis and George Scott.

The mine workers' unions in Murphysboro, Jackson County, Illinois, have on foot a movement to join with other unions in the vicinity to start a coöperative store in the city along the celebrated Rochelle coöperative lines. The store will sell goods at current prices and pay dividends to purchasers in proportion to their purchases.

The Kathleen mine at Dowell, Ill., 5 miles south of Du Quoin, and owned by the Union Colliery Co., of St. Louis, Mo., has been idle since Tuesday morning, July 1, when the miners working at that plant came out on strike. The grievance is over a difference in wages paid the loaders for taking out top coal, and the entire top and bottom force laid down their tools and refused to work until the difference was settled. All efforts made to reach an amicable settlement so far have failed. The shutdown is distinctively felt in Dowell, Elkville, St. Johns, Sunfield and Du Quoin.

A strike was called at all the mines of the J. R. Crowe Coal and Mining Co., near Pittsburg, Kan., to take effect July 2. Alexander Howat, president, and the board of District No. 14 ordered it. It is charged that the company has made a change in working conditions. The union men say the company should go back to the old conditions and submit the proposed changes to the officials of the operators' association and the union leaders. There are five of the Crowe mines. The company also has two steam-shovel plants. Altogther about 1000 men are employed.

In the Alabama district there have been two general wage conferences relative to the scale. On June 27 a joint conference was held, and the mine workers presented a scale which the operators rejected. The mine workers' president, Young, declares the men will stand firm, and a strike seems imminent.

WHAT THE ENGINEERING SOCIETIES ARE DOING

Economic and Business Training for Engineers

At the final session of a two-day conference, held in Washington, June 23-24, resolutions proposed by the conference committee of prominent educators were passed favoring the addition to engineering curricula of courses in general economics, cost accounting and business law and urging that the economic phases of engineering subjects should be emphasized in commercial instruction and that the institutions which have departments of engineering and economics or commerce be urged to consider some plan of coördination to develop a course to prepare men to meet the demand for large numbers of technically trained men for both foreign and domestic commerce.

This conference was called by the Commission of Education through Dr. Glen L. Swiggett, specialist in charge of commercial education in the Bureau of Education, and a representative committee of educators. There were about 155 present from all sections of the country, the discussion centering on the announced subjects of business training for engineers and engineering training for students of business, and on the results of the war experience as affecting technical education and foreign trade.

At the first session, Dean Anson Marston, of Iowa State College, led the discussion on business training for the engineer. Spencer Miller, vice president of the American Society of Mechanical Engineers and of the Lidgerwood Manufacturing Co., New York, placed first the need for developing character and outlined the qualities needed in engineering salesmen and the golden opportunities awaiting them. In the discussion was pointed out the danger of attracting too many men from the fields of design and research work, and the fact that it would be a mistake for all colleges to begin to train business engineers. Prof. G. H. Follows, head of the department of commercial engineering, Carnegie Institute of Technology, Pittsburgh, outlined by chart the course given in his department, and declared that a complete commercial training filled four years, it being almost impossible for men who had taken ordinary engineering courses to become managers of men.

Prof. Walter Rautenstrauch, Columbia University, in discussing engineering training for commercial enterprises, insisted that no worth-while instruction could be given without highly paid teachers. A department of manufacturing is contemplated at Columbia as a 6-year course. E. F. Dubrul, president of the Pyro Clay Products Co., Cincinnati, claimed that the science of business was as broad and its ethics as high as any profession, and that executives are highly paid because they control both the engineering production and the commercial or distribution phases of industry. Money will be provided by business men if the educator will show willingness to adopt new methods for supplying the kind of graduate they need—the course to be devised in conference. He called attention to the new college of engineering and commerce at the University of Cincinnati as offering a coöperative course of large promise. In the discussion a Colorado executive was cited as authority for warning against too many business engineers, claiming 50 technical men were needed to 1 executive.

The third session was devoted to the significance of the war experience for engineering education, a paper by Maj. General John F. O'Ryan, of New York, being read by Mr. Swiggett. He pointed out the shortcomings of the present educational system in character training and suggested as a remedy the inclusion of nonsectarian moral law developed and applied by courses in psychology, leadership, responsibility, physical training.

Dr. Charles R. Mann, chairman of the advisory board, committee on education and special training of the War Department, pointed out that both army men and practicing engineers place character first. He raised the question as to just what is meant by the "fundamentals" which so many advocate, and claimed that these fundamentals are at once apparent if the army method of beginning with a definite job is followed. Thus the motive—motivation—is developed, and results follow because the student is doing something definite and learns to think on the job. Morale is a dominant factor, better than character as a test, and he would judge class work by group morale. The teacher should be a friendly investigator trying to lead the student to his best attainments rather than one who merely tries to meet certain set standards—and generally failing in a large proportion of cases. The classification and rating system of the army should be applied, helping to measure accomplishments. The chairman, Major-General W. M. Black, Chief of Engineers, U. S. Army, advocated less individualism and the development of more coördination; also training for self-mastering through the subordination of passion to duty.

The work of the Engineer School at Camp Humphreys was described by Dean Evans, Toledo University, who had inspected the work in mechanics and by Professor Hatt, of Purdue University, who inspected the work in engineering. Both testified to the evidence of high morale attained through the assignment of concrete problems, forcing the men to face a real design or investigation situation, used as the basis for developing principles. Professor Hatt emphasized the need for developing a science of education.

At the last session, on training for overseas engineering projects, A. W. McLean, director of the War Finance Corporation, Washington, emphasized the need for financing foreign investments and for this country to assume the lead in foreign fields, claiming that engineers and business men can take the position of leadership if

they have the courage and enterprise. C. H. Gardner, of the American International Corporation, New York, advocated more training in vision to see opportunities, especially in transportation, saying that the engineer should be the pioneer. He would have French and Latin required for college entrance. W. W. Nichols, chairman of the American Manufacturers' Export Association's committee on education, pointed out that industry and engineering are mutually dependent, that pure engineering belongs only to rare genius, and that the rank and file of engineers need a practical training. Foreign languages should be taught to develop knowledge of the customs and mental attitude of foreign peoples.

Dr. Jeremiah W. Jenks, research professor, government and public administration, New York University, in an illuminating address, showed two kinds of problems—to get trained men at once for overseas service and to develop such men for holding future supremacy in foreign trade. He classed commerce as one of the humanities, on a par with history and economics. Credit should be furnished in the foreign field, but only by controlling stock interests in order to insure wise and successful management. The discussion by men connected with industrial concerns interested in the foreign field developed the necessity for long-time credits and for using ingenuity to find men with language qualifications and also with sufficient technical knowledge to represent them abroad.

Western Branch of Canadian Mining Institute Holds General Meeting

Coal-mining men were in the majority at the general meeting of the Western Branch of the Canadian Mining Institute held on June 4 and 5 at Nanaimo, B. C. All the collieries of Vancouver Isand were represented and some of those of the lower British Columbia mainland, but many of the persons expected did not attend because the steamboat service between the island and the mainland was interfered with by a strike of the mercantile seamen.

W. M. Brewer, Government Mining Engineer, with headquarters at Nanaimo, occupied the chair and, after the announcement of the Institute officers for the next year, the formation of a coal-mining section was discussed. The idea met with unanimous approval. It was felt that such a move would bring about a revival of interest among coal-mining men in the work of the Canadian Mining Institute. Those belonging to the proposed section could hold their meetings independent of the parent body, transact business having to do solely with the coal-mining industry, and adopt policies calculated to benefit the business of coal production both in relation to legislation and in regard to matters affecting only the collieries. At the same time it would be a part of the Canadian Mining Institute, its members would be members of the Canadian Mining Institute with all the privileges accruing to the same.

The first step was the appointment of a committee consisting of Thomas Graham, general superintendent of the Canadian Collieries (D), Ltd.; George O'Brien, manager of No. 4 Colliery, Canadian Collieries (D), Ltd., and John Hunt, general superintendent of the Canadian Western Fuel Co., Ltd., to nominate a chairman and a council of five of the new section. The committee's report, which was adopted, made the following selection: George Wilkinson, chief inspector of mines for British Columbia, chairman; James Hargreaves, instructor in connection with the technical branch of the Provincial Educational Department, secretary and editor; John Hunt, superintendent Canadian Western Fuel Co.; Thomas Taylor, Pacific Coast Coal Mines, Ltd.; R. R. Wilson, manager, Granby Consolidated Mining and Smelting Co.'s coal mines, Cassidy's; Francis Glover, manager, Princeton Coal Mining Co.; Charles Graham, district superintendent, Comox Colliery, Canadian Collieries (D), Ltd., councillors.

The afternoon session was devoted to the reading of papers as follows: "Taxation of Mines," by T. W. Bingay; "Mining Development in Northern British Columbia," by E. J. Conway; "Memorandum *re* Returned Soldiers Prospecting Organization," by Mortimer Lamb; "Tunneling at the Front," by Major A. W. Davies. Mr. Bingay's observations were along the same line as those he made at the recent International Convention at Vancouver. An interesting account of mining activity in the northern districts, with particular reference to the work on the Hidden Creek mine of the Granby Consolidated Mining and Smelting Co. near Anyox, was the subject matter of Mr. Conway's address.

Mr. Lamb, in his memorandum, dealt with the proposal of the Canadian Mining Institute that the Dominion Government extend financial assistance to enable returned soldiers, with the necessary qualifications, to go into the hills for the purpose of prospecting. He pointed out that there were many who would prefer this to taking up land or to settling in cities; that it was a means whereby the latent mineral resources of the country might be brought to light and their development facilitated.

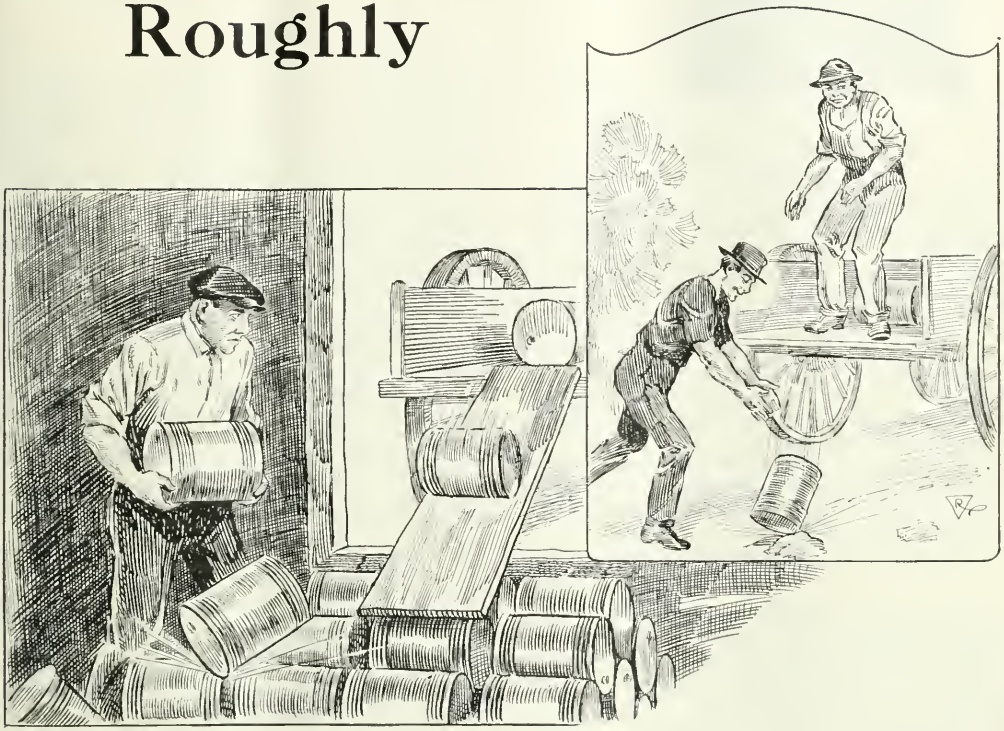
Major Davies' address was one of the most interesting presented, being a personal account of some of his experiences in tunneling operations on the western front. He spoke of the difficulties with which those who burrowed under the enemies' lines had to contend, of the fortitude of those so engaged, of their successes and failures.

The evening meeting was marked by the presentation of four papers, all of which related to coal mining. The first was entitled "Notes on Coal-Mine Air Sampling," by Dudley Michel, of the first-aid department of the Provincial Bureau of Mines. James Hargreaves followed on "Technical Education and its Relation to Coal Mining"; Charles Graham on "Regrading Slopes No. 4 Mine, Cumberland"; and H. H. Sanderson on "Development and Operation of Mine-Rescue Apparatus."

On the morning of June 5 the delegates visited Cassidy's, the site of the new coal mine of the Granby Consolidated Mining and Smelting Co. They were escorted over the plant by Mr. Wilson, the manager. The plant was pronounced the best installation yet seen in this part of Western Canada.

Returning to Nanaimo the party augmented by a large section of the coal-mining fraternity of the city, witnessed at the Nanaimo Government Mine-Rescue Station a demonstration of the use of the Gibbs and the Paul mine-rescue apparatus by two mine-rescue corps, one from Ladysmith and the other from Nanaimo. The Ladysmith corps consisted of T. Davis, M. Thompson, A. Brown and T. Hunter. The Nanaimo squad was composed of J. Kelly, H. Devlin, Jr., A. Mawhinney and J. Brown. The event closed in the evening with a delightful smoking concert which was largely attended.

Don't Handle Powder Kegs Roughly



You may think it safe to handle powder roughly because there are no lights nearby. It isn't safe, of course, though you may think it is. But even if it were safe—for you—it would be dangerous for others who have to take the kegs underground and handle them with lights on their heads. There never was a keg made so strong that it could not be sprung and caused to leak if handled with sufficient indifference to possible damage.

Remember

a Powderman Holds the Lives of Men in His Two Hands

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Certification and Safety

Letter No. 10—The discussion of this question has come to be very interesting. I had hoped that the earnest appeal made by James M. Roddie at the close of his letter, *Coal Age*, Apr. 17, p. 723, would bring a response from at least some of the mine inspectors of the country; but, on this as on all other questions pertaining to mining, there is a strange reluctance on the part of our inspectors to define their attitude and opinions.

The present discussion grew out of the failure of the Coal Mining Institute of America (which includes a large number of coal mine inspectors) to come to any agreed conclusion as to whether the amended Pennsylvania law, permitting the employment of uncertified officials in coal mines, has been detrimental to the efficient and safe operation of the mines in that state, since the law went into effect.

Time Required to Ascertain the Effect of the Law

The question is not easy to answer and it is only natural that there should be some difference of opinion as to the effect of the amended law on the safety of the mines.[1] The best plan is to watch closely events as they transpire at the mines, which will show the practical working of the amended law. Time alone is required to show the effect of the enactment on the conditions of safety of mining operations.

How long the amended mining law has been in force, permitting the employment of uncertified mine foremen, I cannot say.[2] I presume it is since the commencement of the war. As we all know, many of our coal mines were then operated under abnormal conditions. Discipline and vigilance gave way to the production of a greater output of coal, while hundreds of new and inexperienced men flocked to the mines seeking employment. Under the conditions that prevailed on this account, it seems only natural to believe that the accidents and injuries reported as having occurred during the period of the war were largely due to the inexperience of the men employed, rather than to the inefficiency of uncertified mine foremen.

Referring again to the letter of Mr. Roddie, I fully agree with the opinion he expresses that applicants for certificates of competency should have a longer practical mining experience than the five years required by law. Too often it happens that men are granted certificates to act as mine foremen whose experience in mining has been no more than that of a timekeeper, clerk, or other employee whose duties required him to visit the inside of the mine only occasionally but who, by reading mining books and studying, have prepared themselves to pass the examination. In my judgment, there are many practical miners whose long experience underground makes them more fit to manage a mine than men of that class, notwithstanding their lack of technical education and knowledge.

There is a class of miners who regard the mine foreman's position as an easy one and seek to gain it because they do not like to work, and I regret to add that there are too many of this class who are granted certificates. Now, in order that the certificate granted a man shall be a better index of his ability and efficiency, the examination should be made more rigid in its character, and the practical experience of the applicant should be made the determining factor in the granting of the certificate.

There are many foremen now in charge of mines who obtained their certificates long ago, when the examinations were not as rigid or technical as is required today. Many of these, from the time they obtained their certificates, have paid little or no attention to the study of mining questions and, of course, made no advance along this line. They are satisfied to think that the possession of their certificate is all that is necessary.

Mine Foremen Need to Continue to Study

It goes without saying that men who do not read and study fall far behind present-day requirements. On this account, it is my opinion that good results would follow if all certificates were limited to a period not exceeding ten years, and must then be renewed by the holder being required to pass another examination. This would have the effect of keeping men reading and studying the many problems in mining and make them progressive and up to date.

Four years' experience as state mine inspector brought me in contact with many mine officials and taught me that many men who hold high-grade certificates are less competent to manage a mine safely than others holding a lower grade of certificate. To know how to operate a coal mine according to scientific and practical methods is one thing, but to apply this knowledge is quite another thing, and here is where many men who have passed the examination fail in practice.

In my judgment, the efficient mine foreman is the man who has plenty of both technical and practical min-

[1]It will be remembered that the Mine Inspectors' Institute of the United States of America, at their eighth annual meeting, June 10, 1915, St. Louis, Mo., discussed this same question at great length and unanimously adopted the following resolution: Resolved, that it is the sense of the Mine Inspectors' Institute that, in order to secure the greatest degree of safety in the operation of coal mines, it is absolutely essential that candidates for all positions of authority in respect to underground operations should be required to qualify for such positions by passing an examination that will show their fitness and competency to conduct the operations in a mine in a safe manner. *Coal Age*, Vol. 9, p. 928; Transactions of the Institute, 1915, p. 74.

[2]The amendment to the bituminous mine law of Pennsylvania, legalizing the employment of uncertified mine foremen, took effect June 1, 1915. The need of the amendment grew out of the adoption of the Compensation Law that made coal operators responsible and liable for injuries from accidents in their mines. The claim of the operators was that the liability rested with the state as long as operators were compelled to employ only mine foremen whose competency was certified to by the state. The matter was compromised by amending the law to permit operators to employ either a certified foreman or one "equally competent."

ing knowledge, a long experience and the energy to utilize these qualifications in the operation of a mine, and certification should depend on methods that clearly demonstrate these qualifications for service.

Dayton, Tenn. JOHN ROSE.

Letter No. 11—I have followed with interest the discussion of the relation of the certification of mine officials to the safety in the mine, and can say, without hesitation, that I am not in favor of doing away with the examination of candidates for mine foreman's certificates. In my opinion, that would be a retrograde movement.

While it is true that a certificate held by a man does not make him better or worse, it does show certain traits in his character and marks him as a man possessing more or less ability and having a reasonably good character. This is evident, as readily appears, when we consider that there are a number of things required of a man before he can take the examination for a certificate of competency. For example, he must be a citizen of the United States and, in Pennsylvania, must have had five years' practical experience in the mines of that state and be sober and of temperate habits.

WHAT THE CERTIFICATE DOES SHOW

The fact that a man holds a certificate shows that he has sufficient education to reason a thing out and is able to perform at least most of the duties required of a mine foreman and calling for a knowledge of the theory of mining or, in other words, a technical knowledge. It also shows that he is familiar with the mining laws of the state, as a large number of the questions asked in examinations, today, concern the requirements of the law in the operation of mines.

The oral examination that the candidate must pass is intended more to show his knowledge of mine gases, their behavior and where they are to be found in the mine, besides ascertaining the man's ability to detect the presence of gas and protect the men placed daily in his charge. In fact, the certificate that a man holds is a mark of his general intelligence on the subject of coal mining.

WHAT STUDY DOES FOR A MINE FOREMAN

Consider, for a moment, the man who has a limited education, one who left school when he was 11 or 12 years of age, as I did myself. If such a one makes no attempt to study and improve himself, he will grow up to have a very narrow view of things. On the other hand, if he starts to study and takes a course of lessons and masters them, everything will appear to him in a different light than before. It is like the view from a porthole being suddenly enlarged to take in the entire horizon.

There is no question but that a practical man is a good asset in mining; but when practice is supplemented by a knowledge of theory, the benefit is far greater. Therefore, while a certificate is not worth more than the paper it is printed on, its possession shows a knowledge that is of far greater benefit to the man who has gained that knowledge by studying and reading. No one can convince me that a man who has gained his certificate by hard study is no better than the man who has not studied and holds no certificate. Today, no good reliable company thinks of employing an uncertified mine foreman if a certified man can be secured.

Only recently, I attended a superintendents' meeting where the management gave the men to understand that they desired them to employ only certified men as foremen and assistant foremen. Things are changing and changing fast in this respect. It used to be that any man having a good education was thought to be all right for the position of superintendent of a coal mine. Now, I dare say, 90 per cent. of the superintendents with whom I am acquainted are men who hold first-class certificates and have gone through the mill, serving as fireboss, assistant mine foreman and foreman, until they reached their present position. Therefore let me advise any young man that has his eye on a superintendent's job to get busy and start from the bottom, as that is the only way to climb the ladder to success. THOMAS HOGARTH.

McIntyre, Penn.

Waste of Coal

Letter No. 7—While it is not my disposition to find fault with the methods employed in this, my adopted country, I could not but feel deeply interested in the letter on this subject by F. C. Sanner, *Coal Age*, May 22, p. 964. It is only too true that the waste of coal in this country is enormous. Mining conditions here and in England are quite similar in many respects, but there is not the same waste in mining in the old country that is manifest in this field where I am located at present.

Let me illustrate by citing the conditions here, in the working of the No. 3 seam, which has an average thickness of from 5 to 7 ft. The coal is good but the roof conditions are poor, which often causes the miners to load dirty coal. However, I have seen far worse conditions in mines. The only method employed in the working of this coal seems to be the panel system. The panels are about 400 ft. in depth, while the rooms are driven on 33-ft. centers.

In more than one instance, I have seen rooms driven 40 to 50 ft. in and then abandoned because of a roof fall in the room. No effort would be made to recover the balance of the coal in such rooms, but the track would be pulled out, and that was the end of it. The No. 4 seam, which is also worked here, has a thickness in some mines of only 3½ or 4 ft. The same method of mining is employed in this seam, but the waste of coal is not quite as large as in No. 3 seam.

RESULTS OF FREQUENT CHANGES IN MINE FOREMEN

In one mine, in particular, the conditions are something that would turn a practical mine foreman's hair gray in a short time. There is hardly a straight road in the mine, and the output is from 400 to 600 tons a day. The condition in this mine is the result of having changed bosses frequently. Most of these men knew nothing more than the panel system of mining, which was the limit of their experience. They received their certificates long ago, before examinations in mining were as strict as they are today.

Now if a practical mine foreman who has had experience in different methods of mining and understands longwall work could be given a free hand in this mine, it would not be long before he could raise

the tonnage to 1000 tons a day, by adopting the long-wall method of mining, and installing Blackett conveyors at the working face. Coal-cutting machines are already employed in this mine, but the waste of coal will continue until improved mining methods are employed.

————, Ind. MINE FOREMAN.

Specific Gravity Determination of Coal

Letter No. 3—Only recently I have been able to read carefully the extremely interesting letter by H. M. Chance, which appeared in *Coal Age*, Jan. 9, p. 68, concerning the specific gravity determination of coal. As his letter refers, in part, to my previous article on the routine determination of the specific gravity of coal, I may be permitted to add a few words.

Dr. Chance refers to the close agreement of my figures. Attention should be directed to the fact that most of the figures given were averages, and that the agreement may be largely ascribed to the law of averages. The method described by me was offered simply as a routine method, and particular accuracy was never claimed. The accuracy stated in the paper was given as 0.02 unit of specific gravity.

Analyses Prove Specific Gravity Determination

The average specific gravity of the ash of the hard white-ash coal referred to in my previous paper would, I am convinced, be as high as the figures given by Dr. Chance, namely, 2.55, or 2.56, which figures he considers surprisingly high. I have selected about twenty analyses of the material commonly designated at the mines as "slate." These analyses were merely picked out at random, and show the following average approximate results:

Specific gravity	2.34
Ash content	72%
Sulphur content	0.96%

The twenty coal analyses from which these figures were averaged show ash percentages varying from 48 to 86 per cent.

Hard white-ash coals do not commonly contain a large quantity of pyrite; in fact, the average sulphur content of such coal lies between 0.70 and 0.80 per cent.

Dr. Chance calls attention to the variation in specific gravity of coals from different districts. This is an important point and one that is quite frequently neglected in practice. We have noticed that, for a given ash content, coals from different districts will have quite different specific gravities. The following table shows the specific gravity of coals from different districts, the figures being the average corresponding to an ash content of 18 per cent. Results showing average sulphur content are included as a matter of interest.

Classification of Coals	Specific Gravity of Coal with 18 Per Cent. Ash	Per Cent. Sulphur
Hard, white ash	1.68	0.70
Free-burning white ash	1.66	0.74
Schuylkill red ash	1.62	0.62
Locust Mountain	1.58	0.85
Lorberry	1.56	0.66
Lykens Valley	1.56	0.56
Shamokin	1.51	0.95

It seems of interest to note here that, in the case of freshly mined anthracite, the specific gravity decreases with an increasing volatile-matter content. For a difference of 0.17, in specific gravity, as shown between the two extremes in the table above, there will be a corresponding difference of over 3 per cent. of volatile matter, the lower specific-gravity coal having the higher volatile-matter content. With decreasing specific gravity, coals of a given ash content will show a relatively higher heating value.

Dr. Chance calls attention to the possible differences in the specific gravity of the ash of coal and the specific gravity of the ash of the so-called "slate." There is no question but that the data suggested by Dr. Chance could readily be obtained and published. I have myself taken just such low-ash samples picked free from bony coal or slate, such as referred to by Dr. Chance; but the specific gravity of the samples was not determined at the time, and they were not kept. One such coal sample contained only 1.2 per cent. of ash.

Results of some tests made on 14 samples of hard white-ash coal, the size known as "broken," showed an average specific gravity of 1.61, corresponding to an ash content of 9.02 per cent. and a sulphur content of 0.68 per cent. I would assume that the specific gravity of ash-free coal of this nature would be approximately 1.52.

Practical Use of Specific-Gravity Method

Observation inclines me to believe, however, that, for the theoretical purposes brought out in Dr. Chance's letter, the specific-gravity determinations ought to be made by a more accurate method. The method described by me is simply a routine method and one that gives reasonable accuracy with little expenditure of time, and is adapted to finely crushed-coal samples.

Departing somewhat from the subject under discussion, if I may, allow me to direct attention to a possible use of specific-gravity determinations; namely, the means they afford of judging the quality of the smaller sizes of coal, at the breakers. The specific-gravity figures offer a more reliable standard by which to judge the ash content of small coal than does the amount of slate found by an inspector.

Moreover the specific-gravity determination can be made in less time. A small crusher could be installed to crush the coal sample, in order that a representative sample be thus obtained for making a specific-gravity determination; although the specific gravity might be determined on a larger sample, by means of a somewhat modified method, or by any different method. I simply mention this matter briefly, as it was not my purpose to discuss this aspect of the proposition, in this letter.

A. G. BLAKELEY, Chief Chemist,
Philadelphia & Reading Coal and Iron Co.
Pottsville, Penn.

Mine-Haulage Proposition

Letter No. 3—Looking over *Coal Age*, under date of June 5, p. 1053, I came across the inquiry of J. H. Dickerson, of Cambridge, Ohio, with regard to a proposed change in the hauling system of his mine. To many people Mr. Dickerson's inquiry might give the impression of inability on his part. However, the real mining man is never afraid to accept the viewpoint of his fellows; nor yet is he adverse to criticism when it is conducted along legitimate lines.

If we mining men, as a whole, adopted Mr. Dickerson's system with reference to many a problem that might come before us it is safe to say that considerable benefit

would result to all concerned. The problem he presents is one that most mining men run up against, from time to time, and no doubt will bring out much valuable comment from the more advanced readers of this valuable magazine, which we have learned to love.

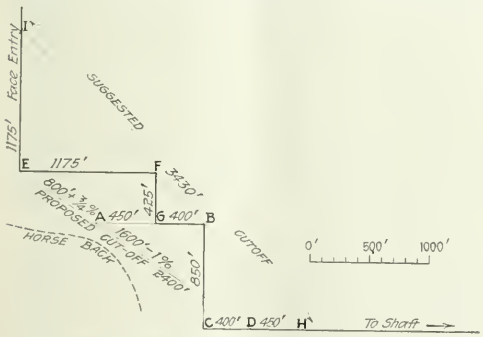
To begin with, insofar as the grades go, the old haulage road is the most favorable. The difference is so slight, however, that this factor need not be considered in opposition to the adoption of the new system. Eliminating the sharp curves at *F*, *G*, *B* and *C* on the old road will provide a more direct and ideal haul, and it should be possible for the motors to make better time even considering the slight plus grade between *E* and *A*.

Estimating the Daily Saving by the Change

Assuming that the original trip speed is maintained on an average over the entire haul after the change has been made, the output will increase in proportion to the decrease in the haulage distance. In other words, the output will be increased 85 tons per day, without increasing the original haulage equipment or crew. To be on the safe side, however, we will deduct 25 per cent. from this increase, and assume that the net gain is, say 65 tons per day, making total output, per shift, of 1265 tons.

Now, I will assume that the coal, f.o.b. the mine, is valued at $3 per ton, which is a conservative figure. Also, I will assume that the same underground and surface company force is capable of handling this increased output. If so it will mean a saving of $195 per day, or a net reduction on the increased output of 15c. per ton. This, to my mind, is the most important factor entering into the whole subject.

Should the plus grade, shown at *EA* on the proposed cutoff, interfere with the efficiency of the motors, no



SHOWING ANOTHER PROPOSED ROAD

great difficulty would be experienced in cutting this grade down, later. Any time lost, however, in ascending the plus grade *EA*, should be easily offset, during the descent of the minus grade from *A* to *D*.

To go into the proposed change fully it is very necessary to have more data relative to local conditions. Mr. Dickerson does not state the size, amount, or cost of timber required for the cutoff, or the amount of bottom brushing or other rockwork to be done in order to secure the necessary height and width and the proposed grades. The efficiency of the labor available and the wages paid will also be a big matter for consideration. On the whole, however, I can see no serious difficulty in the way if the conditions existing throughout the entire length of the cutoff *ED* are at all normal. Mr. Dickerson states that he has two million tons of coal in sight. Then, assuming that he proceeds with the new road and increases his daily output 65 tons per day, estimating on 260 working days in a year, the tonnage in sight, assuming a 90 per cent. recovery, is sufficient to keep the mine running at the increased output. If so it will mean a saving of $195 per day, output for 5.47 years. Should the market value per ton remain at $3 during the entire period mentioned and an output of 1265 tons per day be maintained, the actual saving in that time will run well into six figures.

As already stated, Mr. Dickerson has not supplied sufficient data with regard to local conditions, and one is liable to be considerably off when figuring the ultimate cost of the proposed change. I would, however, place the cost of completing the proposed cutoff at not more than $20,000, including all labor and material, which amount would be returned in less than four months' operation on the new road. Moreover, owing to the total haul between the face entry and the shaft being reduced in length, there should be a corresponding decrease in the per-ton cost for maintenance, during the entire life of the mine.

Suggests Another Proposition

In my opinion, if I may be allowed to criticize the proposed change, the better and most economical method would have been to commence the cutoff road at *H*, 850 ft. outby, or toward the shaft, from the point marked *C* on the plan, and with a deviation of 45 deg. from the line *CDH*. This cutoff would touch the point *B* and cut through the corner at *F;* and, assuming the face entry maintains the course shown on the plan, this cutoff would connect with the face entry at a point 1175 ft. from the point *E*. The total length of this route *HI* would be 3430 ft., as against 4875 ft. on the original haulage route. In Mr. Dickerson's proposed cutoff, the length between the same points *H* and *I* would be 4050 ft., or a difference of 875 ft. in favor of his proposed cutoff.

With a cutoff such as I have proposed, it will be possible to reduce the entire length of the haul from the face entry to the shaft 1445 ft. My proposed method, however, would only hold good provided suitable grades could be maintained throughout its entire length. Being further away from the horseback shown on the plan, I would assume that the roof conditions throughout my proposed route would be much better than that of the route proposed by Mr. Dickerson.

If such grades could be secured that would permit the original trip speed to be maintained the reduction of the haul, by adopting my proposed route, would mean that the output would be increased 147 tons, making the total possible output per shift 1347 tons; and, deducting 25 per cent. for emergencies, we can assume that the actual increase would be 110 tons.

These figures, it is understood, are based on the original trip speed being maintained after the change. If conditions are favorable the latter method is preferable, and would produce much better results than the one proposed by Mr. Dickerson, which nevertheless in itself is good, and should be proceeded with for the following reasons:

1. It will afford a more direct and ideal route from the live workings to the shaft.

2. The total haul will be reduced 875 ft., which means that the motors can haul approximately 65 tons per

shift more than formerly without increasing the haulage crew or shaft bottom force.

3. The first cost of equipping this proposed route should not exceed $20,000, for all labor and material.

4. Based on the market value of $3 per ton at the mine, the saving due to the increased output would be roughly $195 per day, which means that the total cost of equipping the proposed route would be returned in less than four months.

5. Having four and a half years' tonnage in sight and assuming that the shaft and tipple equipment is sufficient to handle the increased output without increasing the day force at the shaft bottom or on the tipple, the proposed change is justified. Even if the saving per ton is on the large side, and the figures quoted be cut in two the day company force remaining stationary, I would still consider the change a good investment and would loose no time in having the proposed cutoff completed and put in operation.

J. H. McMillan, General Superintendent,
Jasper Park Collieries, Ltd.
Pocahontas, Alta., Canada.

Labor and Democracy

Letter No. 1—In his cabled address to Congress, President Wilson says, in regard to the labor question:

> We must find another road, leading in another direction and to a very different destination. It must lead not merely to accommodation, but also to a genuine coöperation and partnership, based upon a real community of interest and participation (of employees) in control. . . . The object of all reform in this essential matter must be the genuine democratization of industry based upon a full recognition of the right of those who work . . . to participate in some organic way in every decision which directly affects their welfare or the part they are to play in the industry.

Whether or not we agree with the President, we can not but recognize the tremendous importance of his words. If based upon a wrong conception of business principles, or a mistaken theory of economics, their harmful effect upon industry, in general, will be well nigh incalculable, and we should at once make every effort to counteract their baneful influence. On the other hand, if his opinion embodies a sound business principle, based on a true theory of political economy, prudence would dictate that we cast about for a method by which his suggestion may be put into practical and early execution.

However, if we attribute the President's remarks to a purely political motive it will be well to remember that the "Whitely Plan"—a cumbersome scheme looking to the democratization of industry, to the end the President has in mind, and working through joint committees of owners and employees—is now being given a tryout in England.

England, as a natural consequence of the greater density of her population, may be logically expected to arrive at a definite and necessary labor program several decades before the problem can become economically acute in this country. But, because of the stand taken by the President, the question of the democratization of such industries as coal mines, railways and telegraph lines will probably become politically paramount in the campaign of 1920 and there is a possibility, remotely probable, that some legislation looking to this end may be forced on the government.

Viewed from a distance the "Whitely Plan," which is essentially English, does not lend itself to modification that would permit of its satisfactory application to American industry. Incidentally, there seem to be grave doubts, even among the English, of its applicability to the industries of the British Isles.

Without entering into the question as to whether or not that portion of the President's cabled address dealing with proposed labor legislation is justified by existing conditions in America, we may safely assume that a ball has been started rolling which it will be difficult to stop. But, in the event of our failing to stop or even seriously impede its progress, a carefully thought out and well formulated plan for the democratization of industry will then be helpful.

Charles P. Steinmetz, in his recent article, entitled "How to Compass Industrial Coöperation," *Coal Age*, May 15, p. 904, has demonstrated that, in a very essential particular, the interests of labor and capital are antagonistic. How then, may I ask, is it possible to reconcile these conflicting interests and secure complete coöperation?

Under existing conditions the workman is capable of taking the viewpoint of the workman only. If, in addition to being a workman, he was also part owner of the concern for which he works, his breadth of vision would be so increased as to enable him to complete the symmetry of his outlook. This ability, even though his principal income continued to be derived from his labor, would qualify him to accord his employers a degree of coöperation not possible under present conditions.

Concrete Example of Democratizing Industry

Let me assume, for example, that a coal operation valued at $200,000 employs 100 workmen. In order that the employees might actually participate in both the profits and control of the organization, it would be necessary that they hold or control 50 per cent. of the capital stock. In that case, stock to the value of $100,000 would be issued to 100 workmen pro rata, or $1000, in stock, to each workman. In few instances could the man be expected to pay for this stock, which would necessitate the holding of the certificate in the company's treasury as collateral, and charging the worker with interest at 6 per cent. per annum, or $2.50 semi-monthly.

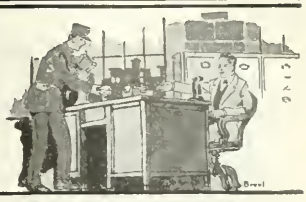
The voting power of the stock would now be vested in the workman, which would entitle him to all information relative to the company's financial affairs and give him an actual voice in the shaping of the company's policies. He would also be entitled to receive any dividend earned on the company's stock, which, if the corporation were managed with reasonable efficiency, should considerably more than repay the amount deducted from his earnings as interest on his stock.

It is readily realized that many complex details would have to be worked out in order that the organization might have a reasonable degree of flexibility; but the plan seemingly offers no difficulties that are impossible of solution. Properly executed, the plan should fulfill the president's requirements of participation in control and give to workers a voice in the policy of the business that employs them. It should secure for capital a greater degree of coöperation on the part of all employees and a material reduction of labor turnover, while assuring a 6 per cent. yield on 50 per cent. of the total invested capital. Economist.

————, Ky.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Installing High-Tension Lines

Kindly explain a safe method of conducting electric power into a mine, a distance of nearly two miles (10,000 ft.) to the working face, for the operation of coal-cutting machines with direct current. According to the best information we have at hand, this proposition is going to be an expensive one, and we are anxious to learn what method can be adopted to insure the greatest safety and reduce the expense of the installation. OPERATOR.

————, Tenn.

The transmission of electric power long distances underground is always attended with danger to the workers employed in the mine and involves, besides, a considerable expenditure in making the installation. Whenever possible, a safer and more economical method to adopt is to sink a borehole from the surface, at a point immediately over the center of distribution in the mine workings, and erect a power line on the surface running direct from the power station to the drillhole. This power line should be carried on substantial supports and the wire cable properly insulated and protected by a covering that will resist the weather. The drillhole should be cased with a pipe and the end of the pipe allowed to extend 10 or 15 ft. above the surface, so as to prevent accidental injury to the conductor where it enters the hole and passes down into the mine.

In general, in long distance transmission, a.c. current should be employed and a transformer installed at the farther end of the line to step down the high voltage of the current, for the operation of the machines in the mine. Or, if the machines are to be operated by d.c. current, a rotary converter should be employed to transform the a.c. current for use in such machines. An a.c. generator has no commutator, it does not present the difficulties due to sparking at the brushes, which always occurs when a d.c. generator is operated at a pressure exceeding, say 500 to 600 volts.

It should be understood, here, that the saving effected in the transmission of a.c. current over long distances, by the reduction in the outlay for copper, will generally cover the expense of installing a converter set. For the same power transmitted, the weight of copper required decreases as the square of the voltage increases. For this reason, economy in transmission demands a high-voltage and small current, which is made possible by the use of an a.c. generator.

To illustrate, the transmission of 30 hp., corresponding to a current of 22 amp. at 1000 volts pressure, a distance of 1 mile, allowing for a 15 per cent. line drop and wire return, would require a No. 8, B & S wire, having a diameter of practically $\frac{1}{8}$ in. But, to transmit this same power at 250 volts (88 amp.) would require a wire having 16 times the sectional area, or 4 times the diameter. In other words, the second voltage mentioned being one-fourth of the first, requires 4 times the current to produce the same power, and 16 times the weight of copper for its transmission over the same distance. Therefore, as previously stated, the weight of copper required for the transmission of a given power a given distance varies inversely as the square of the voltage, which makes a high voltage desirable in long distance transmission.

It is not always practicable, however, to carry high-tension lines over the surface, in the manner described. Numerous conditions may demand that the power line be conducted through the mine, to the distributing point far back in the workings. In that case, it is absolutely essential that every precaution should be taken to safeguard employees against the danger of contact with the line. As before, a high-tension conductor must be thoroughly insulated and protected from injury, by means of suitable covering throughout its length. In addition, these high-tension cables must be substantially supported by insulated hangers dropped from the roof of the entry, or attached to insulated supports affixed to the mine timbers.

Welding Split Gears to Axle

I want to ask the many readers of *Coal Age* if any of them have had experience in electric welding. At the present time, I have a hard proposition in the shape of a pair of split gears that are a trifle too large in the bore for the axle on which I desire to mount them.

I want to ask if anyone has had a similar job and been able to handle it successfully, either by the process of electric welding or any other means that will serve to hold the gears tight on the axle. In this case, they are to be mounted on the axle of an electric mine locomotive.

If someone who has performed the trick will state the process that he used in welding and the results obtained, the information will be greatly appreciated. If the acetylene torch was used in making the weld, did the heat of the flame make the axle brittle at that point? If the electric process was employed, what additional metal was used in making the weld?

Perhaps some readers have used other means than welding for securing split gears on an axle that was too small for them and will be willing to tell how it was accomplished and with what success. I shall be glad of any information along this line.

————, W. Va. MINE MECHANIC.

Although the process of electric welding, now so widely used, is comparatively new in mining practice, *Coal Age* is sure that some of its readers will be able to give the results of their experience in work similar to that described by this correspondent, and we hope for a generous response.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Mine Managers' Examination, Springfield, Ill., April 8, 1919

(Selected Questions)

Ques.—What will be the diameter of an upcast shaft necessary to pass 200,000 cu.ft. per min., with a velocity of 500 ft. per minute?

Ans.—The sectional area of this shaft is 200,000 ÷ 500 = 400 sq.ft. Since the cross-section is a circle its diameter is $d = \sqrt{400 / 0.7854} = 22.57$, say 22 ft. 7 in.

Ques.—A return airway is 10 ft. wide and 5 ft. high, and the velocity 600 ft. per min. The air is composed by volume as follows: Nitrogen, 79 per cent.; oxygen, 20.96 per cent.; carbide dioxide, 0.04 per cent. Find the number of cubic feet of each gas passing in this airway per minute.

Ans.—The sectional area of the airway is 5 × 10 = 50 sq.ft., and the volume of air passing, 50 × 600 = 30,000 cu.ft. per min. Therefore, the volume of nitrogen in the air current is 30,000 × 0.79 = 23,700 cu.ft.; the volume of oxygen, 30,000 × 0.2096 = 6288 cu.ft.; and the volume of carbon dioxide, 30,000 × 0.0004 = 12 cu.ft.

Ques.—Taking the weight of a cubic foot of air at 0.086 lb., what will be the weight of the air in a shaft 15 ft. in diameter and 250 yd. deep?

Ans.—The sectional area of a shaft 15 ft. in diameter is 0.7854 × 15^2 = 176.715 sq.ft. The volume of air filling this shaft, or the cubic contents of the shaft for a depth of 3 × 250 = 750 ft., is 750 × 176.715 = 132,536+ cu.ft., and the weight of this air is 132,536 × 0.086 = 11,398+ lb.

Ques.—A pillar of coal 450 ft. long and 132 ft. wide has been worked. The total weight of the coal is found to be 12,430 tons and its specific gravity 1.25. What was the thickness of the seam?

Ans.—A horizontal section taken through this pillar has an area of 450 × 132 = 59,400 sq.ft. The weight of a cu.ft. of coal having a specific gravity of 1.25 is 1.25 × 62.5 = 78.125 lb. Again, the cubic contents of 12,430 short tons of this coal is, therefore, (12,430 × 2000) ÷ 78.125 = 318,208 cu.ft. Finally, the thickness of the coal in this pillar is 318,208 ÷ 59,400 = 5.35 ft.; or 5 ft. 4¼ in.

Ques.—Find the length of a dumb drift, which is driven from a level, starting 240 ft. from the shaft, and which enters the shaft 100 ft. above the level.

Ans.—This is the dumb drift formerly used in the ventilation of a mine generating some gas and where the ventilation is produced by a furnace. The return air current, charged with gas, passed through the drift and entered the shaft at a point where there was less danger of the gas being ignited by the heat or by sparks from the furnace. The arrangement is seldom found in coal mining, today. The dumb drift represents the hypotenuse of a right triangle whose respective sides are 240 and 100 ft. in length. Therefore, the length of the drift is $\sqrt{100^2 + 240^2} = 260$ ft.

Ques.—(a) Name the gases found in the coal mines of this state. (b) Tell which gas is the most difficult to remove. (c) Which are explosive and which are non-explosive? (d) Give their chemical symbols.

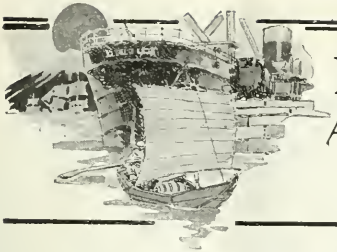
Ans.—(a) The common mine gases found in the mines of Illinois are methane or marsh gas; carbon dioxide; carbon monoxide; hydrogen sulphide and possibly, associated with methane, the heavy hydrocarbon gases, olefiant gas and ethane. The nitrogen and oxygen of the air are always present. (b) Probably the most difficult gas to remove is carbon dioxide when accumulated at the face of a dip heading or in dip workings. Methane, accumulated at the face of a pitch, is also difficult of removal, but less so than carbon dioxide in the dip, owing to the lesser density of the methane. (c) Of the gases named, those that are explosive when mixed with air in proper proportion are methane, carbon monoxide, hydrogen sulphide and the two heavy hydrocarbon gases mentioned. The non-explosive gases of those mentioned are carbon dioxide and nitrogen. (d) The symbols of the gases mentioned in the order given are CH_4, CO_2, CO, H_2S, C_2H_4, C_2H_6, N_2 and O_2.

Ques.—What is the real object of artificial respiration?

Ans.—The object of artificial respiration is to restore the action of breathing, by alternately and mechanically contracting and expanding the lungs, thereby expelling the noxious gases or water from the lungs and causing the inhalation of pure air.

Ques.—If an airtight stopping be erected in the main return airway, at a point 100 ft. from the fan, what effect will be produced on the fan?

Ans.—The placing of an airtight stopping in the main return airway will block the further passage of air. The result is that the air will simply be churned within the fan and no current produced. The effect in the fan drift, outby from the stopping, is to increase the pressure to what is called the "static pressure" due to the fan. The static pressure due to a fan's action may be calculated, by multiplying the actual pressure produced by that fan when running at the same speed and discharging into the unobstructed fan drift, by the ratio of twice the acceleration due to gravity (64.32 ft. per sec.), to the velocity (ft. per sec.) of the air in the unobstructed airway. In other words, the ratio of the static pressure to the actual pressure produced when a centrifugal fan is discharging into an unobstructed airway is equal to the ratio of twice the acceleration due to gravity, to the velocity of the air current that would be generated in the unobstructed airway, by the fan running at the given speed.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Suggests That American and English Coal Operators and Shippers Combine

C. B. Wynkoop, President of Cosgrove & Wynkoop, Believes It Would Be to the Mutual Interest of American and English Coalmen to Get Together—Foreigners Need Coal

C. B. WYNKOOP, president of Cosgrove & Wynkoop, Ltd., of 149 Broadway, New York City, who recently returned from a six weeks' tour of Europe, where he went to look into coal-market conditions, believes it would be advantageous to all producers and shippers of American and English coals if they would get together under a sort of working agreement, as a result of which there would no longer be any obnoxious fighting between the coalmen of America and England. Mr. Wynkoop has reached this conclusion after an exhaustive study of the situation as it affects mine owners in both countries.

Mr. Wynkoop returns to America convinced that there is a big market for American coal on the other side of the Atlantic. France and Italy, he says, are in dire straits for lack of coal, and the Italian railroads are burning anything that is burnable in order to move their trains, the fuel consisting largely of the bark of trees and the smaller limbs, the trunks being used for building purposes.

"England," said Mr. Wynkoop, "is not producing coal enough to meet its own requirements, to say nothing of shipping it to outside markets. The producers are trying to hang on to the export trade but are finding it extremely hard. Their own domestic requirements are taking as much coal as they can produce. So long as these conditions exist (and it will take between three and four years for mining to become anything like it was under prewar conditions) there is a big field for American coals in foreign countries heretofore supplied by the English. By that time our coal ought to be so well established in these foreign markets as to make it exceedingly hard for Americans to lose the trade.

"To my surprise I found that the English, instead of objecting seriously to an invasion of their markets by Americans, are anxious to make friends with the American coalman.

"The conditions in Italy are extremely bad. American coals have been well received, and I heard nothing but good reports about their burning qualities. If we Americans do the right thing I think the chances for permanent business are good; and there is plenty of business to be obtained.

"There is a big market for the coals of the United States all through the Mediterranean, but it must not be forgotten that consumers there have a lot of confidence in the English and will expect the same treatment from the American coalman."

Mr. Wynkoop is firmly of the belief that if American coals once get established in foreign lands and the coalmen wake up to the situation English shippers will not be able to recover the business. One thing will be necessary, however, he declared, and that is that the American coalman revise his methods of doing business.

Mr. Wynkoop spoke of the necessity of living up to contracts, which a great many in this country regard as "mere scraps of paper." In America, he said, one party tried to make it as hard as possible for the other party to the contract and frequently is able to squirm out of the agreement by the slightest excuse; in other words, the contract is regarded loosely. In foreign countries a contract is regarded as a solemn pledge.

Comparing the quality of American coals with those of England, Mr. Wynkoop believes that Pocahontas or New River coals are equal to anything that England produces, although the opinion might be contrary to the analyses. He said these two grades of American coals were now doing the heavy work in some foreign countries better than it was being done by the best grades of English coals, and that they had already made a market for themselves.

Another departure advocated by Mr. Wynkoop is that every coal-selling company in this country send a salesman to Europe to become acquainted with the trade and to learn their methods of doing business. The method of salesmanship, he says, is entirely different from that employed here. The English salesman is not as aggressive as his American brother, and even in these strenuous days finds time to take his afternoon tea and a frequent holiday.

The Southern American trade, Mr. Wynkoop declared, should belong to Americans. He said the English were badly frightened over the fact that that market is gradually but surely getting away from them, and that the prospects of their ever being able to regain it are becoming more remote every day. But, he declared, Americans must be careful as to the quality of coal they send to these South American countries if they wish to retain those markets. Consumers there are familiar only with the best the market affords and will insist upon receiving the same grades from the United States. Then it should also be remembered, added Mr. Wynkoop, that America will take comparatively little of the products of South America in return for its coal, while England is dependent upon these countries for much of its grain and hides.

Export Association to Assist Foreign Buyers

Arrangements have been made by the American Manufacturers' Export Association whereby introduction cards will be placed in the hands of foreign buyers about to visit this country. These cards, properly signed by representatives of the United States Government abroad, banks, chambers of commerce and the representative of the Export Association in foreign lands, will serve to accredit visiting buyers to the New York office of the Export Association. Buyers seeking particular kinds of merchandise will thus be aided by the association in getting in touch with American manufacturers producing the kind of goods desired. This will result in putting foreign purchasers in direct touch with American exporters.

The *Deutsche Allgemeine Zeitung* learns that a new coal agreement has been concluded between Germany and Switzerland, effective as from June 1, for the delivery of 30,000 tons of coke and 20,000 tons of coal per month for a period of six months. It is probable that a further 12,000 tons of brown coal briquets will also be delivered. The figures given refer exclusively to fuel from the Ruhr district. On the basis of the intended delivery distribution the price of fuel to be supplied works out on an average of about 105 fr. per ton.

Forbids Export of British Coal to Marseilles

The coal firms at Marseilles have taken exception to the action of the Ministry of Shipping in London, who refused to sanction the export of any more coal to Marseilles in British ships, owing to information having reached them that coal intended for Marseilles has been re-exported, at very high prices, to Italy and Roumania. After carefully looking into the matter the president of the British Chamber of Commerce at that port decided to send a protest to H.M. Consul-General at Marseilles, from which the following is an extract:

"This matter being of urgent importance to British interests here, I have brought it before my council and also before our Coal Advisory Committee, and the council are of opinion that the action of the Ministry of Shipping was not justified on the facts at present known, and that it is urgently necessary that the decision of the Ministry of Shipping be reconsidered without delay. After careful examination this Chamber is unable to trace any justification for the charges mentioned, and would be very glad, if desired, to investigate any such charges upon receipt of further detail. I trust that a solution may soon be found, as it is obviously extremely hard on the many British and French firms engaged in this trade that they should be penalized in this way, and if an offender exists it would presumably be sufficient to blacklist that offender."

High Wages Paid to English Coal Trimmers

Shipowners have been called upon to face unusually heavy bills for trimming coal at the South Wales ports, remarks the Liverpool *Journal of Commerce*. Recently a case has occurred in which a gang of Cardiff coal trimmers received £16 per man for five days' work at the present limited hours, and another case is recorded in which each man drew £4 for three hours' work. A demand made by the South Wales coal trimmers for a further 20 per cent. increase has been rejected by the Trimming Board. Only recently an agreement was arrived at whereby the employers gave an extra 20 per cent. increase in wages, making their total earnings 116 per cent. above prewar wages.

South Wales coal trimmers' earnings, comments the *Nautical Gazette*, therefore are above the remuneration of many professional men. There is, however, no possibility of any great influx of labor to coal trimming, inasmuch as it is not possible, it is understood, to become a coal trimmer without the consent of the Coal Trimmers' Union, the qualification being that the applicant's father must be a coal trimmer.

The War Trade Board announced on June 27 that shipments of coal may now be made from all ports on the Atlantic seaboard, and that the collectors of customs have been notified to disregard the provision contained in export licenses already issued to the effect that shipment must be made from Philadelphia or ports south thereof

Market for Coal in Pernambuco

The coals used for bunkering steamships, reports Consul A. T. Haeberle, Pernambuco, Brazil, under date of Mar. 9, 1919, are Pocahontas and New River from the United States and North Country from England. Cardiff coal has not been shipped into Pernambuco for some time, although it is preferred for bunkering purposes, and no doubt when things are normal it will be imported again to a great extent. Recently the average price of coal, either gas

or steam coal, has been about £8 10s. ($41.36) per ton, but there is every reason to believe it will be reduced considerably within a short period.

The gas works in Pernambuco are managed by the tramways, and they have been receiving coal from Lancashire, although in June last year a shipment came from Newport News. The price of American coal alongside quay was practically that given above. The gas company is said to consume a great deal of wood in gas production. The tramways have been generating their power from wood for some time, and until coal returns to a normal figure they will probably continue to do so.

The local rate for unloading a steamer with the use of winches and winchmen is 2 milreis (50 cents United States currency) per ton, and that for a sailer varies between 2 and 3 milreis, according to facilities offered by the ship's gear, as there are times when the master of a sailer refuses to allow the use of the winch. In any case, the price for the latter can be reckoned at 3 milreis.

The import duty on coal at present is 2 per cent. on a fixed value of 20 milreis per ton. The customs authorities are endeavoring to base the duty on the invoice value, but up to the present no change has been made. There is also 1 milreis per ton paid by the ship to the port works as a conservancy tax, and another tax of 4 milreis per ton, which is, for the present, in abeyance, as the port authorities can not collect this latter amount until an official coal depot is made by the port works.

American Coal for France

The French Government is arranging to import 1,000,000 tons of coal from the United States, and will employ a special fleet of ships for the purpose. Louis Loucheur, Minister of Reconstruction, said in the Chamber of Deputies recently that while France might not be able to face the coming winter without misgivings regarding the fuel supply, she would be able to tide over the coal crisis, which, he added, is worldwide.

Great Britain, which exported 80,000,000 tons of coal a year before the war, he remarked, has reduced her sales abroad to 40,000,000 tons, and will perhaps shut off exportation altogether. He continued by saying that France must rely on Germany for 20,000,000 tons of coal annually, to replace the diminished production in the north of France, and 7,000,000 tons in addition, which France imported from Germany each year before the war.

Coal Production of Dutch East Indies

According to the Dutch East Indian Archipelago, the consumption of coal in the Dutch East Indies has increased from 600,000 tons for the year 1914 to 1,000 000 tons in 1918. Before the war about 400,000 tons were imported from Australia and Japan, a considerable portion of it being for state railways, which in 1915 consumed more than 150,000 tons of foreign coal.

The scarcity of tonnage on the usual trade routes was the direct cause of the increase in the use of home coal. It is possible that Australian and Japanese coal will again find a market in Java and the outer possessions, as boats from those two countries coming to the Dutch East Indies for raw materials will bring coal as ballast. Moreover, it is possible that Indian coal may find a market in Singapore and Padang, which import about 1,000,000 tons from Australia, Japan and British India.

The chief sources of supply of Indian coal are the Ombilin mines, situated near Padang, Sumatra, and the mines of Pulo Laut, a small island lying off the southeast coast of Borneo, both areas being worked by the Government. The Ombilin mines are by far the more important, producing about 480,000 tons in 1917 and 470,000 tons in 1918. The Pulo Laut mines average 120,000 tons a year. Private mining companies produce about 110,000 tons a year. The output of the Lemantang area, Sumatra, is expected to reach fully 200,000 tons, and an endeavor will be made to increase this by about 20,000 tons each year. There is a coal area at Tandjoeng, Sumatra, which, it is claimed, yields good steam coal; in fact, it is considered the best produced in the colonies. The Government proposes to develop this district.

The port of delivery of the Ombilin coal is Emmahaven, the port of Padang. It is connected with the coal mines by a railway about 95 miles long, a part, owing to the very hilly country, being constructed on the cogwheel system. The Government has constructed all modern appliances at Emmahaven for the quick dispatch of coal.

The Ombilin fields extend for 10 kilometers (6.2 miles) and have a breadth of 9 kilometers (5.6 miles). The seams are usually very thick, some being 23 meters (75 ft.). The mines are generally worked by tunnels, and all modern equipment is employed. The supply is estimated at 200,000,000 metric tons of coal, and about 7,000,000 tons have been extracted from 1892 to date.

Department of State Takes Over Activities of War Trade Board

The Department of State and the War Trade Board announce that, pursuant to an executive order signed by the President on May 12, 1919, the present personnel, duties, powers, functions and records of the War Trade Board have been transferred to the Department of State as of July 1, 1919.

This transfer will not affect nor inconvenience the exporting and importing public in any way. All licenses heretofore issued by the War Trade Board will continue to be valid except licenses for the exportation or importation of wheat and wheat flour.

The functions of the War Trade Board thus transferred to the Department of State will continue to be performed by the present personnel of the War Trade Board in the War Trade Board building at Twentieth and C Sts., Washington, D. C.

All licenses will continue to be issued in the name of the War Trade Board, and all applications for licenses, and all correspondence pertaining to the activities of the War Trade Board, now assumed by the Department of State, should be addressed to the War Trade Board as heretofore.

Ocean Freight Rates on Coal From United States

The United States Shipping Board's rates on export coal to European ports are as follows per gross ton:

To	Daily Discharge,* Tons	Rate
Bordeaux and Havre	700	$22.50
Antwerp and Rotterdam	1000	22.50
Christiania	1000	27.00
Gothenburg (Sweden)	1000	26.50
Helsingfors	800	30.00
Copenhagen or Roune (Denmark)	1000	27.00
Landskrona or Malmo (Sweden)	1000	27.00
Oxelosund	1000	28.00
Stockholm	1500	28.00
Marseilles	1000	26.00
Spanish Mediterranean ports	1000	26.00
Genoa	1000	26.50
Leghorn	1000	26.50
Naples	1000	26.00
Trieste, Fiume or Venice	800	31.00
Patras and Piraeus	700	28 50
St. Nazaire	700	22.50
Cherbourg	700	22.50
Rouen	1000	23.00
Ternewzen	1000	22.50
Helsingfors, Sundsvall	800	30.00
Bergen, Christiania	1000	27.00
Koraor	1000	27.00
Trondhjem	1000	28.00
Lisbon	1000	22.50
Cadiz	1000	23.50
Bilboa, Cartagena, Barcelona	1000	26.00
Cette	1000	26.00
Civitavecchia	1000	26.00
Nice, Leghorn, Spezia, Savona	1000	26.50
Piraeus	1000	28.50
Salonica	1000	31.00
Bari	1000	30.00
Constantinople, Constanza, Smyrna	1000	31.00
Algiers, Oran	800	26.00
Tunis	1000	26.50
Sfax	1000	27.50
Alexandria, Port Said	1000	31.00

* Discharge is as indicated in the tabulation, with time counting 24 hours, after arrival of vessel, whether in berth or not, Sundays and holidays only excepted. If discharge is not completed within the time specified demurrage is to be paid at the rate of $1.00 per net registered ton per running day, payable day by day.

Coal and Coke Exports from New York in May, 1919

The exports of coal and coke through the Port of New York during May of this year were the smallest in three years, those of 1917 and 1918 exceeding them both in tonnage and value, although the average price per ton this year was larger than the previous years, with the exception of coke in 1917.

But three countries received bituminous coal through New York during May of this year, a decrease of two countries when compared with either of the two previous years. Fourteen countries received shipments of anthracite through this port in 1917 as compared with five countries in 1918 and seven this year.

Comparison of tonnages and values for the three years is shown in the following tabulation:

	Anthracite						Bituminous						Coke					
	1917		1918		1919		1917		1918		1919		1917		1918		1919	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Argentina	22	$375	....	.....	....	.....	...	.....	...	.....	...	.....	....	.....	263	$6,100	...	.....
Barbados	.....	.....	50	$500	23	$215	...	.....	25	$334	...	.....	....	.....	....	.....	...	.....
Bermuda	.....	.....	....	.....	....	.....	...	.....	....	.....	...	.....	....	.....	....	.....	...	.....
Brazil	168	1,597	482	3,736	352	2,376	...	.....	7,437	52,734	...	.....	14	$210	....	.....	...	.....
British Guiana	.....	.....	....	.....	5	80	...	.....	....	.....	...	.....	....	.....	....	.....	4	$100
Canada	10,621	83,844	3,341	21,627	2,431	20,232	10	$33	....	.....	...	.....	....	.....	....	.....	...	.....
Chile	391	6,118	....	.....	....	.....	...	.....	....	.....	...	.....	1,258	25,899	....	.....	40	1,120
Colombia	9	145	....	.....	1	20	...	.....	....	.....	...	.....	....	.....	8	200	...	.....
Costa Rica	5	75	....	.....	....	.....	...	.....	20	290	...	.....	....	.....	....	.....	...	.....
Cuba	1396	7,000	70	1,080	....	.....	4	60	....	.....	...	.....	12	258	17	404	...	.....
Danish West Indies	.....	.....	....	.....	....	.....	...	.....	....	.....	295	1,800	....	.....	....	.....	...	.....
Dutch East Indies	.....	.....	....	.....	....	.....	...	.....	....	.....	...	.....	120	3,800	....	.....	...	.....
Ecuador	25	400	....	.....	....	.....	...	.....	....	.....	...	.....	....	.....	25	700	...	.....
France	.....	.....	....	.....	....	.....	...	.....	....	.....	...	.....	....	.....	1,540	15,000	405	5,736
French W. I.	.....	.....	....	.....	....	.....	...	.....	....	.....	...	.....	21	472	17	393	7	180
Guatemala	.....	.....	....	.....	....	.....	...	.....	....	.....	...	.....	....	.....	....	.....	3	105
Haiti	50	725	....	.....	....	.....	50	700	....	.....	...	.....	....	.....	....	.....	...	.....
Italy	.....	.....	....	.....	....	.....	...	.....	....	.....	50	650	....	.....	....	.....	...	.....
Jamaica	2	27	....	.....	....	.....	...	.....	....	.....	...	.....	....	.....	....	.....	...	.....
Mexico	69	443	....	.....	....	.....	...	.....	60	600	195	2,067	213	2,241	....	.....	90	2,106
Newfoundland	1,645	14,128	501	3,215	200	1,670	...	.....	....	.....	...	.....	....	.....	....	.....	...	.....
Panama	.....	.....	....	.....	....	.....	...	.....	....	.....	...	.....	240	4,789	208	6,231	...	.....
Peru	.....	.....	....	.....	....	.....	...	.....	....	.....	...	.....	....	.....	60	1,560	27	752
Portugal	.....	.....	....	.....	....	.....	...	.....	....	.....	...	.....	1	27	....	.....	...	.....
San Domingo	2,301	18,128	....	.....	589	4,809	646	4,644	575	4,160	...	.....	1	22	15	280	20	485
Trinidad	.....	.....	....	.....	....	.....	285	1,710	....	.....	...	.....	20	345	....	.....	...	.....
Venezuela	10	150	....	.....	....	.....	...	.....	....	.....	...	.....	....	.....	....	.....	30	600
Total	16,714	$133,327	4,444	$30,158	3,601	$29,402	995	$7,147	8,117	$58,118	540	$4,517	1,900	$38,063	2,153	$30,868	626	$11,184
Av. cost per ton		$7.97+		$6.78+		$8.16+		$7 19+		$7.16+		$8.36+		$20.03+		$14.35+		$17.86+

COAL AND COKE NEWS

Harrisburg, Penn.

The bill presented by Senator Crow of Fayette County, granting the right and lawful authority to corporations to construct and operate tunnels under the bed of navigable streams where necessary to reach their coal supply, subject to the approval of the Water Supply Commission, is in the hands of the Governor.

This bill went through the Legislature without much noise, and provides that from and after the passage of the act, that where any power or manufacturing plant of any company heretofore or hereafter incorporated under the laws of Pennsylvania is situated upon or near the bank of any navigable stream, and such company has the right, either as the owner in fee or by lease, to mine coal from or under lands adjoining or adjacent to the opposite bank, then the company shall have the right and lawful authority to construct, operate and maintain tunnels under such a navigable stream so as to connect its coal lands and any mine operated in connection with such coal lands with a power plant of the company, provided, before any company begins the construction of any tunnel, it shall make application to and secure the approval of the Water Supply Commission of Pennsylvania. The bill also provides that the corporation constructing such a tunnel shall pay to the State of Pennsylvania the fair market value for all coal mined in constructing such a tunnel.

Charleston, W. Va.

While the same conditions did not apply in other parts of the state, yet in this section under improved transportation conditions, mines were able to get out more coal during the last week of June than at any time during that month, which has so far proved to be the best of the calendar year; although floods in one or two sections of the Kanawha Valley virtually marooned all mines on certain railroads for a period of three or four days, so that no coal whatsoever was shipped. However, traffic on trunk lines operating in this territory was not affected. Careful inquiry in the producing fields of this section elicits the information, that there was during the last week of June at least a ten per cent. increase in the output mainly due to the fact that more cars were furnished the mines than at any time in the month; other districts, however, did not fare quite so well.

While production in general has not reached its maximum, the trend is rapidly tending in that direction in West Virginia, at least in so far as market conditions are concerned; local conditions are mainly responsible for holding back production and in some sections in this part of the state the output now equals about 85 per cent. of capacity. Labor gives the impression of becoming scarcer each succeeding week in the face of a more plentiful car supply, which gives the mines larger opportunities for work. The demand for all kinds of coal was most pronounced in West Virginia at the beginning of July, especially as to smokeless, most of which is said to be under contract. In fact smokeless producers claim that fully 90 per cent. of the output of smokeless regions is under contract now.

Gas and splint coal mine-run are also finding a much readier market than was the case even by the middle of June. Although there is room for improvement as to steam coal, still with industrial consumers, under the necessity of restocking and making provision for future needs, even that coal is showing greater activity. Eastern markets on the whole are using by far the largest proportion of West Virginia coal, although Western markets are also showing increased activity. Tidewater shipments during the week ended June 28 were unusually heavy, indicating a marked growth in the export demand. As the demand becomes stiffer, prices on all kinds of West Virginia coal are also moving upward. As one West Virginia operator puts it, it is more a question of getting coal loaded than of selling it.

Production in the New River field was unusually heavy at the end of June, an excellent car supply enabling the mines to run continuously throughout the week. A number of companies had about a 100 per cent. supply of cars, though the general average was somewhat lower than that. The return of a certain number of mine workers to the field has also made it possible to produce more coal in the district, though in general miners are still hard to secure and for that reason there is not a full production. As was the case earlier in June the greater part of New River tonnage was being moved to tidewater and general Eastern markets for bunkering and export, although the Navy was a heavy consumer of New River coal. The demand for mine-run smokeless was becoming heavier and consequently there was an increase in the price, the average quotation for mine-run being $3.25 a ton. Prepared sizes ranged in price from $3.50 to $4.00 a ton. With mine-run in heavier demand it was found easier to move stock.

By the end of June the mines of the Kanawha district had almost succeeded in reaching a production as high as that attained during most of the time in 1918, the output during the last week of June being approximately 75 per cent. of full time capacity; total production was close to 190,000 tons, an increase of about 10 or 15 per cent. over the previous week. It was largely through a better car supply that such results were secured. Inquiries for all kinds of coal were much heavier. It was apparent in fact that market conditions were still becoming more favorable. That was true at least as to splint and gas mine-run, the demand for which in the East has become sustained, much of such coal being consigned to tidewater. While the sales of steam coal were larger than during previous weeks, such coals were not quite as active as others. A surprisingly large amount of Kanawha coal is being shipped eastward, although usually the markets for Kanawha coal have been in the West rather than the East. The last week in June found an additional number of companies with their product under contract. Contract mine-run had reached a price of from $2.25 to $2.35, while mine-run spot was averaging $2.25. Prepared sizes advanced in price from about $3.00 to $3.25 a ton.

Huntington, W. Va.

Further gains were scored in the production of coal in the Logan mining district during the week ended June 28, the total output being 237,759 tons, as compared with 232,129 tons for the previous week. There was an output of 237,708 tons during the corresponding period of last year. There was a very slight increase in the car shortage loss during the week, lack of cars still affecting production to the extent of 30,855 tons or about 10 per cent. of capacity. This was offset, however, by a somewhat improved market, only 23,776 tons being lost because of no market. Mine workers were somewhat more scarce, the percentage of loss from labor shortage being almost 3 per cent. or 8593 tons as against 2722 for the previous week. The output now amounts to 76 per cent. of capacity.

It became necessary on July 3 to place an embargo on Lake shipments, according to a notice received by operators of the Guyan Valley, owing to an accumulation of Lake coal on port roads; also owing to the small number of vessels available, an embargo was imposed on the loading of all Lake coal to Toledo, covering a period of 72 hrs. or up until July 6. Between the embargo and the fact that so many miners were helping to bury John Barleycorn as well as to celebrate Independence Day, production probably slumped to 50 per cent. during the first five days of July.

Another gain in Chesapeake & Ohio Ry. coal loading was revealed in the official figures issued at the local offices. Five hundred more cars were loaded in June, 1919, than in June, 1918, a month when war production was at a high level.

Fairmont, W. Va.

Dents were made in the production of the Fairmont and other northern West Virginia fields, served by the Baltimore & Ohio, during the last ten days of June, by a quite acute car shortage which, while generally anticipated, was not expected so soon. The fact that there were a surplus number of cars on hand, owing to the heavy car supply of earlier weeks, was all that prevented a general suspension or at least a limitation of operations throughout northern West Virginia fields. As it was 25 companies were affected in the Fairmont district proper for a day or so, there being only about 500 cars furnished along toward the middle of the last week of the month as against a requirement of about 900. There was no improvement as to Lake shipments. Producers ascribe the limited tonnage moving to the Lakes from northern West Virginia fields as being due largely to rate discrimination. The tonnage moving Lakeward was even less than during the week ended June 21; while on the contrary shipments to tidewater were somewhat heavier. There was an enlarged demand for railroad fuel apparent during the week. While Western tonnage has been running rather light, the loss has been more than compensated for by a gain in Eastern business. It also became apparent that industrial consumers were buying more coal.

Bluefield, W. Va.

There was a complete recovery in the Pocahontas district during the week ended June 28 from the production slump of the previous week, production reaching the highest point in recent months, 336,695 tons, as against 156,000 tons for the previous week, a gain of 180,000 tons. Such a recovery was made possible entirely because of a most marked improvement in car service, the loss from a shortage of cars being reduced from 263,000 to 37,105 tons, a difference of 225,000 tons alone in that respect. There would have been an even larger gain in production but for the fact that the labor shortage loss jumped from 791 tons to 10,467 tons and mine disability from 1945 tons to 10,382 tons. As it was, however, the total production loss was cut down from 265,000 tons to 58,215 tons, a gain of 207,000 tons. That Pocahontas coal, in addition to the extremely large tonnage under contract for the coal year, is being sold as fast as mined is shown by the fact that there was no loss whatsoever from "no market." The demand for export coal from this field has become quite heavy and prices are showing further tendencies to advance. In most markets Pocahontas prepared is selling from $4.50 a ton upward. Coke production is still around 7000 tons.

A gain of 23,000 tons was made in the Kenova-Thacker district during the week ended June 28, production being 110,897 tons as against 77,738 tons for the previous week; there was a production of 140,624 tons for the same period of 1918. In short the mines of this district were producing up to about 62 per cent. of capacity; the loss in output was 68,497 tons, with a car shortage loss of 15 per cent. amounting to 28,897 tons, that being a reduction, however, of 38,000 tons. There was also a larger market for Kenova-Thacker coal as shown by the fact that the loss from no market was reduced to the extent of 13,000 tons. It is believed that production for the first week of July will show a decrease owing to the fact that miners in many instances spent most of the week on an Independence Day vacation.

Columbus, Ohio

On June 26 Jerome Watson, chief deputy and safety commissioner of mines, of the state of Ohio, sent the following communication to the operators and miners of that commonwealth:

"The recent terrible disaster which occurred at Wilkes-Barre, Penn., in which the lives of approximately 100 men were snuffed out in an instant, as the result of an explosion of powder which was being conveyed into the mine in a car attached to a man-trip, and which was ignited either by a spark or by a short circuit from the electric wires which were carried along the entry, has prompted the Mining Department of Ohio to call your attention to the following section of the mining laws relating to the conveying of explosives into the mines of our state:

"Section 962. * * * (Conveying of Explosives) 'Blasting powder or explosives must not be taken into or out of a mine, or moved from place to place in a mine along any entry or haulway where there are electric wires, while the power is on such wires, except when such powder or explosive is conveyed in insulated cars or packages.'

"In connection with the following the Mining Department hereby issues the following order, effective at once: That no powder or other explosives be conveyed, transported or taken into or out of any mine in this state, on any trip in which men are being hauled to and from their working places, save those whose duties so require shall ride on, or in any car containing powder or other explosives.

"The purpose of the above order is to eliminate the danger of an accident of a like nature occurring in any of the mines of our state. We all know that had such a rule been enforced at this ill-fated mine at Wilkes-Barre, all of the sorrow and suffering that attended this disaster would have been averted, and those men who suffered and died would have been alive today. The Mining Department will insist upon this order being complied with and expects your coöperation in the enforcement of same."

A similar law is operative in Illinois as regards shutting off the electric power on wires when explosives are being moved in proximity to current conductors in the mines.

Ottawa, Ont.

As the result of an investigation by a Committee of the Senate into the granting of certain valuable coal leases in the Smoky River district of the Alberta Peace River to Colonel A. T. Shillington and C. A. Barnard, the leases have been cancelled by the Canadian Government. The lessees had made application for the right to build a railway to be known as the Athabasca, Grand Prairie & Vermilion Ry. for the development of their property, and when the matter came up in the Senate, objection was raised on the ground as regards advertising the manner in which the leases had been secured. An investigation disclosed the fact that the lands were originally leased to Dr. Hoppe, a German-American, in 1912, at an annual rental of $1 per acre for 18,800 acres. He made default in his payments in 1918, and on Aug. 3 of that year the lease was cancelled. Dr. Hoppe and associates had spent some $200,000 in exploration and mining work, proving the valuable nature of the deposit. Shillington and Barnard somehow obtained inside information to this effect before the cancellation of the lease to Dr. Hoppe, and parties acting in their interests proceeded to stake the claims on the first opportunity. D. B. Dowling, of the Canadian Geological Survey, testified that the area is probably the most valuable of its kind in Canada and estimates the coal content at 400,000,000 tons of semi-anthracite coal, superior in grade to any other of that kind in the Dominion. It is not charged that there was anything absolutely illegal in the second staking, the ground on which the leases were cancelled being that property known to be enormously valuable should not be handed over to private individuals for exploitation.

Victoria, B. C.

Amendments to the Coal Mines Regulation Act introduced at the last session of the Provincial Legislature by the Hon. Wm. Sloan, minister of mines, came into effect on July 1. Henry Miard, of Coal Creek, B. C., and James Dixon, of Nanaimo, B. C., are the examiners appointed under this act. Since 1911 Mr. Miard has been the miners' representative on the retiring Board of Examiners. He has worked in the coal mines of the Crow's Nest Pass field for nearly 20 years, holding official positions for some 10 years. James Dixon is mine manager at the Reserve mine operated by the Western Fuel Co. at Nanaimo, B. C. He has been appraiser for the Board of Examiners of British Columbia, examining the papers of candidates for certificates of competency. Messrs. Miard and Dixon will act in a dual capacity. First, they are members with the Chief Inspector of Mines as chairman of the Board of Examiners charged with the examination of candidates for certificates of competency as coal mine officials. Secondly, they are members, with the inspectors of mines of the various districts as chairmen, of the board for the examination of candidates for certificates of competency as coal miners. Mr. Sloan explains that there is really only one board—a Central Board superseding the top-heavy machinery which has existed permitting the reduction of the personnel of the Examining Administration from 33 to 3, and enabling the Government to dispense with the services of 27 officials. At the same time it will result in much increased efficiency.

It is pointed out that the formation of this Central Board will remove the difficulties encountered by the various boards of examiners for the examination of coal miners and the one board for the examination of coal mine officials. The representatives of these boards often have been unable to attend board meetings. Moreover traveling expenses of those coming from a distance did not reimburse for loss of time which trips from various parts of the province to the coast entailed. The result was that the board often found it difficult to obtain a quorum. Furthermore, high priced outside parties prepared examination papers and examined the answers of candidates. The board then forwarded the results to the Minister of Mines. Wm. Sloan; when considering reorganization much of this procedure was considered useless, besides having the effect of leaving functions of vital importance in the hands of a few. Under the new arrangement the two examiners just appointed, with the Chief Inspector of Mines as their chairman, will conduct examinations of candidates for certificates of competency as officials in coal mines, wherever it may be most convenient to all concerned.

If the old system of examination had been continued it would have been necessary to continue adding to the boards of examiners. Under the unamended Coal Mines Regulation Act most of the collieries had their own boards for the examination of men. This arrangement was satisfactory so long as there were only a few operating mines in the province. Conditions, however, are changed; there now are a considerable number of small collieries and, if each of these was given a board there might be almost as many members of examining boards as there are miners coming up for examination monthly.

The problems noted will be completely met by the new Central Board. Instead of the men going to the board, the board will go to them. It will travel from one coal mining district to another at regular intervals. The new method will have the effect of setting a standard of knowledge among all underground workers in coal mines throughout the province. It will obviate the present difficulty of too much board representation at one point and too little at another. Another important point is that no man will be recognized as a coal miner for a temporary period pending his examination. In this connection Mr. Sloan maintains that it is a manifest absurdity to allow an uncertificated man to assume the responsibilities of a miner for 30 days without his knowledge being tested, it being possible for an incompetent person in that period to endanger not only his own life, but that of hundreds of others.

PENNSYLVANIA

Anthracite

Audenried—The C. M. Dodson Co., of this place, has installed an electric hoist and pump at its Beaver Brook colliery, thus doing away with the services of a number of men employed at a steam plant.

Pottsville — The Middle Creek colliery, one of the old operations of Schuylkill County, is again to be placed in operation and seams of coal heretofore untouched will now be mined. There were large culm banks left at this colliery when its operations were discontinued a number of years ago, and these banks proved exceedingly valuable. All this coal has now been marketed, the banks having been cleaned up. It is expected that more than 600 men and boys will find employment in the reopening of the colliery.

Hazleton—A large group of mining engineering students from Lehigh University, at South Bethlehem, among them being three Chinamen, started to work in the No. 40 shaft of the Lehigh Valley Coal Co. here to gain practical experience during vacation time. The J. S. Wentz Coal Co. will resume the first aid contests this summer, it was announced on July 1. These competitive events, among teams representing the various collieries of this company, were abandoned during the war owing to the great demand for fuel. The best teams from every mine will be brought together at a central point to compete for prizes, one of these being a free trip to Atlantic City.

Bituminous

Clymer—The Estep brothers, of the Estep Brothers Coal Mining Co., Inc., and the Milbar Coal Co. have purchased several large tracts of coal near Diamondville. Diamond-drill test holes have been completed and work has already been started on the new opening. The siding will be connected with the joint Cherry Tree branch of the New York Central and the Pennsylvania railroads.

Brownsville—The coke business in the Connellsville region continues to improve. The H. C. Frick Coke Co. is following out its program of firing 1,000 beehive ovens, distributed among its various plants. The Republic Iron and Steel Co. is firing 300 ovens at Republic, making 350 in blast at that point. The Thompson-Connellsville Coke Co. is firing 50 ovens each at its No. 1 and No. 2 plants. The W. J. Rainey company is showing increased activity at its various operations. Also the Snowdon Coke Co. is firing 60 ovens at its plant near Brownsville, making 210 in blast at that plant.

WEST VIRGINIA

Keystone—The large steel tipple recently completed by the Keystone Coal and Coke Co. at this place has been put in operation. This company makes an annual shipment of over 400,000 tons of Pocahontas coal.

Charleston—Having spent several months in sinking a shaft and in building an up-to-date plant on Campbell's Creek, the Columbia Coal Co. began shipping from its new plant during the week ending June 21 and is now getting out quite a fair tonnage.

Charleston—On June 26 the newly created Department of Public Safety became a reality, Lieutenant-Colonel Jackson Arnold of Weston having been appointed as the head of the department. He is now at work selecting the members of the force which may have a total maximum strength of 110 privates.

Ward—Extensive improvements are under way at the mines of the Kelly's Creek Colliery Co., on Kelly's Creek, in the Kanawha region. The company has in mind the loading of coal from all its mines over one central tipple, and with that in view is arranging to expend about $250,000 in improvements. The general manager of the company is J. J. Smarr.

Gassaway—Cloudbursts played havoc with mining operations on the south end of the Charleston division of the Baltimore & Ohio R. R., it being impossible to move any trains on a 75-mile stretch of road several days recently. Trestles, culverts and embankments were swept away. Not only was the main line washed out but also many sidings and branches leading to coal operations.

ILLINOIS

Zeigler—The Bell & Zoller Mining Co. is now installing in their mine here two new generators which together with other improvements also being made, will double the power capacity of their mine. A drill hole has been sunk a mile from the shaft, to be used as a conduit for the high tension wires, direct to the entries. The estimated cost of the improvements is $39,000. They are being rushed to completion. Organization is under headway in Zeigler, for a miners' rescue team; helmets and other necessary equipment have been ordered. A new brick building is being built for the team, and it is expected that Zeigler will soon be able to boast of one of the best rescue teams in southern Illinois.

Benton—A particularly bold robbery was staged at this place on June 27 when six men seized and escaped with $41,000 payroll money for the Middlefork mine of the United States Steel Corporation. This money in pay envelopes in the mine office, was seized by the bandits, who escaped in an automobile. All but one of the office men were shot, but only one seriously—fuel inspector John Dolan. He was at once taken in a special train to St. Louis to receive the attention of specialists. One robber was killed while attempting to escape.

The others were trailed by a posse to a thicket which was fired upon and many shots exchanged. Finally the posse captured four men and lodged them in jail at Marion; the sixth man escaped. A search is still being made for the stolen money.

Lincoln—The Lincoln-Latham Mining Co. took over the mine and plant of the Latham Coal and Mining Co. on July 1 and has announced that the mine would be run full time. The mine has been closed for some time. The new company is well organized with sufficient capital to rehabilitate the mine. Harold D. Wright is the president of the new company.

MISSOURI

———The Missouri State Retail Merchants' Association reorganized recently on the first night of its second annual convention by obtaining a closer affiliation with the National Retail Coal Dealers' Association. The convention is being held at the Planters Hotel. The officers elected were as follows: Walter Hinsecke, president; H. Hesse, first vice president; H. B. Carr, second vice president; W. D. Ryan, Jr., treasurer. The new board of directors are: Edward Devoy, L. P. Coan, Wm. Reister, F. W. Autenrieth, P. B. Bryan, A. Cruikshank and H. F. Schrankler. More than 200 delegates attended the convention.

Kansas City—The Southwestern Coal Operators' Association elected F. W. Lukins, of Kansas City, president at its annual meeting held at this place July 1. Mr. Lukins previously held the office for two terms. W. P. Hawkins was named general vice president, with H. J. Kellogg of Kansas City, vice president for Missouri. Joseph Fletcher, of Pittsburg, Kansas, was appointed vice president for Kansas, in place of R. J. Laurance; the latter has business of another nature which demands the greater part of his time. The association appointed M. M. Williams, of Clarkville, Ark., vice president for Arkansas, and James Cameron, Henryetta, vice president for Oklahoma. C. N. Fish, of Leavenworth was elected secretary; George Manual, of Kansas City, treasurer, and W. L. A. Johnson, general commissioner.

OKLAHOMA

Alderson—An explosion occurred on June 30 in the No. 5 mine of the Rock Island Coal Mining Co. at this place with disastrous consequences. The latest report notes that 25 men are believed to be dead, suffocated by gas or crushed by falling rock or coal as a result of the explosion. Eight bodies have been recovered and rescue crews are continuing exploration work. It is further stated that 167 men were in the mine.

Personals

W. G. Whildin, formerly general superintendent of the Lehigh Coal and Navigation Co., has been appointed manager in charge of the company's coal mining operations, with offices at Lansford, Penn. The office of general superintendent has been abolished.

A. W. Evans, a mining engineer of Petros, Tenn., was appointed chief mine inspector by Governor A. H. Roberts. Mr. Evans has been connected with the coal mines of Tennessee for some time and should be well fitted for the duties of the office both by training and education. His acquaintance with the operators and miners of the state should assist him in the performance of his new duties.

J. Noble Snider resigned his position as acting coal traffic manager of the New York Central R. R. to enter the coal business as New York state representative for Madeira, Hill & Co. He entered the service of the New York Central in 1904 in the Coal Traffic Department and occupied practically every position in the department in the 14 years of his service. He held the commission of captain in the 8th Coast Artillery Corps, N. Y. Guard.

Obituary

John Lobenate, state mine inspector for the Breese district, was killed on June 27 by a gas explosion while on a tour of inspection in the Beckmeyer mine of the Breese-Trenton Mining Co. Mr. Lobenate entered the mine after the workmen had departed; upon their return they found his body badly burned lying at the bottom of the shaft. At the inquest it was disclosed that gas explosions in the mine had been frequent. The inspector lived at Collinsville.

Trade Catalogs

Pedigreed Gears. R. D. Nuttall Co., Conway Building, Chicago, Ill. Bulletin. Pp. 16; 6 x 8½ in.; illustrated. A description of Nuttall tractor gears.

We Do the Work. Cement Gun Construction Co., Chicago, Ill. Gunite book No. 6—pamphlet. Pp. 24; 6 x 9 in.; illustrated. The illustrations show recent cement-gun work in a variety of instances in different parts of the country.

"Bulldog" Jaw Crushers. Traylor Engineering and Manufacturing Co., Allentown, Penn. Bulletin JX-1. Pp. 26; 6¾ x 9½ in.; illustrated. Notes details of the crusher and incidentally some other specialties manufactured by this company.

Canton Automatic Mine Switch Thrower. American Mine Door Co., Canton, Ohio. Bulletin. Pp. 8; 6 x 9 in.; illustrated. Notes advantages and operation of this switch thrower which is adapted for all kinds of mines and large industrial plants.

Justrite Loose-Leaf Catalog. Justrite Manufacturing Co., Chicago, Ill. Pp. 88; 9¼ x 6¾ in.; illustrated. Covers in a concise and handy way the miners' carbide lamps, acetylene lanterns, fire prevention devices and hardware specialties manufactured under the Justrite trademark. Prices are quoted.

Jeffrey Standard Apron Conveyors for Every Service. The Jeffrey Manufacturing Co., Columbus, Ohio. Catalog No. 258. Pp. 72; 8½ x 11 in.; illustrated. Shows installations of both steel and wood conveyors in service in various industries, including coal plants, general dimensions and other important data of vital interest to the purchaser and engineer.

Stuart System of Ground Storage and Reclaiming. International Conveyor Corporation, 50 East 42nd St., New York City. Bulletin No. 4. Pp. 16; 8½ x 11 in.; illustrated. This bulletin notes installations at various types of plants. The system is adapted to locomotive coaling, fuel distribution at yards, vessel loading and unloading and power, coke and steel plants.

Industrial News

St. Louis, Mo.—The Walter A. Zelnicker Supply Co., of this place, has added 2000 sq.ft. to its present office space—an increase of 33⅓ per cent.

Clendenin, W. Va.—The Kanaelk Coal Co. is having plans made for a new power plant for increased operations at its coal properties. W. W. Whyte is president.

Coma, Texas—The Lone Star Coal Mining Co. is opening up a new mine at this place which is planned to have a capacity of 1000 tons daily. S. A. Wartell is the president and general manager.

Buffalo, N. Y.—Louis H. Eller, a major in the National Guard in Buffalo and in the regular army in France, has opened a coal office at 653 Ellicott Square, under the name of the Eller Coal Co. Before going into service he handled the soft-coal department of E. L. Hedstrom.

Signal Mountain, Tenn.—The Suck Creek Coal Co., Chattanooga, which recently acquired the Montlake Coal Co., is arranging plans for extensive improvements and additions to increase the present capacity to about 500 tons. It is also proposed to construct a new 1500-ton capacity incline. The estimated cost of the proposed work is $100,000.

Columbus, Ohio—John Rogers, of Columbus, and James Jones, of Athens, have purchased the mine of the Falk Coal Co., located near Buckingham on the Hocking Valley Ry. The new owners will operate the property as a partnership with offices in Columbus. The Falk Coal Co. will secure other operations and continue its business as an operator and jobber.

Charleston, W. Va.—The Kanawha City Coal Co., recently incorporated with a capital of $50,000, is planning for the development of about 600 acres of coal properties located in the vicinity of Garnet, to have an initial daily capacity of about 125 tons. R. E. Writteker is president; F. D. Cunningham, vice president; W. W. Venable, secretary-treasurer; J. R. Cunningham, manager.

Charleston, W. Va.—Thirty or forty members of the Winding Gulf Operators' Association held a meeting at White Sulphur Springs on June 4 but no intimation was given as to what was done at the meeting. It is presumed, however, that the association gave its attention both to the railroad rate question and the matter of resuming the making of reports to the Federal Trade Commission.

Moran, Iowa—The Norwood White Coal Co. will soon complete its big mine at this place. The Foundation Co., of New York, was employed to sink the two shafts—both of which are of concrete construction; quicksand was encountered but little difficulty was experienced in getting through it. The mine is to be equipped with an electric hoist and the steel tipple will have a capacity of 2500 tons daily.

Remick, Ohio—Arrangements have been perfected between the Chesapeake & Ohio and the Baltimore & Ohio railroads for taking care of any congestion of coal freight which may occur on the Cheapeake & Ohio so far as Lake-bound traffic is concerned by the establishment of a point of interchange between the two roads at this place where additional tracks will be put in. Much coal loaded in 70-ton cars will be shipped.

Hubball, W. Va—The Russell Coal Mining Co., of Russell, Ky., recently organized, is arranging for the development of about 146 acres of coal properties in the Hubhall district at an early date. The plant is to have a daily capacity of about 500 tons. In connection with the installation of equipment, it is proposed to construct an aerial tramway, 1200-foot span, to have a capacity of 50 tons per hour. W. M. Jones is president and manager.

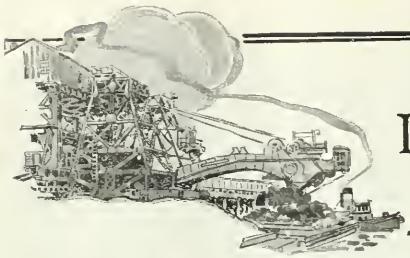
Washington, D. C.—Investigation was ordered recently by the Interstate Commerce Commission into the relationships between the rates on coal via the Lakes to Minnesota, North Dakota, South Dakota and the northern portion of Wisconsin from mines in Ohio and West Virginia and the rates on coal by rail to the same destinations from mines in Illinois and Indiana.

Many complaints have been received, alleging that the increase in the rates from Ohio and West Virginia, amounting to 52 cents a ton, disturbed the relation hitherto existing with the rates from Indiana and Illinois, which were advanced 55 cents a ton.

Huntington, W. Va.—West Virginia operators are protesting against the non-use of many hundreds of coal cars built upon orders of the government last year. Some such cars were built by the Huntington plant of the American Car & Foundry Co. There are within a short radius of Huntington about 2000 of the cars referred to not in commission but remaining idle on side tracks. The operators insist these ought to be used to relieve the shortage of equipment now in evidence and certain to become more acute as the demand for coal increases. Some of the railroads refused to accept the cars which the government had built but the C. & O. accepted such cars it is understood.

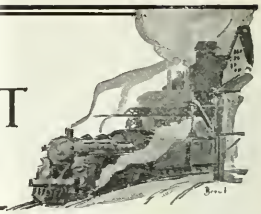
Charleston, W. Va.—That the West Virginia coke producers are upon the threshhold of a resumption of coke operations after a long period of inactivity, is confidently believed by those in touch with general business conditions, particularly with the iron and steel business. The resumption of operations at iron and steel mills on both sides of the Ohio River in the Wheeling district of West Virginia on June 23 was regarded as an index to conditions elsewhere in the country and as forecasting a general resumption of iron and steel making. A further indication of an increase in shipments has been found in parts of West Virginia where during the latter part of June shipments were being increased.

Indianapolis, Ind.—The Midwest Engine Co., of this place, announces the opening of four new offices to more fully meet the growing demand for its prime movers, pumping equipment, etc. The new offices are at Jacksonville, Fla.; El Paso, Texas; New Orleans, La., and New York City. D. J. Carrison represents the company in the southeastern field; his offices are in the Florida Life Building, Jacksonville. C. B. Loomis represents the Midwest company in the southwest; his offices are in the Caples Building, El Paso. J. R. Lowe represents this company in the south and has offices in the Maison Building, New Orleans. B. H. Downing is eastern sales manager for the Midwest company; he is located at 111 Broadway, New York City.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Output of Soft Coal Increasing—High-Grade Coals Hard to Obtain—Poor Car Supply and Labor Shortage Affects Production—Domestic Hard Coals in Active Demand, with Small Steam Sizes Going at Reduced Prices

PRODUCTION in the soft coal fields is picking up, the output for the week ended June 28 totaling 9,147,000 net tons, the highest since the last week in January. The increase in production, though slight, is a sure sign that conditions in the soft coal trade are improving. High-grade coals are scarce, most of the tonnage being tied up by contract. There is therefore little of the good grades of soft coal available for spot buyers. Operators producing the medium grades of coal who have so far not contracted for their output show little willingness to do so now. They are optimistic of the future and look forward to a busy fall and winter, with coal going at high prices.

Complaints of poor car supply are heard from many fields, and this, coupled with an ever-growing scarcity of labor, will serve to handicap the mines in their endeavors to meet a belated demand for fuel this autumn.

New River and Pocahontas operations are extremely active, and the lack of cars in this region is already a disturbing factor. Both of these coals are sold up for months ahead, and the spot buyer has little chance of picking up any tonnage. The better grades of central Pennsylvania coals are also hard to obtain for the same reason.

Anthracite production for the week ended June 28 was also the highest recorded since the last week in January, the output being 1,841,500 net tons. Though the production has been growing from week to week, the supply of domestic coals is still unequal to the demand. Based on the output of 1918, there is a shortage of more than 10,000,000 tons of hard coal to be overcome this year.

Coal produced by the so-called independent companies is in urgent request and premiums are being offered for prompt shipment. While the demand for all domestic sizes of anthracite is active, the stove and egg sizes are the favorites, and the supply of these two coals is short. More steam sizes of anthracite are being stored than was the case two weeks ago and are therefore not causing much trouble. Buckwheat No. 1 is moving readily at prices said to be 50 cents below the mine circular. Rice coal is also being quoted at about the same amount below schedule prices, while good grades of barley can be obtained from some shippers on a basis of $1 at the mines.

WEEKLY COAL PRODUCTION

The production of bituminous coal in the week ended June 28 is estimated at 9,147,000 net tons, the highest recorded this year since the last week in January. The gain over the weeks preceding, in May and June, was slight and is attributed to buying to tide consumer over the holiday week following. The total production in the calendar year to date is estimated at 212,581,000 tons, compared with 284,585,000 tons in the corresponding period of last year.

The production of anthracite in the week ended June 28 was 1,841,500 net tons, the highest recorded since the last week in January. The production in the week ended June 21 was 1,748,000 tons. The total production in the calendar year to date is 38,796,000 tons, compared with 49,077,000 tons in the same period last year.

The most notable feature of the reports of operating conditions for the week ended June 21 is the reported loss of nearly four days' running time on account of car shortage in the Pocahontas region, and a general increase in the loss of time because of car shortage in other eastern districts. The Railroad Administration announced a short time ago that such a condition was impending and would be largely beyond its control because of the demands upon the transportation systems for the movement of other traffic.

The production of beehive coke in the week of June 28 is estimated at 286,858 net tons, a slight gain over the previous week but only about 45 per cent of the output in the corresponding week of 1918. The slackness of demand for beehive coke, which is the factor limiting production, is largely due to the increase in the past year in the capacity of byproduct ovens, which are, of course, operated in preference to buying beehive coke or operating beehive ovens.

Bituminous coal dumped at Lake Erie ports for transshipment up the lakes in the week ended June 21 was 1,058,273 net tons, an increase over the previous week in which dumpings were 959,265 tons. The total movement of lake coal this year to date has been 8,134,601 tons, compared with 6,799,417 tons in the corresponding period of last year.

BUSINESS OPINIONS

Dry Goods Economist—The report issued on Tuesday, July 1, by the Department of Agriculture placed the condition of the cotton crop as of June 25 at 70 per cent. of normal. This means, the report says, a probable crop of about 10,986,000 bales, or more than 1,000,000 bales less than last year's yield. Due in part to this estimate, prices of July cotton rose to 33.92 cents on the New York Cotton Exchange.

The Iron Age—June pig iron output shows definitely the turn in the industry. For the thirty days the total was 2,114,863 gross tons, or 70,495 tons a day, against 2,108,056 tons in May, or 68,002 tons a day. Seventeen furnaces blew in and twelve blew out last month, a gain of five, and estimated capacity active on July 1 was 71,700 tons a day for 200 furnaces, as compared with 68,600 tons a day for 195 furnaces on June 1.

Marshall Field & Co.—Current wholesale distribution of dry goods ran a little less than for the corresponding period a year ago. More merchants were in the market than during the same week a year ago. All report excellent pre-holiday business. Orders from salesmen on the road for both immediate and future delivery were much larger in volume compared with the same week of 1918. Collections continue satisfactory.

Iron Trade Review—June definitely turned the tide in the iron and steel industry toward better and more stabilized conditions and the evidence of this fact grows with each passing week. The cumulative effects of the recent period of freer buying are marked not only by the steadily mounting line of production, but, what is probably more important, by the apparent adjustment of consumers to present price levels. The latter factor is resulting in a continuous and increasing movement in placing future wants under contracts and in ordering out tonnage for immediate use.

American Wool and Cotton Reporter—With no surplus goods on the shelves of the clothiers or surplus raw material in the hands of the mills, it is expected that for some time to come the demand for wool will be much more than usual. In the cotton market the activity in demand, strength in prices and optimism as to the outlook stand out more clearly. The urgency of needs in the dry goods line is demonstrated by the early appearance in the eastern markets of important buyers of the South and West.

Atlantic Seaboard

BOSTON

Market continues without change in prices. Quality grades offering less freely even for spot shipment. Clearfield operators still seeking orders. Thin vein producers have difficulty keeping men. Coal at New York in better request. Pocahontas and New River shipments light to this market. Export demand shows improvement. Anthracite deliveries steadily falling behind. Domestic sizes in extremely short supply.

Bituminous—Besides a reduced output, both on account of holidays and prohibition, there has been no price movement the past week, although the undertone continues distinctly favorable to an upward swing later, especially on the fancy grades. There is still an amount of current buying at the quotations that have prevailed the past month or more, and while here and there 10@20c. is being asked for deliveries beyond July or August, there is no bidding up of prices. Conservative buyers are getting in line for fall and winter shipments on the ground that nothing can now

be gained by waiting, and then, too, they have noticed that desirable fuels that were easy to get 60 days ago are now practically out of the market. The trade is somewhat puzzled that higher prices are so long coming, but one reason doubtless is the volume of lower grades that shippers have tried to force on this market. No price movement is likely until less effort is made to depress the spot market by offering less desirable coal at ridiculously low prices.

The higher priced Cambrias are fast disappearing from the market. Practically no contract business has been done in these grades for the past fortnight, and now orders are being declined in many instances, even for spot shipment. This has been particularly true of those coals which are being taken for the Navy on recent requisitions. Most shippers are in doubt as to the volume they will have free in the fall and so long as the Navy Department is paying $3 or more per net ton it is likely that many operators will continue "marking time" rather than load themselves with orders for deferred delivery. One of the features of the present market is the widely different attitude of buyers as between high grade low volatiles and the high ash higher volatiles. The former are not only in steady demand but they are increasingly hard to get.

The less favorably known coals, on the other hand, are able to get business enough for only a very limited output. In several sections of Clearfield County this has been particularly true, although within a few days it is noticeable that some of the better prepared coals in this region have had a spurt, accounted for by the fact that there is beginning to be an actual dearth of Miller Vein and "C" prime coals for prompt shipment. There are still some heavy reserve stocks in New England and that is a special reason why steam-users in this territory are anxious not to increase their supplies of only ordinary "D" and "E" seam coals. The low figures quoted a month ago are still necessary apparently to induce any considerable movement of these grades.

Receipts here from Hampton Roads are still relatively light. Some of the agencies are doing very little business in the open market. Others have undertaken to supply staple customers directly on tidewater but have practically abandoned to all-rail distributors their usual trade inland. Both Pocahontas and New River tonnages will show very heavy reductions in New England business the current year, even as compared with 1915-1916, and it is not easy to see how this tonnage can be won back. Marine freights are likely to be on a high level for an indefinite period certainly as compared with rates all-rail unless under private management the railroads show a determination to restore old equilibrium as between rail and water deliveries.

The export demand is much improved, as was expected would be the case with the formal signing of peace. The attitude of the French Government is looked upon only as one of a number from European markets which England will find it hard to supply. The South American demand continues strong and prices offshore generally are so much more remunerative it is not surprising that even New England interests are giving much more attention to shipments overseas. Less has been heard of labor conditions in the so-called smokeless districts in West Virginia and current reports are favorable to a continued heavy movement to the Hampton Roads piers.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.90@3.40
F.o.b. Philadelphia, gross tons	4.27@4.95	5.10@5.55
F.o.b. New York, gross tons	4.62@5.29	5.45@6.00
Alongside Boston (water coal), gross tons	6.10@6.85	7.00@7.50

Georges Creek is still quoted at $3.20 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $5.14@5.35 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $7.32@7.60, and on cars Boston and Providence at from $7.50@7.90 per gross ton.

Anthracite—Retail dealers are exceedingly anxious over the slowness with which domestic sizes are being shipped. Predictions that June and July would show an easing up of egg and stove, the sizes in greatest demand, were not borne out by the tonnage shipped in June, and unless the trade has been misled by the heavy volume of coal distributed at retail during April and May each week now sees all the sources falling farther behind on deliveries. In several cities in this territory retail prices have been advanced 50c., partly because of the increasing premium exacted by several of the independent operators. Circular prices f.o.b. mine are on the basis of $6.15 for egg, but rules by "independent" shippers have been made at a full dollar above that figure.

Egg, stove and chestnut are in very short supply both all-rail and by water. Buyers are being obliged to take a large proportion of less desirable sizes in order to get any tonnage forward.

NEW YORK

Demand for domestic coals continues, but retail dealers say the pressure for quick deliveries has lessened, owing to the vacation season. Dumpings at the railroad docks show a decrease. Anthracite steam coals easy. Bituminous operators and shippers hopeful, but fear transportation facilities in fall and winter.

Anthracite—All houses report a continuation of the heavy demand for the domestic coals, and although the retail dealers say there is not so much pressure being brought to bear upon them for quick deliveries, because of the exodus of many houseowners to the country and seashore, they are anxious to put away all the winter fuel they can secure. There has been no reduction in the accumulation of orders on the books of the wholesale houses, and so far there are no signs ahead that the country is to be saved from a near coal famine next winter, unless production increases materially.

There has been a healthy growth in production for the past few weeks, but there is a shortage of more than 10,000,000 tons to be overcome, when this year's production is compared with that of the corresponding period of last year. Dealers claim there is a deficit in receipts in this market but expect larger shipments when those sections farther removed from the source of supply are cared for.

Independent coals are in heavy demand and premiums are being offered for shipments. These, it is reported, range all the way to $1, the Canadian dealers offering the highest amount.

While there is an active market for all domestic coals, stove and egg are shortest in supply. Chestnut in this market is easier, but is being easily absorbed when egg and stove form part of the shipment. Pea coal is being handled easily, local dealers taking it when they can secure either egg or stove with it.

The steam coals are not causing so much trouble as they did a few weeks ago because of the tendency to store them. Retail dealers, as they did some time ago, are taking considerable buckwheat No. 1 at prices said to be 50c. below mine circular. Rice is also being quoted at about the same amount below regular company mine price, while good grades of barley are being quoted by some shippers in the neighborhood of $1 at the mines.

Current quotations, white ash, per gross ton at the mines and f.o.b. at tidewater, at the lower ports, according to company schedule, are as follows:

	Mine	Tidewater
Broken	$5.95	$7.80
Egg	6.15	8.00
Stove	6.40	8.25
Chestnut	6.50	8.35
Pea	5.10	6.85
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—There is a brighter outlook in the bituminous situation. Reports that some of the foreign countries are to make heavy purchases of coal here led to a slight flurry and stiffening of quotations for coal stocks in the stock market. This feeling was reflected among the trade.

Tonnage figures show a sure indication of an uplift. Production has steadily increased and there is a better feeling throughout. High-grade coals are hard to pick up. Most of these grades are tied up in contracts with very little to offer to spot buyers. Operators having plenty of the medium grades not tied up are not now inclined to sign up any part of their free output. They are exceedingly optimistic of the future and look forward to a busy fall and winter.

Numerous complaints have been heard of poor car equipment, repairs not having been made. There is also some complaint of poor car supply and this, it is pointed out, will become more general as the season advances. Shippers say that consumers who have hesitated to buy will likely suffer from the lack of fuel this fall and winter more from the lack of cars than because of the scarcity of coal. The cars, they say, will be necessary to move grain and to take care of the needs of the steel industry and will be used for these purposes when needed, to the detriment of the coal business.

From the New River and Pocahontas regions come reports of considerable activity together with complaints of bad car supply. Both of these coals are heavily sold ahead and the spot buyer has little chance of picking up stray lots. The better grades of central Pennsylvania coals are also hard to obtain, most of them being under contract.

There is a better demand for all-rail deliveries than here at tidewater. Prices are also slightly better, although there is a tendency to some improvement for tidewater coals.

Prices on the various pool coals f.o.b. at this Tidewater range about as follows:

Pools 1 and 71, $5.40 to $5.60; Pool 9, $5.30 to $5.50; Pool No. 10, $5 to $5.25 and Pool 11, $4.75 to $5.00.

Quotations on the various grades, per net ton at the mine, range about as follows:

South Forks (Beat)	$2.95@3.25
Cambria (Best)	2.75@2.95
Cambria (Ordinary)	2.35@2.50
Clearfield (Best)	2.75@2.95
Clearfield (Ordinary)	2.35@2.50
Reynoldsville	2.50@2.75
Quemahoning	2.75@2.95
Somerset (Best)	2.75@2.95
Somerset (Poor)	2.15@2.35
Western Maryland	2.25@2.50
Fairmont	1.75@2.00
Latrobe	2.10@2.25
Greensburg	2.35@2.50
Westmoreland 2 in.	2.60@2.75
Westmoreland run-of-mine	2.35@2.50

PHILADELPHIA

Anthracite demand remains strong. Shipments disappointing. Dealers have good business on books. Call for stove increases. Egg and nut demand heavy. Pea plentiful and stocks increase. Advertising campaign influences ordering. Credits in fair shape. Retailers giving longer time to certain class. Steam coal draggy except buckwheat. Bituminous stationary. Prices well held. Holidays make good grades tighter.

Anthracite—There continues to be a strong retail demand for all sizes of coal, except possibly pea, and even good quantities of this size are being moved. While the month of July so far has been unusually warm, the dealers report they have received a fair addition of orders to those already filed.

The unusual demand for egg shows no signs of diminution and the dealers are really surprised at the call for this size as compared with some years back, and still further surprised at their inability to get the tonnage they need to fill the orders they have. Pea coal is the one size that all dealers have in greater or less quantity and a fair proportion of the receipts are being placed in the cellars; but on the whole the stocks above ground are increasing.

With the slackening up in the orders from consumers some dealers are urging their customers to take in at least a fair proportion of pea, using the argument that it will not be any cheaper and also when the demand does come in the fall and winter they will be unable to meet it unless a greater quantity is stored in the cellars of the people. A great drawback to this is that while the people are entirely willing in numerous instances, there is a lack of ready money among the class who are the largest users of this size.

Due to the holiday happening on Friday most of the retail men closed up their yards for the remainder of the week, as they reasoned that similar conditions would rule at the mines and their prospects of getting increased shipments at this time were slight. As a matter of fact no one feels that coal will come in really heavy volume until well past the middle of the month, when they have hopes that the outside markets will be fairly well taken care of. However, from the shippers' standpoint this is hardly likely to happen, as a number consulted stated they had orders enough on their books for the larger sizes to keep them busy almost indefinitely.

As to prices, the company circular is being strictly maintained by the larger producers, while the indepedent prices still range from 15c. to 40c. above this figure. We have heard of a sale in a rare instance of 70c. above circular, but this is sporadic and in no way indicative of the market trend.

The steam trade changes but very little, although the good grades of buckwheat are in active demand. It is not believed, though, that the entire output of this size is being taken, and the big companies are placing a fair tonnage in storage. The call for rice and barley has in no wise increased and the companies are adding to their accumulations of this size very materially.

Bituminous—The position of soft coal as regards demand has lately inclined to remain stationary. In some instances we do hear of certain operations increasing their output, but on the whole the call for coal remains at about the same volume prevailing for the past six weeks. While prices have also remained stable, there was some tendency after the holidays to a strengthening in the better grades. All along it has been somewhat difficult to get fine coals promptly and the shortening of the working time due to the closing down in the latter part of the week made it more difficult to get the fine coals. Certain it is, that while there is no immediate hope of a price increase on the part of producers, the market is in such a condition that they will certainly move forward if any change is made at all.

The more progressive concerns hereabouts still display a tendency to take in coal in excess of their current requirements, while there are plenty of inquiries from consumers asking contract quotations but very little business of this kind closed, as the majority of the good shippers have obligated themselves for the full allotment of tonnage they expect to have available for this purpose.

The prices prevailing here are as follows:

Georges Creek Big Vein	$2.95 @ $3.05
South Fork Miller Vein	2.95 @ 3.05
Clearfield (ordinary)	2.60 @ 2.75
Somerset (ordinary)	2.50 @ 2.65
Fairmont lump	2.50 @ 2.60
Fairmont mine-run	2.35 @ 2.50
Fairmont slack	1.90 @ 2.05
Fairmont lump (ordinary)	2.25 @ 2.35
Fairmont mine-run	2.00 @ 2.15
Fairmont slack	1.65 @ 1.75

BALTIMORE

Fine export business and better spot market in bituminous. Anthracite receipts low.

With three months of the coal year passed and July getting a good start, there continues to be plenty of export business and a firmer spot market for the bituminous mein, while the anthracite dealers have announced an increase in the schedule of from 25 to 50 cents per ton. The increase has been looked for, and it is expected that it will show a still further raise in August or September.

As the large stock of high-grade coals which has been around Baltimore for some time began to decrease during the past week the prices became firmer. This was due to several reasons. A great amount of the coal was used to fill some of the export orders and there was also a falling off in receipts, the falling off being due to shortage of cars and the demand of the lake region business.

The receipts during this week are expected to be very light, for the Fourth of July will provide a two-day layoff for the miners, and it is impossible to forecast what effect prohibition will have. With the light production and the supply of good coals here diminished, better prices are looked for. During the week $2.75 was the prevailing figure for the best grade of coals. There was no demand for the medium or cheap grade of fuels.

The anthracite receipts continue to be low, and while the increase is slight the forecast is that it will go higher with the possibility of many homes being without fuel if they do not get orders in promptly. A comparison of the prices of July 1 with those of the Apr. 1 schedule follows:

Hard White Ash	July 1 Ton	July 1 Half Ton	April 1 Ton	April 1 Half Ton
No. 1 (broken)	$11.50	$5.90	$11.50	$5.90
No. 2 (egg)	11.75	6.05	11.50	5.90
No. 3 (stove)	12.00	6.15	11.75	6.00
No. 4 (chestnut)	12.10	6.20	11.85	6.10
Pea coal	10.25	5.30	10.00	5.15
Buckwheat	8.20	4.25	8.20	4.25
Sunbury				
No. 2 (egg)	12.00	6.15	11.50	5.90
No. 3 (stove)	12.25	6.25	11.75	6.00
No. 4 (chestnut)	12.35	6.25	11.85	6.10
Lykens Valley				
No. 2 (egg)	12.45	6.35	12.20	6.25
No. 3 (stove)	12.85	6.50	12.60	6.45
No. 4 (chestnut)	12.85	6.50	12.60	6.45

A charge of 50 cents additional for bagging and a discount of 25 cents for cash is allowed on the present schedule.

Lake Markets

PITTSBURGH

Coal market stiffer. Contracts not acceptable. Steam coal almost reaches gas coal in price. Prospects of domestic consumption.

The Pittsburgh district coal market has stiffened perceptibly in the past week, spot prices being higher while operators have become entirely averse to making any additional contracts for the coal year. The situation as to contracts is that the tonnage put under contract is the tonnage the operators feel reasonably certain they will be able to deliver, with only normal car shortages, and without labor disturbances. Consumers not covered by contracts will have to depend on the prompt market, and the question is whether the coal that will be released by the closing of lake navigation will be sufficient to take care of demands late in the fall and during the winter.

On the basis of men on payrolls, coal production in the Pittsburgh district is at about 75 per cent., but the actual proportion, relative to theoretical full output, is less, as fewer men are on payrolls than the mines would accommodate. Labor supplies bids fair to decrease rather than increase as many of the foreign born assert positively they are going back to the countries of their birth when transportation is available.

Steam and gas coal have now reached almost a market parity, steam coal having previously been much easier than gas. Lake shipments are now running chiefly to steam coal, the pressure early in the season for moving gas coal having subsided. The situation is shown by prices obtainable for slack, which at present is produced almost exclusively by the screening of coal for lake shipment, steam slack being available at as low as $1.30, while gas slack brings $1.70 and higher. A number of operators have advanced their prices on mine-run to $2.50 and they regard that price as applicable to prompt shipments only as they will not book additional contracts. There is practically no demand for domestic coal, as natural gas takes care of nearly all domestic fuel requirements. Domestic consumers do not seem to be alive to the menace of the West Virginia law enacted some time ago, prohibiting the movement of natural gas out of the state if consumers in the state are not fully supplied, but the coal interests point out that there may be much demand for domestic coal next winter on account of this gas situation, and no provision is being made by way of accumulating supplies. The best estimate, applicable to conditions of the past few years, is that taking the year as a whole 12 per cent. of the Pittsburgh district coal production is used for domestic purposes. The proportion may be much higher next winter.

The market is now quotable as follows, for spot and prompt: Steam slack, $1.30@1.40; gas slack, $1.70@1.80; steam mine-run, $2.25@2.50; gas mine-run, $2.35@2.50; 3-in., $2.60@2.75 per net ton at mine, Pittsburgh district.

TORONTO

Supplies of anthracite much below demand though rail shipments well maintained. Little arriving by water. Consumers of stove coal substituting other sizes. Nut coal becoming scarce. Bituminous advancing in price.

The demand for anthracite is still much greater than the supply, though shipments from the mines are coming forward in about the normal quantity by rail. Very little is being received by water, the great bulk of shipments by vessel going up the lakes. There is still a marked shortage of stove coal, though at the instance of the dealers many consumers are taking nut and egg sizes as substitutes, resulting in an increasing scarcity of nut coal. The market for bituminous remains quiet with local prices unchanged but due to advance shortly, as the Youghiogheny operators have notified the dealers of an advance of 15c. per ton for July shipments.

Quotations for short tons are as follows:

Retail:	
Aothracite, egg, stove, nut and grate	$11.50
Pea	10.00
Bituminous steam	7.50
Slack	6.50
Domestic lump	10.00
Cannel	11.50
Wholesale f.o.b. cars at destination:	
Three-quarter lump	5.75
Slack	4.44

BUFFALO

Some advance in bituminous price. Improvement reported by most shippers; may be large if car shortage increases. General shortage of anthracite. Lake shipments fair.

Bituminous—The firm feeling in Pennsylvania coal circles has extended to this market, and an advance of a few cents shows that the trade finds it can hold the situation and not depend on the consumer for prices any longer. The volume of movement has not increased much as yet, but if the improvement in the iron industry goes on the consumption will begin to mount up before long.

The consumer is now ready to contract, in fact is eager to do so, but the shipper holds off. It is no advantage to him, even with stationary prices, to make contracts such as are offered; besides nobody looks for anything but an advance, which will be large if the present predictions are made good. Consumers are not confident and view the situation uneasily. The feeling on both sides is that it is too late to contract, and if prices continue to go up few will be made this season.

Shippers now quote bituminous as follows: Allegheny Valley, all sizes, $4.45; Pittsburgh and No. 8 lump, $4.80; same, three-quarter, $4.65; mine run, $4.25; all slack, $3.25. Slack is plentiful and is not advancing to any great extent. All quotations are per net ton f.o.b. Buffalo. Pittsburgh is advancing again, and Buffalo will soon have to follow.

Anthracite—The demand is not so insistent as it was, as hot weather discourages it and many families are now supplied. Shippers still hold that a winter shortage is before us and advise laying in a supply when it can be had. The all-rail demand is heavy and as much as possible is put into that trade, so that outlying territory at least may be taken care of during open weather.

The anthracite shipments by lake keep up well, being for the season to July 1,246,999 net tons, as against 866,156 tons for the same time last season; for June, 453,797 tons and 483,550 tons for June, 1918; for the past week, 104,150 tons, of which 43,000 tons cleared for Chicago, 29,000 tons for Milwaukee, 19,300 tons for Duluth and Superior, 6000 tons for Waukegan, 5500 tons for Hubbell and 1350 tons for Depere.

Freight rates are quiet at 60 cents to Chicago, 47½ cents to Milwaukee and Waukegan, 42½ cents to Duluth and Hubbell, consignee's rate to Depere.

Anthracite, except the extremes of domestic sizes, grate and buckwheat, advanced 10 cents a ton for July and is quoted as follows:

	F.o.b Carr. Gross Tons	At Curb Net Tons
Grate	$8 55	$10 20
Egg	8 75	10 50
Stove	9 00	10 70
Chestnut	9.10	10 80
Pea	7 30	9 25
Buckwheat	5.70	7 75

CLEVELAND

Demand for bituminous coal continues to increase and prices are being strengthened in proportion. Nevertheless, steam-coal users are not responding in coal purchasing to the extent business in general is picking up. Domestic demand for anthracite and Pocahontas continues good.

Bituminous—Steam-coal users and the lake trade at present may be said to be taking every ton of coal eastern and southern Ohio operators are able to bring forward. With the mines being operated at not over 60 per cent. of capacity, it may be seen that in reality buyers are not taking as much coal as surface indications would show. In every department of industry northern Ohio now is on better than a 75 per cent. basis; the iron and steel industry—the biggest single consumer of coal—is rapidly approximating 100 per cent., yet coal is not being taken in satisfactory tonnages. More and more desire to stock for the coming winter is being evidenced, yet the undertone of the market, in regard to movement, is not satisfactory. Compared with conditions a few months ago and with what many operators predicted for the early summer, the coal trade may be said to be booming. But contrasted with the urgent need for stocking fuel and the condition the mines are approaching, steam-coal users are not responding to a decree hoped for.

On slack the market appears quite deceptive. Some operators are talking of $2 and $2.10 slack and say they would not take a cent less. On the other hand, it

appears that some slack has been sold as low as $1.40 in northern Ohio recently. Mine-run may be said to be centering around $2.25. Prices are gaining strength constantly, as talk of a shortage this winter increases.

Conditions at the mines continue unsatisfactory. Car shortages appear in streaks—a good run one day and next to no cars the next. The outlook of labor shows no signs of abating, but this has been offset in part by the return of a few skilled miners who left for other employment in the slack days following the armistice.

Anthracite and Pocahontas—Some dealers are contemplating a 50-cent advance in anthracite prices shortly. Demand continues good; in fact, is better than the supply. Much the same condition obtains with Pocahontas. Dealers estimate their summer business so far has been about 20 per cent. above normal.

Lake Trade—Lake shipments of bituminous coal to July 1 will show a gain of about 1,500,000 tons over shipments to July 1 last year, which were about 7,500,000 tons, it is predicted. The 9,000,000-ton mark will be attained by July 1, many believe. Lake Erie docks now are keeping the pace of better than 1,000,000 tons of cargo coal a week. From Duluth and Superior comes the word that receipts of bituminous coal there to July 1 totaled 4,767,000 tons, compared with 1,992,200 tons last year. Receipts of anthracite to July 1 this year and last year, respectively, are given as 562,000 and 1,375,600 tons. The supply of cargo space has exceeded the coal tonnage at the car dumpers the past ten days. Lake shipments of slack, always small, have increased somewhat.

DETROIT

Steam coal is not yet awakening the interest of Detroit consumers to the extent present conditions and future outlook would seem to justify.

Bituminous—Consumers of steam coal in Detroit are continuing the more or less indifferent attitude that has characterized this division of the business since early in the year. There is a moderate demand for domestic stock, but sales of steam coal are disappointingly small and, according to wholesalers and jobbers, do not reflect a healthy general buying movement such as the present market conditions and forecasts would suggest is advisable.

Few of the large consumers show any interest in opening negotiations on a contract basis. The producers also are said to be showing indifference concerning contracts. This attitude is attributed to a disinclination to assume obligations at present prices that might prove unsatisfactory in case increasing costs necessitate an advance in prices later.

The movement of bituminous into Detroit is not of very large volume and is said to be considerably below what was regarded as normal before the war. Some coal is to be found on tracks. The amount is not great. Jobbers believe it would be difficult for consumers of steam coal to replenish stocks regularly from track coal.

Net ton prices at the mines on West Virginia gas or splint lump are quoted at $3 to $3.25 and for two-inch lump $2.85, while run of mine ranges from about $2.10 to $2.15 and slack averages $1.75. On Hocking domestic lump the price is given at $2.75, with $2 for mine run and about $1.50 for slack. The product of other leading Ohio districts is said to be selling at about the same price as Hocking. Smokeless coal is limited in supply, with practically no lump or egg to be had. Mine run is quoted at $2.75 to $3, when available.

In the yards of many of the industrial consumers there is still considerable of the low grade coal that went into reserve last year. This is exerting an influence unfavorable to renewal of buying.

Anthracite—Household consumers are taking their time about stocking up for winter requirements. Higher temperatures during the week are a discouraging factor. Retailers are still endeavoring to spread the early buying movement, but are apparently not meeting with the success that might be expected, considering the shortage of supply last winter.

Lake Trade—Shipments over lake routes are easing off, though vessel capacity is available in large amount.

COLUMBUS

There is a decided improvement in the coal trade in Ohio territory. Steam buying is better and the same is true of the domestic trade. The lake movement is steady. Coal men generally predict a much improved market within the coming two months.

The domestic trade is now attracting considerable attention as buying on the part of the retailers is better. Householders are awakening to the fact that they should put in their winter's supply, and while a few orders for delivery during the month of July have been booked, the one thing that is holding up the domestic trade is the unsettled real estate condition. With housing conditions so stringent, renters are not sure that they will be permitted to retain their dwellings.

All these factors have been holding up the retail trade to a large degree. There is a good demand for the fancy grades such as Pocahontas and West Virginia. Rescreened varieties are also selling better. An increased demand for Hocking lump is also reported, and generally speaking the domestic trade is in good shape. Retailers are now inclined to stock up to a certain extent. Retail prices are higher, with Pocahontas selling in the neighborhood of $7.50.

The steam trade is also showing signs of awakening. Steam users have been in the market and quite a few contracts have been closed within the past few weeks. Reserve stocks are pretty generally used up and purchasing agents are negotiating for a renewal of supply. Iron and steel plants are using a larger tonnage than formerly. General manufacturing is rather slow to resume, but fuel requirements are gradually increasing. Steam prices show distinct strength and there is every indication of still higher levels. Railroads are not taking the tonnage that was expected and that is the worst feature of the trade.

The lake trade is going along steadily with loadings at the docks fairly large. A good tonnage is moving to the Northwest from Ohio and West Virginia mines. There is no congestion on the upper lake docks as the movement to the interior is rather active. Practically all of the lake contracts have been made and there is little opportunity for tonnage to be sold later on.

Production is rather good in all of the producing fields of Ohio. This is especially noticeable in the eastern Ohio field, where the output is estimated at 60 to 75 per cent. Pomeroy Bend field also shows an increase. Cambridge and Crooksville are producing a fair tonnage and the same is true of the Hocking Valley field.

CINCINNATI

Little change in condition, though outlook is brighter. Car and labor shortage.

Coal dealers and operators in the Cincinnati market report little change over conditions last week, although they say a gradual improvement is noted which should gain in momentum from now on. They attribute whatever change there is in the situation to the advertising of the national association and the local dealers.

Domestic users have about resigned themselves to the fact that there will be little smokeless coal for them this season and are beginning to take whatever little of this grade is available for their consumption. Orders placed the past week by household users of coal have shown a decided increase over the past few weeks.

Dealers look for a rush of business during July and August. The warning has gone out that there will be a serious shortage of gas the coming winter, and those who experienced the discomforts of a shortage two years ago are taking no chances but are laying in their supply of coal so as to be prepared when the shortage does come.

Reports of car and labor shortage in the smokeless coal fields continue to come in. There appears to be a good movement of coal from these fields, but much of it is going to the seaboard and lakes, with some reaching the storage piles of those dealers who saw far enough ahead to get in their orders for mine-run.

LOUISVILLE

Retailers advance prices on domestic coal. Car shortage beginning to be felt. Good demand for domestic coal with steam grades still dull. Market slightly stiffer.

Louisville retailers have made general advances on domestic coal, this advance being forced by advances on the part of operators, who have advanced domestic to take care of shrunken values of spot steam. Starting July 1, all eastern Kentucky coal jumped to $7 a ton retail, with West Virginia river still selling at $6.50. Western Kentucky lump advanced 15c. a ton to $5.75. Coke is selling at $10.25 and anthracite at $12.75. Smokeless has advanced to $8. Mine-run is retailing at 50c. under lump, and screenings at $1 under lump.

There is a good retail demand for coal, with operators in the retail field operating about 70 per cent. full equipment. Stocking demand on domestic is about 35 per cent. of deliveries, with the balance of the demand coming from small steam plants.

Eastern Kentucky mines are operating about six days a week, with western Kentucky about two days. Car shortages are becoming more general, and many reports are being received of cars being delivered in bad shape.

Quotations show: Eastern Kentucky block, $3.50@3.75; mine run, $2.50@2.75; nut and slack, $1.85@2.25; western Kentucky lump, $2.25@2.50; mine run, $2@2.10; screenings, $1.50@1.75; fine screenings, $1.40@1.50.

Eastern Kentucky coals are all stronger, although there is still a marked need for business on screenings. Many operators are refusing additional business for block coal, as they cannot dispose of the screenings.

The labor situation is in fairly good shape, but there has been a good deal of shifting, with labor leaving western Kentucky two-day mines for eastern Kentucky mines that are operating almost full time.

BIRMINGHAM

Steam-coal market has strengthened during past week. Domestic remains stiff and premium prices are offered for spot tonnage, but little is available. Production shows a decline over previous week.

There has been a perceptible strengthening in the demand for steam grades the past few days, some new contracts have been made and old ones, with few exceptions, are being renewed as they expire. The general industrial demand is better and in the aggregate a considerable tonnage is moving. A public utility company closed for approximately 50,000 tons for the next twelve months at Government price. The Louisville & Nashville R.R. is reported to have closed for a small portion of its requirements for the next year, the major portion of the coal taken from this district by that line not having been allotted as yet. The Southern Ry. is now receiving new bids from local producers, having rejected the bids received on its former inquiry. Bunker business is showing some gains with an increased demand from ships making the ports of Mobile and New Orleans.

The domestic market is decidedly stiff, all operators having tied up practically all their output in contracts, and spot coal brings a premium when available. Piper, Coleanor and Montevallo lump is readily taken at $5.50 per ton mines, but there is little to be had of this high grade fuel from the Cahaba and Montevallo fields.

Production for the week ending June 21, as reported to the Alabama Coal Operators' Association, shews an output of 224,513 net tons, a material reduction as compared with the previous week. Labor is getting restless under restricted operating schedules and is beginning to leave the district for other fields. However, the indications are that the next week or two will see the blowing in of at least three additional furnaces, which will enable some idle mines to resume and others to go on fuller schedules.

Coke

CONNELLSVILLE

Contracting practically concluded. Stiffening in spot before holiday. Production increasing.

Little additional contract business in furnace coke has been closed in the past week, as nearly all the blast furnaces in operation had already covered. Several furnaces now out of blast have desired to contract, but operators are indisposed to take such chances and the furnaces will probably have to guarantee they will go into blast before they can make requirement contracts. The great bulk of the contracting was on a ratio basis, as explained in previous reports, the proportion being 6/4 to 1, coke per net ton at ovens against basic pig iron per gross ton at valley furnaces, with monthly adjustment of invoice price.

While there have been reports of furnace coke contracts being made at flat prices, only one such case is definitely known, the price in that instance being a special one of $4 for July shipment, $4.10 being the figure for the remaining five months of the half-year.

The spot coke market stiffened up sharply a week before Independence Day, $4.25 being the minimum for furnace coke, with some operators demanding more. The market has been quiet the past few days but is still quotable at the advanced figure. Spot foundry coke at $4.50, one a common

price, has been growing scarcer, but as a rule some can still be picked up at that figure, choicer brands commanding up to $5.

While some operators regard coke as established on the higher level recently attained by the spot market, there are others who are willing to sell furnace coke for the remainder of July at $4, which was the usual settling price for June on monthly adjustment contracts, a few having been settled at $3.75. These monthly adjustment contracts are now a thing of the past. They had developed on Feb. 1 from contracts that had been written at Government price, but subject to negotiation should the Government price be withdrawn. The market is now quotable as follows: Spot furnace, $4.25; spot and prompt foundry, $4.50@5; contract foundry, $5@5.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended June 28 at 138,633 tons, an increase of 7433 tons.

Buffalo—The price of coke advances slowly, in sympathy with bituminous coal, and a firmer market is in prospect hereafter, as the furnaces are running much more actively than they were a month ago. Quotations, per net ton f.o.b. Buffalo are $7.85 for 72-hour Connellsville foundry, $7.10 to $7.35 for 48-hour furnace and $6.20 for off grades. The sale of breeze and other fine stuff has not been resumed to any extent, on account of the very low price of slack coal.

Middle Western

GENERAL REVIEW

The market continues without any radical changes, either for the better or the worse. Steam sizes continue inactive, while prepared domestic sizes are in very good demand. Operators are feeling better these days, however, because they think they see better times ahead, and in the immediate future.

The campaign recently undertaken by the National Coal Association to stimulate buying is now well started, but the results obtained so far have been from the domestic trade, rather than the steam. The big manufacturers, as yet, do not realize the seriousness of the present situation, and therefore do not show much interest either in contracts or current sales. A well organized drive for steam business has been started by a number of coal operators' associations in the Middle West, but the results obtained have been nothing to brag about. The present opinion of the operators is that they have done their best to get the public to contract. The public will not contract, therefore the operators are relieved of responsibility and, with justice, can sell their coals to the highest bidder during the fall and winter months. It must be admitted that the producers are looking forward to this situation with considerable anticipation. While we are on this subject it might be well to say that last week there developed a car shortage in the Harrisburg field that practically closed 90 per cent. of the mines in that district. It is true that this condition developed only on the Big Four R.R., but it is extremely likely other roads will be affected a little later on. We understand there are plenty of cars, but most of them are in such poor repair that they are unfit for coal hauling. The labor question is again coming to a position of prominence, and many opinions, practically all different, are to be heard. It seems pretty generally conceded, however, that the miners will demand more money.

The Franklin County field in Illinois experienced another consolidation the other day, when the Old Ben Coal Corporation took over the T. C. Keller properties at Sesser, Ill., on the C. B. & Q. R.R. This gives the Old Ben Coal Corporation eight mines in Franklin County, all of them producing very good coal, both from the standpoint of high natural quality and excellent preparation. We predicted some time back that the Franklin mines would soon be in the hands of two or three very strong operating and sales companies, and our predictions appear to be developing. It will be interesting to note the next independent mines to be absorbed. The trade, in general, looks with favor upon these consolidations, as it puts important mines in strong hands and hence stabilizes the industry.

A mine in the Belleville district of Illinois sold from 500 to 1200 tons per day of mine run and screenings to the Chicago Great Western R.R. on a basis of $1.70 mines per ton for mine run and $1.40 per ton for screenings. Contrary to expectations the trade looked upon this sale with favor as it removed a tonnage from the market that was being sold at pretty low prices, and consequently demoralizing the market, it is said.

CHICAGO

Poor market on screenings. Domestic coal situation improving daily. High grade eastern coals hard to get.

The market on screenings is in bad shape. We hear from very good authority that southern Illinois screenings of good quality have been selling at $1.50 mines, with the steam coal public showing but little interest even at these prices. We gather, however, that certain manufacturing interests whose plants have been closed for the last six months are now starting up again, and soon will be running full time. There is no use in camouflaging the steam-coal situation, as it couldn't be worse than it is today. Operators are looking for better business on Monday, because the mines being closed over the Fourth as well as Saturday and Sunday will automatically keep some of the surplus from the open market.

The situation on domestic coals is improving daily, and operators having a surplus of lump, egg, nut or even smaller prepared sizes are having no trouble in selling the product in Chicago. High-grade eastern coals are at a decided premium, and will be harder to get as the season advances.

MILWAUKEE

Advance in anthracite and Pocahontas announced with the opening of July. Coke also shoved up a notch. Demand increasing under the agitation of threatened shortage.

July 1 brought the customary monthly advance of 10c. per ton on all grades of anthracite except buckwheat, which remains stationary in price. Screened Pocahontas was also put up 50c. per ton, while mine run was advanced only 25c. Coke was given a lift of 25c. per ton, making the prevailing price of that commodity $11.25. The demand for coal has increased both in the city and country as a result of a campaign of publicity in which the danger of a coal shortage next winter is given credence. Milwaukee is faring well in the matter of receipts by lake, and unless there is a sudden and continued cessation of this supply there will be ample fuel for the Wisconsin district when the season of navigation closes. It will be advantageous however, if the demand can be stimulated so as to relieve the docks and make way for additional supplies. Receipts by lake for the months of April, May and June aggregate 204,037 tons of anthracite and 1,148,753 tons of soft coal, against 164,889 tons of the former and 827,436 tons of the latter during the same period last year.

Chestnut anthracite is $12.50; stove, $12.40; egg, $12.20; pea, $11, and buckwheat $9.75. Coke is $11.25, Pocahontas screened $10.25 and mine-run $8.

ST. LOUIS

Considerable activity in domestic sizes of higher grade fuels, while low grade coal finds no demand. Steam coal market hard to find and over-supply is keeping mines idle. Future domestic supply in doubt on this account.

The past week witnessed the opening up of the orders for high-grade storage coal. The retail price advance of 25c. a ton on July 1 set things going when it was backed up by national newspaper advertising.

This demand is almost entirely for Carterville, but there is some call for hard coal, a little smokeless and considerable coke. Almost no demand at all for Mt. Olive and no Standard aside from a small tonnage for a few apartments.

From now on the movement will reach out to the cheaper fuels, especially as soon as it dawns on the public that the failure to wash steam coal is going to curtail the production of domestic sizes.

The country call for domestic is almost identical with the city needs, but not so pronounced.

The steam situation shows no improvement. Screenings from all fields are piling up at the mines and this is the one cause for many mines being idle in the Williamson-Franklin County field. It is not as bad in the Mt. Olive district but affects the Standard mines to almost the same extent as in Williamson and Franklin Counties.

A survey of the steam trade for July indicates a decreased tonnage and unless something out of the ordinary takes place in the local industrial situation in the next two months the steam tonnage will have to be dumped at the mines if anywhere near the amount required for domestic use is to be produced in all of the fields.

The mines in the Standard field work one and two days a week, execpt when on railroad coal. This tonnage does not indicate that the roads are storing to any extent. Many mines are idle and those that do work for the most part fight for the little business offered by selling below cost. An effort was made by some operators on July 1 to get more money, but it was not general and so far has not been successful.

The Mt. Olive field is fairly well taken care of in shipping north and northwest. Some railroad fuel is moving, and steam coal from this field moves easier than from other fields if it can go north.

The situation in Williamson and Franklin Counties is a vexatious problem for the operator. Snowed under in the past two weeks with domestic orders and no place for steam sizes makes it hard to give the men work enough to keep them contented. Two days a week is not enough, especially for the foreign element who are ready to leave at the first chance. One or two mines are working steady out of the entire field and some are idle entirely.

Cars are plentiful yet and the movement is good. Prices are well maintained on all sizes by the Association operators, while the independents are quoting as much as 50c. less.

No contracts reported except at prices at time of shipment.

Coal and Coke Securities

New York Stock Exchange Closing Quotations July 7, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	...
Buna Brothers, Com.	(BB)	148	152
Buna Brothers, Pfd.	(BB)	99½	115
Central Coal & Coke, Com.	(CK)	55	...
Central Coal & Coke, Pfd.	(CK)	63	...
Colorado Fuel & Iron, Com.	(CF)	51	52½
Colorado Fuel & Iron, Pfd.	(CF)	105	125
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com.	(EH)	37	37½
Elk Horn Coal, Pfd.	(EH)	...	47
Island Creek Coal, Com.	(ICR)	39	...
Island Creek Coal, Pfd.	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd.	(JF)	63	...
New Central Coal of West Va.	(NCC)	5	...
Pittsburgh Coal, Com.	(PC)	68	69
Pittsburgh Coal, Pfd.	(PC)	93	95
Pond Creek Coal	(PD)	18	19½
Virginia Iron, Coal & Coke	(VK)	...	67

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	97	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	75½	...
Colorado Fuel & Iron, Gen. 5s, 1943	90	90½
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	80½	80¾
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87½	88
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	98	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	100	101
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1913	79¾	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F., 5s, 1928	80¾	...
Pocahontas Coal & Coke, Joint 4s, 1941	83½	84½
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	86½	87½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	...	81
Tenn. Coal, Iron & R R., Gen. 5s, 1951	93	...
Utah Fuel, 1st Sinking Fund 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85½	88½

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations compiled by The Matthew Addy Company as per Department of Commerce Committee Schedule.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$30 35	$30 35
Northern Basic	27 55	27 55
Southern Ohio No. 2	28 55	28 25
NEW YORK, Tidewater delivery		
2X Virginia (silicon 2 25 to 2 75)	31 90	31 90
Southern No. 2 (silicon 2 25 to 2.75)	33 95	33 95
BIRMINGHAM		
No. 2 Foundry	26 25	25 25
PHILADELPHIA		
Eastern Pa.	30 65*	30 65
Virginia No. 2	30 85†	30 85
Basic	30 90*	30 90
Grey Forge	29 90*	30 90
CHICAGO		
No. 2 Foundry Local	26 75	26 75
No. 2 Foundry Southern	28 00	32 00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	28 15	28 15
Basic	27 15	27 15
Bessemer	29 35	29 35

* F.o.b. furnace. † Delivered.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$2 45	$3 47	$4 24½	$3 54	$3 42
Channels, 3 to 15 in.	2 45	3 47	4 24½	3 54	3 42
Angles, 3 to 6 in., ¼ in. thick.	2 45	3 47	4 24½	3 54	3 47
Tees, 3 in. and larger	2 45	3 52	4 24½	3 54	3 47
Plates	2 66	3 67	4 49½	3 54	3 67

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	Cincinnati	St. Louis	Denver	Birmingham
2 75	3.25	3 44	4 30	3 50

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3 25	$3 90	$4 90	$3.90	$4 25	$5.00	$5 00
Cut	4 25	5 40	5 61	5 50		6 40	6.40

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝ in. and larger	$3 35	$4 27	$4 44	$5 65	$4.50	$5 05
Track bolts	4 35	5 17 Prem.	6 65	6 00	6 00	6 05
Standard section angle bars	3.00	4 22 Prem.	4 60			4.45

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring fair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St. Louis	Denver	Birmingham
17½%	List —5%	List —2%	+15%	+20%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5 75	$7 50	$6 50	$7 25	$8 15	$7 00
Assorted	6 40	7 50	6 50–7 00	6 40	8 40	7 25

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$53 00	$55 70	$64 35	$54.80	$48.00	$72.50	$59.00
6 in. and over	50.00	52 70	61.35	51.80	45.00	69.55	56.00

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$45 00	$55 00	$45 00	$65 00
Standard openhearth rails	47.00	57 00	47 00	67 00
Light rails, 8 to 10 lb.	2 58½*	3.13½*	2 8½*	3 13½*
Light rails, 12 to 14 lb.	2 54*	3.09*	2 79*	3 09*
Light rails, 25 to 45 lb.	2 45*	3 00*	2 70*	3 00*

* Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$19 50	$17 00	$18 50
Stove plate	15 50	17 00	17 00
No. 1 machinery cast	21 50	21 50	23 50
Machine shop turnings	9 00	6 65	9 00
Cast borings	9 50	9 50	9 00
Railroad malleable cast	14 00	16 00	15 50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0 12	$0 16½	$0 18	$0 13	$0 18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	14c	13c.	15c.
Hollow	18c.		

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Inches	Steel Black	Steel Galvanized	Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	50½%	24%			
½	54½%	40%	¾ to 1½	39½%	23½%
¾ to 3	57½%	44%			

LAP WELD

2	50½%	35%	2	32½%	18½%
2½ to 6	53½%	41%	2½ to 4	34½%	21½%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	46½%	29%	¾ to 1½	39½%	24½%
½	51½%	39%			
¾ to 1½	55½%	43½%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	48½%	37%	2	33½%	20½%
2½ to 4	51½%	40%	2½ to 4	35½%	23½%
4½ to 6	50½%	39%	4½ to 6	34½%	22½%

Stocks discounts in cities named are as follows:

	New York Black	New York Galvanized	Cleveland Black	Cleveland Galvanized	Chicago Black	Chicago Galvanized
⅛ to 3 in. steel butt welded	47%	31%	46½%	31%	52½%	44%
3½ to 3 in. steel lap welded	42%	27%	42½%	27½%	53½%	41%

Malleable fittings. Class B and C, from New York stock sell at list + 12½%. Cast iron, standard sizes, 10% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+17½%
Galvanized cast steel rigging	7½%
Bright plain rigging	35%
Bright cast steel	22½%
Bright iron and iron tiller	5%

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Chicago Current
*No. 28 black	4 35	5 37	6 22	6 45	5 27	5 37
*No. 26 black	4 25	5 27	6.12	6 35	5 17	5 27
*Nos. 22 and 24 black	4 20	5 22	6 07	6 30	5 12	5 22
Nos. 18 and 20 black	4 15	5 17	6.02	6 25	5 07	5 17
No. 16 blue annealed	3 75	4 77	5 37	5 65	4 62	4 77
No. 14 blue annealed	3 65	4 67	5 27	5 55	4 52	4 67
No. 10 blue annealed	3 55	4 57	5 17	5 45	4 42	4 57
*No. 18 galvanized	5 70	6 50	7 57	7 70	6 62	6 72
*No. 26 galvanized	5 40	6 20	7 27	7 40	6 32	6 42
No. 24 galvanized	5 25	6 05	7 12	7 25	6 17	6 27

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gage; 25c for 19 to 24 gages; for galvanized corrugated sheets add 15c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair sizes orders, the following amount is deducted from list:

	New York Current	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago	St. Louis Current
Hot pressed square	$1 28	$1 90	$1 40	$2 00	$1 05	$2 25
Hot pressed hexagon	1 08	1 90	1 20	2 00	85	2 25
Cold punched square	3 25	1 90	25	1 30	1 00	2 25
Cold punched hexagon	2 70	1 90	75	1 30	1.00	2 25

Semi-finished nuts sell at the following discounts from list price.

	Current	One Year Ago
New York	50—10%	40%
Chicago	50%	50%
Cleveland	60–10–10%	60%
St. Louis	45%	

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago	St. Louis
¾ by 4 in. and smaller	50–10%	50%	50–10%	50–10%
Larger and longer up to 1 in. by 30 in.	40–10%	40%	40–10%	40–10%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York ..... $1.25 Cleveland..... $3.50 Chicago $2.25

For cast-iron washers the base price per 100 lb. is as follows:
New York..... $6.00 Cleveland ..... $3.75 Chicago $4.00

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ½ and smaller	65%	60—5%	45%
Tinned	65%	60—5%	40%

Boiler, ½ to 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York, $4.72 base Cleveland $4.00 Chicago $4.87 Pittsburgh...$4.65

Structural, same sizes:
New York $4.82 Cleveland $4.10 Chicago $4.97 Pittsburgh...$4.75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon.

	New York — Current	New York — One Year Ago	Cleveland — Current	Cleveland — One Year Ago	Chicago — Current	Chicago — One Year Ago
Raw in barrel	$1 98	$1 61	$2 00	$1.70	$2.04	$1 66
5-gal. cans	2 11	1 71	2.25	1.85	2 24	1.86

WHITE AND RED LEAD—Base price.

	Red — Current		Red — 1 Year Ago		White — Current	White — 1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	13 00	14 50	12 25	12 50	13 00	12 25
25 and 50-lb. kegs	13 25	14 75	12 50	12 75	13 25	12 50
12½-lb. keg	13 50	15 00	12 75	13 00	13 50	12 75
5-lb. cans	15 00	16 50	14 25	14 00	15 00	14 50
1-lb. cans	16 00	17 50	14 25	14 50	16 00	14 50

500 lb. lots less 10% discount. 2000 lb. lots less 10–2½% discount

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows

Chicago	$12.00	Birmingham	$15.00
St. Louis, salmon	10 00	Denver (hard red)	12 00
Cincinnati	16 00		

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply — C.l.	1-Ply — L.c.l.	2-Ply — C.l.	2-Ply — L.c.l.	3-Ply — C.l.	3-Ply — L.c.l.
No. 1 grade	$1 45	$1 70	$1 80	$2 05	$2 15	$2 46
No. 2 grade	1 30	1 55	1 60	1 85	1 90	2 15

Asbestos asphalt saturated felt (14 lb. per square) costs $5.00 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $2.00 per roll in carload lots and $2.25 for smaller quantities.

Shingles, red and green slate finish cost $5 00 per square in carloads, $5 25 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago

	Carload Lots N. Y.	Carload Lots Chicago	Less Than Carload Lots N. Y.	Less Than Carload Lots Chicago
Tar felt (14 lb. per square of 100 sq ft.)	$60 00	$60 50	$61 00	$61 50
Tar pitch (in 400-lb. bbl)	21 00	18 00	22 00	19 00
Asphalt pitch (in barrels)	34 00	34 00	37 50	37 50
Asphalt felt	63 00	63.00	67 50	67 50

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0 056	$0.11	$0 162
St. Louis	.08	.15	.....
Seattle	.09	.175	30
Los Angeles*	.082	.154	236
New Orleans	.165	.22	325
Pittsburgh	.065	.115	.....
Chicago	.08	.144	.....
Denver	.125	18	.....
Cincinnati	.07	.13075	.....

*F. o. b. factory, 4, 8 and 10 inch.

LUMBER—Price of pine per M in carload lots:

	1-In. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$30@51	$35 00	$33 00
Birmingham	39 00	33.00	31 00
Denver	43 25	35 00	43 00
Cincinnati	41.00	39.00	40.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York		$0.27½	$0.30		$2.40
Boston	$0 22½	.24½	.26½	$0.31	2.40
Kansas City	19	23½	.26½	.30	2.45
New Orleans	.22½ (50%)	.23½	.24½	.....	.....
Seattle	.14½	.18½	21	.....	.....
Chicago	18½	21½	25½	.....	.....
St. Paul	19	22½	26½	.....	2 45
St. Louis	19	21½	23½	30	2 25
Denver	17	22½	24½	28½	2.60
Dallas	189	22⅝	288	342	2 75
Los Angeles	196	237	251		

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots.

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	7	8½	14½
Fiber or sponge	8	13	8½	18
Transmission	7	13	8½	17
Axle	4½	4½	4½	5½
Gear	4½	7½	8½	8
Car journal	22 (gal)	4 9	8½	8

BABBITT METAL—Warehouse prices in cents per pound:

	New York — Current	New York — One Year Ago	Cleveland — Current	Cleveland — One Year Ago	Chicago — Current	Chicago — One Year Ago
Best grade	87 00	125 00	79 00	100 00	75 00	113 00
Commercial	42 00	70 00	17 50	22 00	15 00	23 00

HOSE—Following are prices of various classes of hose:

	Fire	50-Ft. Lengths
Underwriters' 2½-in		70c. per ft.
Common, 2½-in		40%

	Air — First Grade	Air — Second Grade	Air — Third Grade
¾-in. per ft	$0 50	$0 35	$0 25

Steam—Discounts from list

First grade	30%	Second grade	40%	Third grade	40–10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	50%
Denver	35–5%	30%
Birmingham	35%	35%
Chicago	45%	35%
Cincinnati	30–5 2½%	40–2½%

RAWHIDE LACING—20% for cut; 45c. per sq.ft. for ordinary.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.60
Duck and rubber for piston packing	1 00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	1 00
Wire insertion asbestos sheet	1 20
Rubber sheet	.60
Rubber sheet, wire insertion	80
Rubber sheet, duck insertion	50
Rubber sheet, cloth insertion	30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1 20
Asbestos wick, ¾- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ⅝-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ¾-in., 8 ft., ⅞-in., 6; 1-in., 4½; 1 in., 3⅜; 1¼-in., 2 ft. 10 in.; 1½-in., 2 ft. 4 in. Following is price per pound for ¾-in. and larger, in 1200-ft. coils:

Boston	$0 26	Atlanta	$0 29½
New York	27	Denver	29½
St. Louis	26½	Kansas City	28½
Chicago	26½	New Orleans	27½
St. Paul	28	Seattle	27½
San Francisco	26	Los Angeles	26

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING — Pipe Size	Standard List Per Lin.Ft.	BLOCKS AND SHEETS — Thickness	Price per Sq.Ft.
1-in.	$0 27	½-in.	$0.27
2-in.	36	1-in.	.30
6-in.	.80	1½-in.	.45
4-in.	.60	2-in.	.60
3-in.	.45	2½-in.	.75
8-in.	1 10	3-in.	.90
10-in	1 30	3½-in.	1.05
85% magnesia high pressure			List
For low-pressure heating and return lines		4-ply	58% off
		3-ply	60% off
		2-ply	62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ⅙ lb. rolls	48c. per lb.
Rubber tape, ½-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

No.	Denver — Single Braid	Denver — Double Braid	Denver — Duplex	St. Louis — Single Braid	St. Louis — Double Braid	St. Louis — Duplex	Birmingham — Single Braid	Birmingham — Double Braid	Duplex
14	$12.00	$15.50	$33 00	$11 00	$20 00	$31 50	$9.92	$9.92	$41.66
10	18.85	25.45	49 50	25 40	29 00	59 00	29 99	29 99	56.26
8	26 45	33 70	68 00	35 45	35 00	72 50	40 89	40.89	. .
6	40.00	45 70	.....	. .	61 00	120 00	82 13	82 13	. .
4	56 35	64 30	.....	. .	86 00	. . .	112 48	112 48	. .
2	84 85	94 35	.....	. .	130 00	.....	158 76	158 76	. .
1	111 00	123 35	.....	. .	176 00	. . .	213 34	213 34	. .
0	163 00	163 00	.....	. .	222 00	. . .	251 50	251 50	. .
00	. . .	196.85	.....	. .	270 00	. . .	302 78	302 78	. .
000	. . .	238.85	.....	. .	330 00	.....	366 00	366 00	. .
0000	. . .	289.85	.....	. .	400 00	.....	439 74	439 74	.....

Cincinnati is using a 20-cent base, with 55 to 58% discount.

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains etc., the following freight rates per 1000 lb. are effective:

Boston	$0 30	New Orleans	$0 38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	.24
Cleveland	.17	St. Paul	49*
Denver	.99	Pacific Coast (all rail)	1.25*
Kansas City	.59		

Note—Add 3% transportation tax. Minimum carload, 80,000 lb.

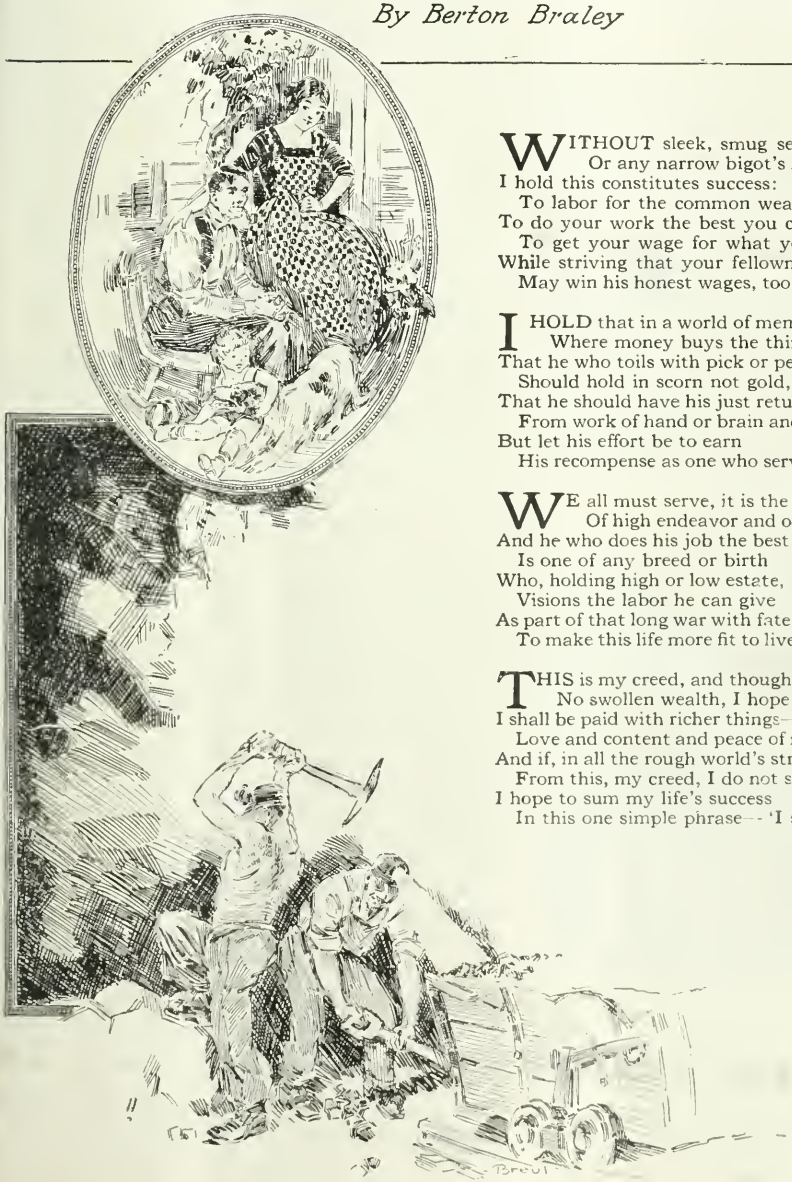
COAL AGE

Volume 16 Number 3

New York, July 17, 1919

THE CREED OF SERVICE

By Berton Braley

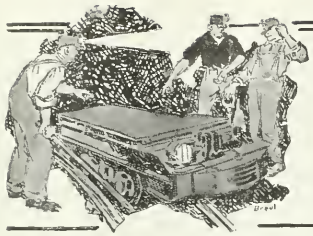


WITHOUT sleek, smug self-righteousness
Or any narrow bigot's zeal,
I hold this constitutes success:
To labor for the common weal,
To do your work the best you can,
To get your wage for what you do
While striving that your fellowman
May win his honest wages, too.

I HOLD that in a world of men
Where money buys the things we need,
That he who toils with pick or pen
Should hold in scorn not gold, but greed!
That he should have his just return
From work of hand or brain and nerves,
But let his effort be to earn
His recompense as one who serves.

WE all must serve, it is the test
Of high endeavor and of worth;
And he who does his job the best
Is one of any breed or birth
Who, holding high or low estate,
Visions the labor he can give
As part of that long war with fate
To make this life more fit to live.

THIS is my creed, and though it brings
No swollen wealth, I hope to find
I shall be paid with richer things—
Love and content and peace of mind.
And if, in all the rough world's stress
From this, my creed, I do not swerve,
I hope to sum my life's success
In this one simple phrase—'I serve!"



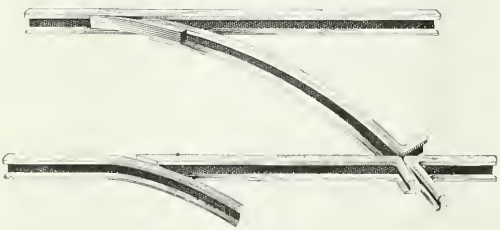
IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Simple Scotch for T-Iron Road

By Machine Runner
Sullivan, Indiana

A simple scotch to use on T-iron road where it is necessary to unload the mining machine may be made as follows: Take two fishplates and put one bolt through them in the second hole from the end. Tighten



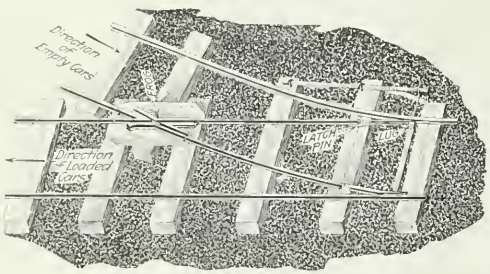
DETAILS OF SCOTCH FOR USE ON T-IRON ROAD

the bolt up to the desired size to fit the rail, then lay them clothes-pin fashion in front of the wheel which is to be scotched. There will now be no trouble in holding the machine while unloading.

A Spring Latch

By R. Bowen
Pittston, Penn.

A spring latch for use where branch tracks are put in against the loaded cars is illustrated below. It is always the tendency of small 3-ft. latches to fly open when the car runs over the latch pin. This results in the derailing of the cars behind, and many a man bears



SIMPLE SPRING LATCH PREVENTS DERAILS

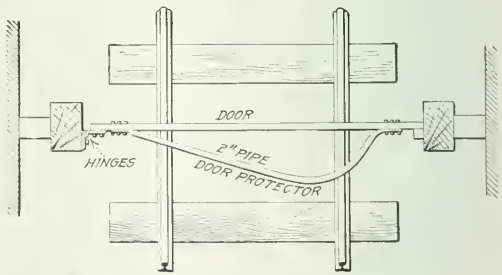
evidence of the dangerous practice of pulling the latch back into its place with his hand, as the trip goes over the latch.

The little kink shown, which is by no means new, is extremely simple and costs practically nothing to put in. An ordinary latch is taken to the blacksmith and a lug welded on its side 6 in. from the point and extending 2 to 3 in. below the latch. A hole ¼ to ½ in. in diameter is cut in the center of the lug, permitting the attachment of a piece of wire that runs under the latch and wing rail. The wire can be held in the hand a safe distance from the moving cars, or the limb of a tree, a pole or a sapling may be nailed or stapled to the ties, the wire being then tied to this pole.

A piece of ¼-in. iron rod bent to the shape of an eye-bolt that is slipped over the pole, the other end passing under the rail and latch and through the lug into a nut, answers the purpose better. The dotted lines show the position of the pole when an empty car passes back through the latches.

A Mine Door Protector

A type of door protector adopted by one of the large coal companies of Pennsylvania, and used by it on many of its doors underground, is shown below. This protector is made as follows: A piece of 2-in. pipe of suitable length is bent in approximately parabolic curve, or one of changing radius. Each end of the pipe is



MINE DOOR PROTECTOR MADE OF CURVED PIPE

flattened for a distance of about 10 in., and the flattened portion reflexed sufficiently so that when the concave side of the curved pipe is next the door the flattened ends will lie flat upon it near either edge. The maximum clearance from the door to the pipe protector should be at a point about two-thirds of the distance from the hinged to the free side of the door, and should amount to about 1 foot.

This curved pipe protector is bolted securely to the door at each end, three bolts being employed ordinarily. It should be placed at such a height that the frame of the locomotive will strike it, thus pushing the door open. It also prevents the door from coming in contact with the sides of the cars in the trip, thus holding the door proper distance away.

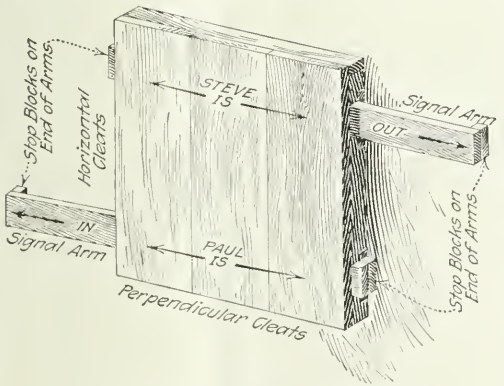
This device is cheap to build and install, and does its work efficiently. It will save its cost many times over in preventing damage to the door upon which it is placed.

Block Signal Board

By Ralph W. Mayer
California, Penn.

It is necessary at times for two or more locomotives pulling coal from butt entries to use the same entry between the butt entries and the parting. Unless some method of signaling is adopted, the motormen do not know whether the track is clear, and confusion or lost time results. Makeshift or careless methods are sometimes used, such as hanging a piece of canvas from the trolley or roof.

A block signal board has been adopted by one large mining company as a more efficient method. This board is fastened to the rib, close to the track, at the junction of the butt and cross entry tracks. It is about 24 in. long and 18 in. wide. Four horizontal cleats are nailed to the back of the board. Each pair of these cleats are nailed far enough apart so that an arm 6 in. wide and 1



EFFICIENT BLOCK SIGNAL BOARD

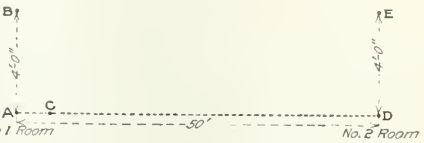
in. thick will easily slide between them. Two perpendicular pieces are nailed over these horizontal ones next to the edge of the board. These prevent the signal arm from falling out while the arm slides between them and the face of the board.

The arms have stop-blocks fastened to either end to prevent the arm from going too far. One end of the arm has OUT, the other IN printed upon it, with arrows showing the direction. On the face of the board is printed MOTOR NO.—IS—OUT—IN, the words OUT or IN being indicated by the signal arm, depending on which end of the arm is exposed. When the motorman goes out to the parting he exposes the end of the arm showing OUT. When he returns he exposes the end showing IN.

Turning a Room Without the Engineer

By J. A. Monico
Besoco, W. Va.

A simple method of laying off rooms and entries is shown in the accompanying diagram. This method can be employed for rooms or entries turned at any angle. All the mine boss has to do is to learn from the engineer the distance between room centers on the angle turned. The mine boss can then turn the rooms and entries, and drive them at least 150 ft. before the engineer is needed. To illustrate: Suppose that *A B C* are spads for No. 1 room and the entry, and that No. 2 room is ready to be turned (in this case at a right angle to the entry) on a 50-ft. center. The first thing to do is to hang two plumb-bobs in spads *A* and *C*. Sight along the entry to *D* and measure 5 ft. on that line of sight. Mark the line of sight on the roof, and also the distance. Next measure the distance from



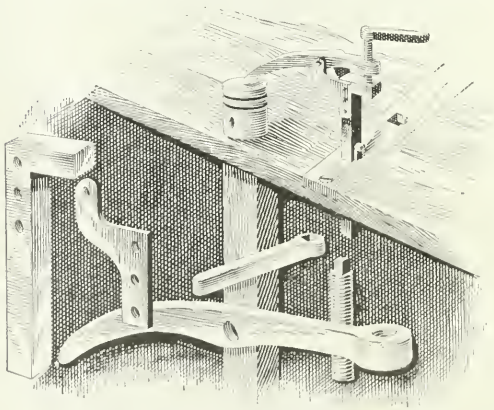
SIMPLE METHOD OF LAYING OFF ROOMS AND ENTRIES

A to *B*; in this case it is 4 ft. Then measure the distance *D E*, making it the same as *A B*. Next measure 50 ft. from *B* to *E*, keeping 4 ft. from E. The two points *D* and *E* are sights for No. 2 room. Several rooms can be turned in this manner and little error will be found.

Clamp for the Work Bench

By Charles H. Willey
Concord, N. H.

The bench clamp illustrated herewith is simple to construct and of value to any mechanic who has much bench work to do. The contrivance is shown in both detailed and assembled views, but the dimensions have not been given as these can best be made to suit the size of work to be handled. The upright of the clamp is made of square stock, one end being bent over at



THIS BENCH CLAMP IS EASILY MADE

right angles to make the foot on which the clamp screw operates. Two pieces of iron plate make the lugs that hold the hinge pin of the clamp finger; these are riveted or bolted to the upright by three bolts.

The clamp finger is forged to a suitable curve and is made sufficiently large at the short end to take a ¾-in. screw. A piece of 3½ x ⅝ in. flat bar stock is machined with square holes and taper keyways in each hole and is set in flush with the bench top. This is bolted down. The tool is held firm by the taper wedges or keys, the leg of the tool being of sufficient length to raise and lower it to suit a wide range of work.

Importance of the Proper Bonding of Mine Rails*

THE electric haulage circuit in a mine is like a chain, composed of many links or elements, each of which must do its work or the whole will be a failure. The most complicated portion of the electrical path is the return. Bonding, if properly done, greatly decreases the resistance of mine track; if improperly done, it is next to useless. The latest type of bond is that employing terminals welded to the rail ends.

By C. C. Beck
Mansfield, Ohio

AN ELECTRIC haulage system is made up of electrical paths in series, each of which is a link in the electrical chain. If each does not properly perform its function, serious losses result. Fig. 1 shows diagrammatically a complete system. The current is generated at the power house, flows out over the feeder and trolley wires, through the locomotives and cutting machine motors, and back to the power house, through the rails and joints.

The importance of good rail bonds is often overlooked. The feeling appears to be prevalent that electricity will have no trouble in getting back to the power house over rails that are connected together with good splice plates that are tightly bolted in place. When it is remembered, however, that the joints are in series so that the resistance of the return path is the total of the resistances of all the joints, it is seen that a comparatively low average joint resistance may result in a high total resistance, and that the voltage drop may become a high percentage of the total potential. This results not only in considerable power loss but, still worse, in

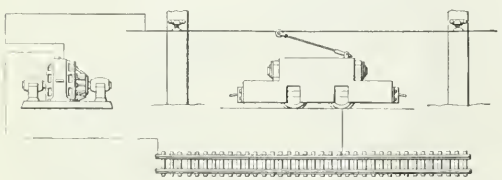


FIG. 1. DIAGRAM OF A COMPLETE HAULAGE SYSTEM

low voltage to the motors. This means slow speed, inefficient loading of locomotives, and correspondingly higher current values which burn out armatures.

On one property it was necessary to keep an armature winder constantly busy rewinding burnt-out armatures. The concern furnishing the coils suddenly noticed an absence of orders and checked up to see why this excellent coil business was not coming to them any more. The reason was that the manager had realized the poor bonding on his system and had rebonded the track, with the result that he had practically eliminated burning out of armatures and was furthermore hauling heavier loads at higher speeds than before.

*Paper presented before the Kentucky Mining Institute, Lexington, Ky., June 7, 1919.

The loss on a single joint may be surprisingly large. One rail joint that used to be in front of the house in which I lived impressed me more than any other with the excessive loss that might exist in a single joint. This particular joint would give off so much heat that snow was always melted away from its vicinity, and at night an arc would often be noticed which gave off considerable light. One of the boys of the neighborhood

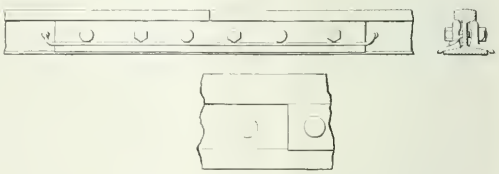


FIG. 2. METHOD OF HOLDING WIRE IN PLACE

ran a pair of wires and tapped them across this joint, carrying the wires into his window. He borrowed a voltmeter and found a 60-volt drop across the joint. He managed to get a small motor, which he connected to these wires. The neighborhood boys had considerable fun running all sorts of mechanical contrivances from this motor.

Iron oxide, or rust, has a high resistance, and it only takes a few days' time, when exposed to the weather or to the corrosive conditions of most mines, for rust to form over the rails and splice bars, insulating the rails from each other.

One of the first bonding methods employed to reduce the resistance between rails consisted of a piece of copper wire clamped under the bolt heads. Corrosion, however, soon proved this method no better than the splice bars alone. A later plan was to drill holes in the webs of the rails and insert the ends of a wire, holding these ends in place by driving in channel pins which were a little larger than the hole in the rail. This made a tight fit, the pin being compressed around the wire as shown in Fig. 2.

Channel pin bonding has also proved inefficient. In some cases failure has arisen from the old worn trolley wire used, which was so out of round and of such reduced size that it did not fit the channel pin closely and was not sufficiently compressed in installation. But even with good, new wire the moisture can enter the space between the pin and rail. It then spreads by capillary

attraction, soon corroding the surfaces and resulting in high resistance. Fig. 3 shows a channel pin removed from a rail in service. The crack and corrosion as well as the reduced diameter of the pin, which was originally the diameter of the circle drawn around

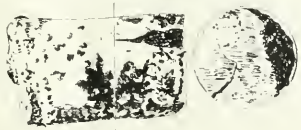
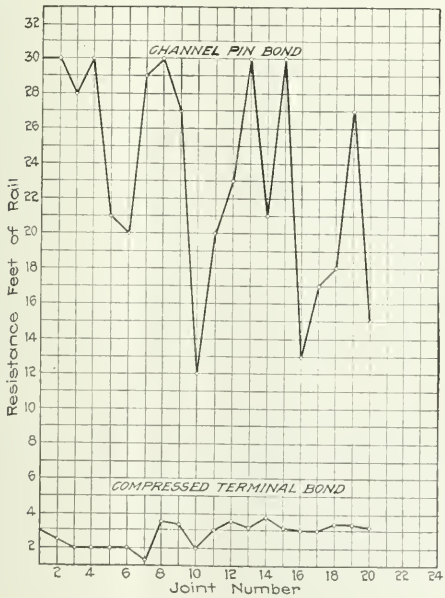


FIG. 3. A CHANNEL PIN AFTER SERVICE

it, should be noted. It is easily appreciated that such contacts cannot give a low resistance joint.

Fig. 4 is made up of actual readings on joints bonded with channel pins, in which the resistance per joint averaged between 12 and 30 ft. of rail. The lower curve, Fig. 5, shows corresponding track resistance when bonded with compressed terminal bonds in which no joint showed a resistance in excess of 4 ft. of rail.

Compressed terminal and pin expanded terminal bonds have now largely superseded those of the channel pin variety. Fig. 6 shows a compressed terminal bond in-



FIGS. 4 AND 5. JOINT RESISTANCE WITH VARIOUS BONDING

stalled under the splice plate, while Fig. 7 shows one placed around the splice plate. Fig. 8 shows this type of bond before being installed, the flexible cables being welded into the copper terminals which are expanded into the rail by means of the compressor (Fig. 10). Good results are secured when care is used in installation to see that the holes in the rails are properly drilled to size and the bonds expanded before the surface has rusted. If this is not possible, the holes should be drilled $\frac{1}{32}$ to $\frac{1}{64}$-in. under size and reamed just before the bond is put in place.

The bond terminal also should be cleaned with emery cloth just before being installed, and plenty of energy should be used on the compressor to insure a tight joint between the steel and the copper. With these precautions a low-resistance joint is secured which will withstand corrosion and vibration for many years without much deterioration.

The pin expanded terminal is shown in Fig. 9 and has the advantage over the compressed terminal of greater ease of installation. If proper care is used the results are practically the same, but if the hole happens to be oversize, due perhaps to improper grinding of the drills, there may not be enough expansion to give a tight contact.

Well applied compressed or pin-expanded terminal bonds are perhaps unexcelled under the service conditions to which they are suited, but no one type of bond is best for all conditions and the permanency of welded

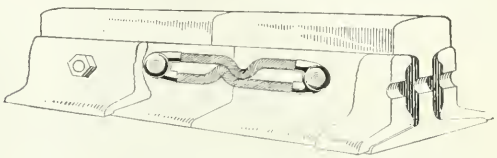


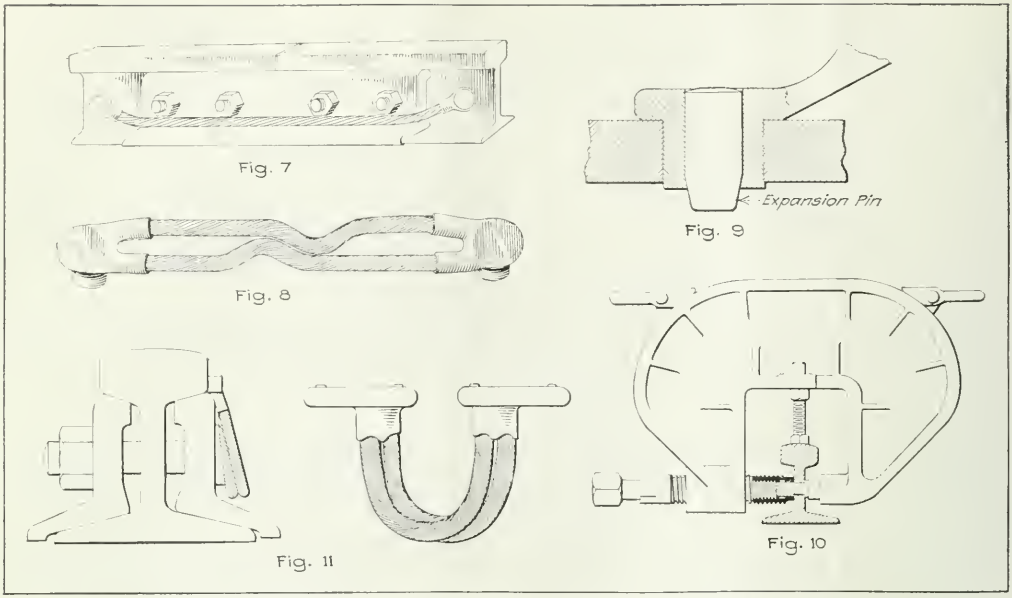
FIG. 6. COMPRESSED TERMINAL BOND UNDER SPLICE PLATE

contacts together with the recent advancement in welding practice has brought the welded type of bond into prominence.

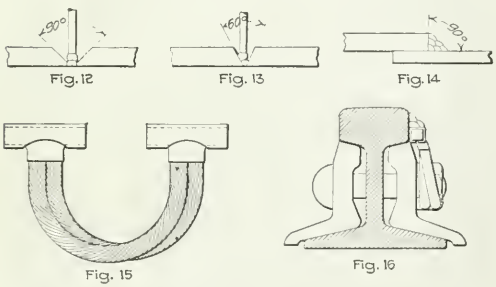
Of the welded bonds the gas-weld type (Fig. 11) is oldest, as gas welding came into general use before arc welding. However, the difficulty in handling the gas tanks and getting renewals and the added hazard of using an explosive gas in the confined spaces of underground mines have prevented the gas-weld bonds from becoming popular in mining districts.

In arc welding, the easiest method is to weld steel to steel with steel "filling-in" metal. In mine-track bonding it is desirable to keep to the simplest form because of the difficulty of securing trained welders. Most companies train one or more employees for this work, the concern furnishing the bonds or the welding machine, sending a demonstrator for a day or two to assist the bonding crew in getting started. Everyone will not develop into a good welder, and care must be used in selecting the proper man. The Government started a training school for welders in connection with shipbuilding, in which 90 days were spent in training and developing welders. Even then only a comparatively small number of men qualified as capable of handling all classes of work. In bonding, it has therefore been the custom to utilize the simplest of standard practice; and as the procedure is of a routine nature, only one form of weld is required, so that the time spent in learning is reduced to a minimum.

Fig. 12 shows a simple weld between two flat plates in which metal is built into a 90 deg. cut or groove The figure shows the arc welding at the bottom of the groove, the metal being built up in successive layers until the groove is entirely filled. Fig. 13 shows a similar weld in which the groove is less than 90 deg. It is almost impossible with such an acute-angle groove to get a solid weld at the bottom because of the tendency of the arc to jump to the side of the groove. The 90-deg. angle between the work is considered the best practice,



FIGS. 7 TO 11. VARIOUS BONDS AND THEIR APPLICATION

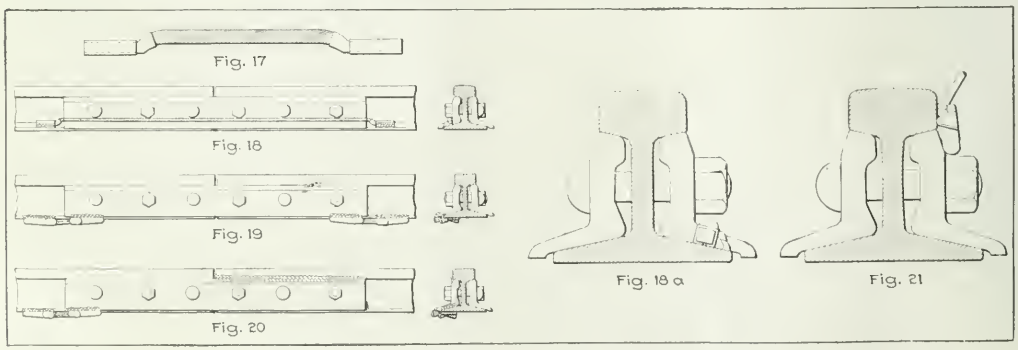


FIGS. 12 TO 16. PLATE AND BOND WELDING

as an acute angle makes it difficult or impossible to secure a good weld, while one greater than 90 deg. requires an excessive amount of time and filling-in metal. Fig. 14 shows a simple weld between two flat plates. Here again the 90-deg. angle between work is maintained. This fundamental principle is employed in rail bonding.

Fig. 15 shows an arc-weld bond for installation on the ball of the rail, and Fig. 16 shows it in place. The 90-deg. angle between work should be noted. The copper cable is fitted with copper terminals which are inclosed in steel casings, the steel being brazed or welded to the copper at the factory, thus insuring a good mechanical and electrical contact. The size of the terminal is such that it carries off the heat of the welding without danger of burning away the terminal under the arc, while the size of the welding surface insures a strong mechanical and electrical contact to the rail.

Fig. 17 shows an arc-weld bond for use around the splice plates, and Fig. 18 shows this bond installed. This is a method of installation that is recommended for light rails and for mining work generally. Figs. 19 and 20 show special applications which may be used



FIGS. 17 TO 21. VARIOUS APPLICATIONS OF WELDED BONDS

to advantage under certain conditions. It should be noted that with all these bonds the 90-deg. angle between the bond and the rail is employed, thus following standard welding practice.

Some bonds have been tried in which the upper surface of the terminal is beveled away from the rail, giving an angle between the working surfaces that is less than 90 deg., as shown in Fig. 21. This form, of bond however, is open to the criticism that it is difficult to get a good weld in the bottom of the groove.

For arc-weld bonding a simple resistance machine using trolley current is most convenient. It should be light enough to be carried readily by two men and should be sufficiently rugged to withstand the rough usage to which such apparatus is subjected in track work. The temperature rise should be low enough so that a fairly long life is secured. Fig. 22 shows one form of machine for this work.

In maintaining efficient bonding, periodic testing of the joints is recommended. There are several good bond testers on the market. One of the most accurate consists of a duplex millivoltmeter, Fig. 23, connected so that one instrument spans the joint and the other spans unbroken rail. By varying the length of unbroken rail spanned, a balance or equal reading is secured between the two instruments. It is only necessary to measure the unbroken rail spanned to secure the joint resistance in terms of feet of rail.

One of the commonest difficulties encountered in keeping up rail bonding arises from the bond installation and maintenance being put in charge of the track department, the members of which do not understand or appreciate the importance of careful bonding. They accordingly treat the whole bonding subject as a secondary matter and of little importance. This often results in good bonds being practically thrown away because of poor installation or to excessive loss arising from a few rail joints needing attention. It is especially recommended that each property using electric haulage arrange a bond department directly under the chief electrician. The business of this organization will be to install all bonds, test the track joints at regular intervals and, in general, make a study of the few fundamental considerations, which, if understood and followed, mean good results; but, if not understood or ignored lead to big losses which are entirely unnecessary.

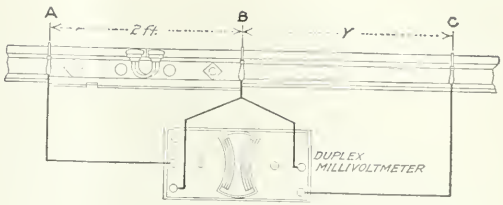


FIG. 23. DIAGRAM OF BOND TESTING INSTRUMENT

In many mines are telephone stations with connections to the surface, and many mines have also telephone communication with adjoining, near-by and distant mines. Such telephones should not be overlooked after a fire or an explosion. The alarm for a mine fire can probably be given by telephoning to different parts of the mine, and even after an explosion the telephone system may not be destroyed in all parts of the mine; hence effort should be made to call up the inside stations and to ascertain whether any men are alive and able to respond to call. The telephone should be used promptly for summoning assistance from the nearest mines as well as for informing the state mine inspector and any near rescue station or trained rescue men that can be reached by it.

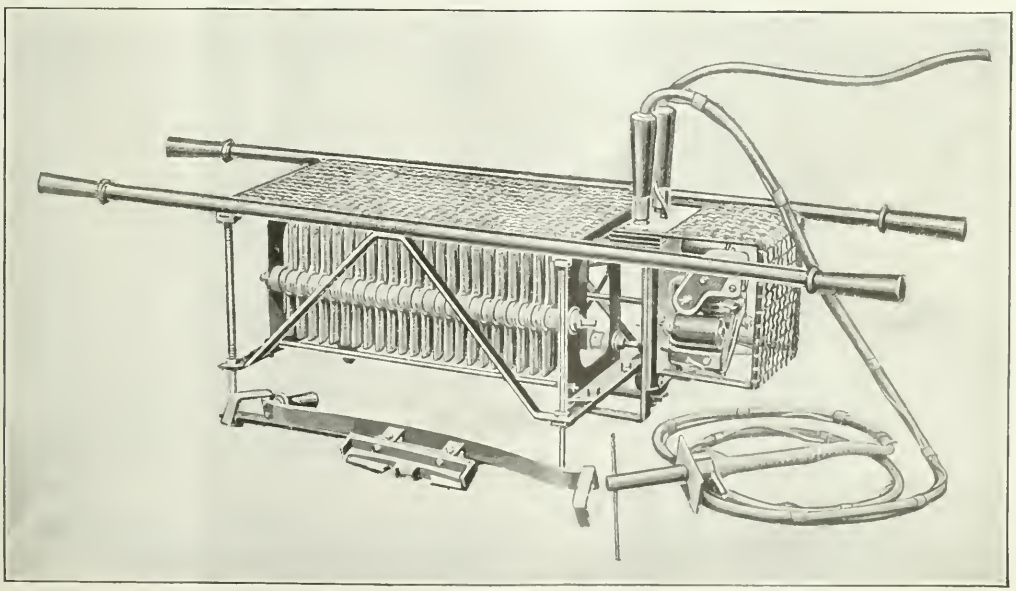


FIG. 22. PORTABLE RESISTANCE FOR USE IN MINE RAIL BONDING

Tests and Comparisons of Various Types of Permissible Explosives*

By Joseph C. Thompson
Director of Mines and Minerals, State of Illinois

SYNOPSIS — *Considerable attention has been given to explosives during recent years by the Bureau of Mines. The principal field work in this connection has been carried on at the Pittsburgh station, especially the new explosives experiment branch near Bruceton, Penn. The following article notes the tests used by the Bureau of Mines to establish permissible explosives. A comparison is made of black powder and some permissible explosives; the different classes of permissibles are noted and discussed.*

IF AN explosive passes the three following tests, established by the Bureau of Mines for trial in its explosion gallery, then the explosive may be placed on the permissible list: 1. Ten shots each with the charge of a specified deflective power, in its original wrapper, shall be fired (each tamped with 1 lb. of clay stemming at a gallery temperature of 77 deg. F.) into a mixture of gas and air containing 8 per cent. of gas (methane and ethane) in the explosion gallery. An explosive is considered to have passed the test if no one of the ten shots explodes this mixture.

2. Ten shots each with the charge of a specified deflective power, in its original wrapper, shall be fired (each tamped with 1 lb. of clay stemming at a gallery temperature of 77 deg. F.) into 40 lb. of bituminous coal dust, 20 lb. of which is to be placed uniformly on a wooden bench placed in front of the cannon and 20 lb. placed on side shelves in the sections of the explosion gallery. An explosive is considered to have passed the test if no one of the ten shots ignites this mixture.

3. Five shots to be fired (each with 1½ lb. of the explosive without stemming at a gallery temperature of 77 deg. F.) into a mixture of gas and air containing 4 per cent. of gas and 20 lb. of bituminous coal dust, 18 lb. of which is to be placed on shelves on the sides of the first 20 ft. of the explosion gallery and 2 lb. so placed that it will be stirred by an air current in such a manner that all or part of it will be suspended in the first division of the gallery. An explosive is considered to have passed the test if no one of the five shots ignites this mixture.

An explosive is a substance, the decomposition of which results in the sudden expansion of its components into a volume of heated gases many times exceeding its original bulk. The strength of an explosive depends upon the volume of gases liberated, the rate at which decomposition proceeds, and the temperature of ignition. The gases liberated by the ignition of gunpowder, for instance, amount to about 2000 times the original volume of the powder used, and the force exerted by ordinary blasting powder has been ascertained to be about 22,000 ft.-lb. per square inch.

Black powder has been largely used in mining operations for the following reasons: It is cheap, and it is comparatively slow in action and therefore suitable for coal and soft rock and less dangerous than some of the nitro compounds. On the other hand, it is quite dangerous in the presence of firedamp and coal dust; its use is now being objected to by many experienced mining men for the reason that, if exploded in large quantities, it is dangerous to health, life and property. This is owing to the large percentage of carbon monoxide it gives off; no explosive which gives rise to this gas ought to be used for extensive blasting in mines because of this risk. Furthermore, because of the fact that it has been proved that even small traces of carbon monoxide render mixtures of coal dust and air highly explosive. This is a point frequently overlooked in experiments with explosives. For instance, on firing 1¼ lb. of black powder, over 3 cu ft. of combustible gas (consisting chiefly of carbon monoxide) would be produced, and this when mixed with pure air (apart from any consideration of coal dust) would give over 10 cu.ft. of an explosive, or at least a rapidly burning mixture.

Chemical Changes When Using Black Powder

It would perhaps be well at this point to note the chemical change that takes place and also the gases produced when exploding ordinary black powder. Then we can make a comparison with the chemical change attending the explosion of some of the permissible explosives. In that way we may have a standard of comparison that will enable the intelligent observer to note the advantages or disadvantages of various explosives.

The approximate percentage composition of ordinary black powder is nitrate of potassium 75, carbon 15 and sulphur 10; when it is exploded 56 per cent. of solid and 44 per cent. of gaseous matter are formed. Ordinary black powder explodes at 600 deg. F. and by the explosion the following gases are produced:

	Percentage by Volume
Car dioxide	32 15
Carbon monoxide	33 75
Nitrogen	19 03
Sulphuretted hydrogen	7 10
Marsh gas	2 73
Hydrogen	5 24
Total	100 00

From this it will be seen that black powder gives off a large percentage of carbon monoxide which, as already stated, is extremely objectionable. The sulphuretted hydrogen also is highly dangerous and therefore objectionable.

A sample of mine air was taken 12 minutes after a blast of 22 lb. of a permissible explosive of the nitrocompound class. An analysis showed that the following gases were produced:

	Percentage by Volume
Carbon dioxide	0 08
Oxygen	20 80
Carbon monoxide	
Nitrogen	79 12
Sulphuretted hydrogen	
Hydrogen	
Marsh gas	
Total	100 00

*Paper read at a meeting of the Illinois Mining Institute.

The difference in the air after an explosion of black powder and then after a permissible explosive, as shown by analysis, is quite striking. It was a consideration of these highly dangerous properties of explosives more than anything else, perhaps, that induced mining men and chemists to begin to look for something else that might be used in preference to powder.

Most of the permissible explosives produced may be said to belong to one or other of the following classes: (1) Chlorate mixtures, or explosives containing chlorate of potash; (2) nitrate mixtures other than gunpowder; (3) nitro compounds containing nitroglycerine; (4) nitro compounds not containing nitroglycerine.

The term chlorate mixture means any explosive containing a chlorate. This has been divided into two divisions—one consisting of those chlorate preparations which contain nitroglycerine or other liquid explosives and the other those containing chlorate of potash.

Explosives of the second class have not been a success on account of the fact that chlorate of potash develops considerable heat on decomposition; the result being that not only is an explosive containing chlorate more sensitive as a rule to percussion and friction than a compound in which the oxygen carrier is a nitrate, but it is also more violent in its action. It may be said, however, that mere sensitiveness is no great defect since there are many methods by which this may be overcome; if this were the only failing possessed by these explosives, it is more than probable that a large number would have been on the permissible list. Unfortunately, however, especially after exposure to wide differences of temperature in the presence of moisture, the chlorate is liable to crystallize on the surface of the explosive, a condition which gives rise to a considerable increase of sensitiveness to which there is practically no limit.

A moment's reflection makes it clear that it is safer to deal with a highly sensitive explosive of which the degree of sensitiveness is known than with another which (although originally vastly less sensitive) may in the course of time develop dangers, the full measure of which we are quite ignorant.

Some Explosives Unsuitable for Mine Use

In the second class of explosives (or nitrate mixtures) nitrate of sodium is substituted for potassium nitrate, such mixtures being cheaper; but they are so absorbent or deliquescent—that is, they take up moisture from the atmosphere so readily—that it renders them unsuitable for mining purposes.

In considering the third class, or nitro compounds containing nitroglycerine, we find they have special risks. Although many manufacturers will guarantee these compounds to be non-hydroscopic, yet such explosives contain notroglycerine in which the liquid is held merely by the absorbent qualities of the other constituents; they possess the quite serious defect, that in contact with the moisture of the atmosphere the nitroglycerine exudes owing to its easy displacement by water. This exudation is at all times undesirable and extremely dangerous as it may be precipitated in what is practically a pure state to one point and it is extremely sensitive to shock.

Again, all explosives containing even a small percentage of nitroglycerine possess the common defect that they freeze at a relatively high temperature (at about 45 deg. F.) and when once frozen do not completely thaw until the temperature rises above 50 deg. F. It is quite easy to find these explosives in sheltered magazines frozen at times when the temperature outside is fairly warm. The effect of this is twofold: First, when in this condition, they are more liable to be exploded by rough treatment; secondly, they are less easy to explode by means of a detonator with the result that there is more likelihood of unexploded cartridges being left at the back of the hole or among the coal thrown down from a shot. Moreover, they are, unfortunately, even more sensitive to friction when in a half-frozen state; the reason being, no doubt, that small portions of the semi-liquid nitroglycerine on the softened outside layers of a cartridge are liable to be crushed between two crystalline surfaces of the still frozen core or to be unduly heated by the breaking of the crystals.

Risks with Certain Kinds of Explosives

To illustrate the risks of the third class of explosives compared with black powder, heat up a single grain of a mass of gunpowder to the ignition temperature of sulphur and the whole will explode; but until that temperature is reached, there is practically no danger, except that as the temperature rises so much the less additional heat is required to cause ignition; and the powder, therefore, becomes more sensitive to shock. But in the case of a nitro compound it is by no means necessary that the temperature should reach the ignition point for an explosion to take place. Even when thoroughly well made an explosive of this class cannot be exposed for any length of time to an elevated temperature, even though far below its ignition point, without decomposition setting in. This chemical action develops more heat, which in its turn increases the chemical action and so on, and thus sufficient heat is provided to cause an explosion.

Lastly, we have the fourth class, or nitro compounds not containing nitroglycerine. To this class belong the ammonium nitrate explosives. The good points of this group of explosives are as follows: (1) Simplicity and safety in manufacture. (2) So far as past experience goes they seem to be considerably less dangerous to handle and store than most other explosives. (3) They do not freeze. (4) They are not as a rule easily ignited by the direct application of fire, and when ignited there is no record of any explosion having resulted unless a detonator was present. (5) If they are kept too long or the cartridges are subjected to rough handling, the affinity of the nitrate for moisture soon renders the explosive harmless. (6) They are as a class relatively safe to use in mines. One objection is that to get the best results they require a large detonator, which to a certain extent is a source of danger.

In connection with the subject of explosives, I wish to state that neither the Department of Mines and Minerals of the State of Illinois nor the inspectors have any desire or intention of lending their moral or active support to any system or principle, other than the highest degree of safety consistent with the best economic and practical results.

Carbon ignites at about 900 to 1000 deg. F. Therefore, in burning pulverized coke or anthracite in furnaces it is necessary to use special expedients to raise the temperature of the burning fuel above the ignition point. Low-volatile fuels have been burned satisfactorily by this method.

Preparation of Bituminous Coal—VII

By Ernst Prochaska
Benton, Illinois

SYNOPSIS—*The problem of power transmission is one that requires careful attention. In most cases it is advantageous to drive the machines of a washery in groups with the larger units driven individually. Buildings should preferably be of steel, although wood and reinforced concrete are often employed. The costs of coal washing vary considerably with conditions of coal, quality of machinery, layout, thoroughness of process and supervision.*

IN THE earlier washeries frequently only one main-drive unit (usually a steam engine) was employed for the whole plant, or one engine drove the washery and another the screening plant. The power had to be transmitted from one point to all the different pieces of apparatus. This resulted in complicated systems of transmission machinery distributed over the entire plant. The disadvantages of this arrangement were well known, even at that time, but as long as only steam was available as the sole source of power, a decentralization of the power supply was out of the question on account of the great weight and large size of the steam engines.

The disadvantages of such a centralized power station are as follows: The great number of shafts, pulleys, belts, sprocket wheels, chains, sheaves, ropes and clutches makes the installation expensive in first cost as well as in cost of operation. The supervision of such a plant is difficult, costly and dangerous. It requires a large crew to attend to the lubrication and upkeep of all this complicated machinery. The loss of power caused by friction and inefficient transmission machinery is enormous. The swiftly moving belts, chains, ropes and shafting are a constant source of danger to the operator. The necessary safeguards are expensive and at best only a cumbersome makeshift.

It is consequently only quite natural that the direct electric-motor drive has been quickly adopted for coal washeries. This permits the installation of small independent drives, avoiding all cumbersone, expensive and dangerous transmission machinery. The small motors can easily be placed in almost any position without heavy or expensive foundations.

For centrifugal pumps and crushers the electric motor drive is especially well adapted. Electric drives permit the different units to be operated independently one from the other. They can be stopped easily and quickly by throwing a switch, which enhances the safety of the operation. The control of all motors can be consolidated on a central switchboard, so that by using a remote-control system any unit can be started or stopped from a central point. Furthermore, cutout switches can be placed at convenient points throughout the plant, so that in case of danger it is not necessary to go to the motor or the central control board. Disastrous and costly wrecks can thereby be avoided.

The starting apparatus of the different machines forming one unit can be connected in such a way that it will be impossible to start one machine before the following one has been put in operation or, vice versa, to stop a machine before the preceding one has been shut down. This, in case of crushers, elevators and conveyors will avoid choking up any piece of apparatus and spilling coal. It is easy to make the operation of an electrically driven plant foolproof by taking the successive starting of the separate pieces of machinery out of the hands of the machine operator.

The starting apparatus should be provided with an overload circuit breaker so that in case of a jam in the machinery, wrecks or burnouts of the motors will be avoided. No-voltage releases ought to be installed also,

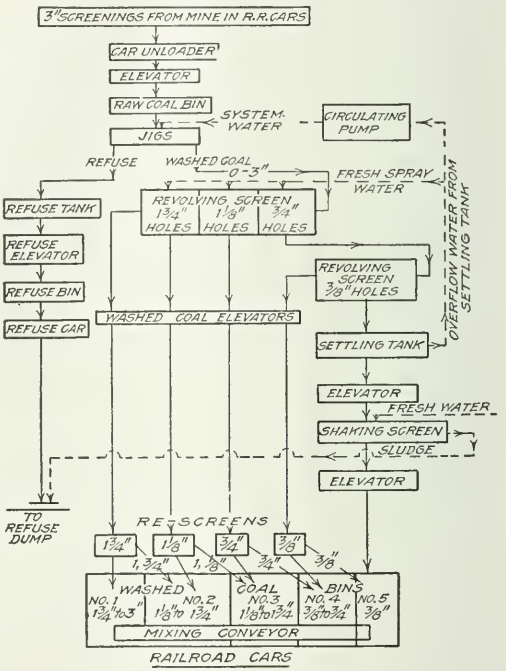


FIG. 25. FLOW SHEET FOR A FUEL COAL WASHERY TAKING SCREENINGS FROM A DISTANT MINE

so that in case of a sudden failure of the power supply the motors will not start when the power comes on again. It should be possible to lock the starting apparatus, to provide a safeguard for the men repairing the machinery.

Slow-speed motors are in most cases advisable on account of the extra expense and increased loss of power caused by speed-reducing gears. Constant-speed motors with a good starting torque should be employed, except for elevator and jig drives where a variation of speed is sometimes required. Washed coal and refuse elevator drives should be designed to permit the reducing of the elevator speed for short periods.

The only disadvantage of electric-motor drive encountered in actual operation arises from the inability to change the speed within the limits sometimes re-

quired in the operation of a washery. It is necessary to slow down the greater part of the machinery at certain intervals to permit a careful and thorough inspection. For this purpose the speed of the machinery should be reduced at least to 25 per cent. of the normal working speed. With steam engines as main-drive units the speed of the machinery can be reduced to almost any degree and the starting and stopping can be accomplished without exposing the machinery to sudden stresses and shocks.

The question remains, How far should decentralization be carried? To install a separate motor for each piece of apparatus would require an undesirable number of small motors, which would increase the cost of installation out of all proportion to the advantages gained thereby. The whole electrical equipment would become complicated and the control unwieldy.

It will be far more advisable to combine the drives for a group of machinery, making thus one drive unit, if one motor can actuate it by means of simple, conveniently arranged transmission apparatus. This is especially the case with jig drives. Therefore, we must consider in the selection of a proper drive the following: The degree of decentralization depends upon the space at disposal. This sometimes requires a fixed arrangement of the machinery, regardless of the convenient arrangement of the drives. In some cases, however, it will be possible to consider the most convenient and economic drives, regardless of other requirements. Therefore, generally speaking, no special method of driving can be pronounced as the best. Each separate case demands its particular solution and the number of motors to be installed will vary from 6 to 35. In the simplest case the motors can be arranged into groups as follows: (1) Raw-coal elevator and preliminary screening; (2) all the jigs, the washed coal and refuse elevators; (3) sizing screens; (4) washed coal conveyors to the bins; (5) circulating pump; (6) sludge-handling and water clarification.

In the most complicated case, where the decentralization has been carried to extremes, we find the following: (1) Docking table; (2) coal conveyors to crusher; (3) feeders under unloading hopper; (4) cross conveyor from unloading hopper; (5) conveyor for foreign coal to crusher; (6 and 7) crushers; (8) conveyor to raw-coal storage bin; (9) reclaiming conveyor under storage bin; (10) conveyor to screen house; (11 and 12) sizing screens; (13, 14 and 15) conveyor for sized coal to equalizing bins; (16 and 17) jigs; (18 and 19) washed-coal elevator (20) refuse elevator; (21, 22, 23 and 24) dryers; (25) washed-coal conveyor; (26 and 27) circulating pumps; (28, 29 and 30) sludge pumps; (31, 32, 33, 34 and 35) thickeners; (36) concentrating tables; (37) laboratory crusher.

The horsepower of the foregoing 37 motors varies from 7½ to 250, and two voltages are used—that is, 440 and 2300—besides the lighting circuit of 110 volts.

Buildings and Structures

Timber construction is rather antiquated and undesirable on account of the fire risk. Only in certain cases, where the acreage of the mine will not promise a long life, it will be excusable to use timber in the construction of a washery. But even then the danger of fires must be considered. Such fires, even when the washery is fully insured, entail a lengthy interruption to operation and a consequent loss of profit, or even the loss of a desirable customer.

In addition to this, timber construction, on account of the larger size of timbers necessary, narrows down the space at disposal and the great number of joists, beams and braces interferes with the passageways and

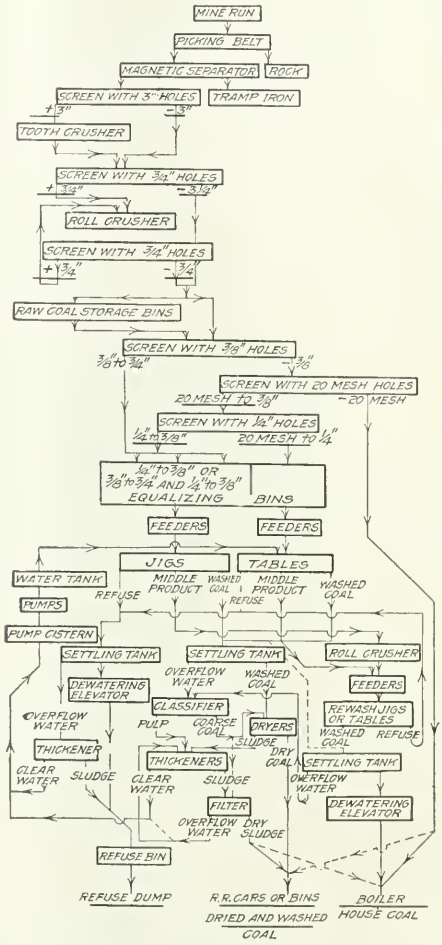


FIG. 26. FLOW SHEET FOR COKING COAL WASHERY

the convenient supervision of the plant. Reinforced concrete for the building proper is expensive and has the further disadvantage that changes and additions cannot be made except at great cost and under difficulties.

For tanks, sluiceways and bins, reinforced concrete is supreme. In connection with this it may be stated that concrete sluiceways ought always to be lined with glazed terra-cotta tile to resist abrasion. For the construction of the housing over the machinery, steel is the only feasible material. A steel structure makes a light, rigid and durable building, permitting the location of plenty of windows and ventilators. Daylight is the cheapest item we have at our disposal, and it should be used freely. Machinery supports can be arranged

easily, and floor beams, stairways and walks conveniently placed to provide accessibility to all parts without obstructing the view.

For the covering of the buildings we have a great variety of materials, so that the proper selection will depend upon the climate, the money available and the personal preference of the designer. Under ordinary conditions galvanized corrugated steel sheets are quite suitable for the sides of the buildings. If painted and kept in good repair, they will last a reasonable time; but even under the most favorable conditions the cost of upkeep is considerable, and they do not give sufficient protection in colder climates. The increased cost for heating may easily overbalance the cheapness of corrugated steel siding.

In a warm climate the sides can be arranged in sliding panels so as to give plenty of fresh air in the summertime. In colder climates, and for durability, concrete stucco work on an expanded metal base is advisable. This offers good protection against the weather and does not require painting or frequent repairs. It ought to last as long as the steel framework.

A guarantee for a certain amount of ash in the washed coal is only to be considered if at the same time a certain yield is also guaranteed. The cost of operation is an important factor. An indisputable guarantee should read: With x cents cost of operation per ton of such and such a coal handled we guarantee an output of y per cent. with z per cent. of ash in the washed product.

To check these figures it is necessary to take average samples of the different products and analyze them. Therefore, a laboratory is a necessary appendage to a washery. Daily samples ought to be taken, the ash and sulphur contents determined, also the percentage of "sink" in the washed coal and the percentage of "float" in the refuse. These results ought to be posted on the jig floor so that the jig runner can see what he is doing.

The cost of operation depends upon the character of the raw coal, just as the yield and the percentage of ash and sulphur in the washed coal depend upon it. But the cost of operation is furthermore influenced by the arrangement of the washery and the supply and appli-

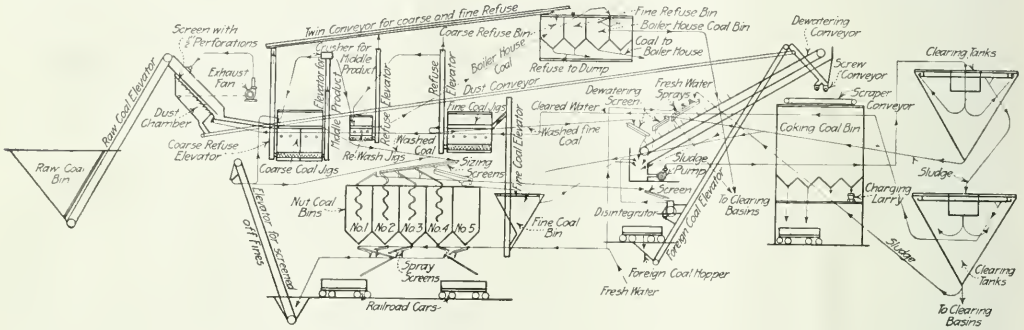


FIG. 27. A PICTORIAL FLOW SHEET FOR A WASHERY TREATING SEVERAL SIZES OF COAL

Roofs can also be covered with galvanized corrugated steel sheets, but asbestos cement in the shape of shingles or corrugated sheets is far more advisable. Floors should be made of reinforced concrete with a non-dusting top dressing and arranged in such a way that they can be easily and thoroughly washed off. Stair treads should either be filled in with concrete or made of some non-slip material. The inside of the building, especially the under side of the roofs, should be painted in, say, a light gray color.

The idea that a washery must be a dark, sloppy place has long ago been exploded. A coal washery can be made just as clean and light as any other industrial building. Plenty of light not only means convenience but also safety. Dark corners are tabooed in modern construction. The ideal design should permit the unobstructed supervision of all machinery from one point. The main requirements to be considered in the design of a washery building may be condensed as follows: The building must give sufficient protection against the inclemencies of the weather; all vibration must be taken care of; all the machinery must be in full and unobstructed view from preferably one but in any case as few points as possible; all machinery must be safely, fully and easily accessible; artificial lighting should only be required during the nighttime; no dark corners should be permitted; changes in the arrangement of the machinery must be easily accomplished.

cation of power and water. General conditions only can here be considered, as each separate case must be handled in a different way and individually. Weekly or at least monthly cost sheets on a per unit (ton of input) basis are of great value, especially as the comparatively simple operation of a washery permits an easy and correct subdivision of the cost for all separate operations. By carefully studying and comparing the figures obtained valuable information can be gained which will be a guide in making changes in the method of operation. It is therefore judicious to arrange the cost sheets according to the different units of operation, so that we get the cost of each step of the process separately.

ANALYSIS OF EXPENSE

The cost of operation must be divided into fixed charges, operating expenses and the cost of special work. It is only natural to keep the cost of installation as low as possible. This effort in economy is limited, however, by the necessity of keeping the cost of operation and that of repairs as low as possible. If one operator can be saved by a certain increase in the cost of installation, this increase will be justified if it is lower than the capitalized wages of the operator. This is because it is desirable to become as far as possible independent of the imperfection of human labor.

The regular cost of operation includes wages, cost of power, water, light and lubricants. In regard to the

cost of power and water we must consider that they depend in many cases on the more or less perfect operation and efficiency of the machinery. An increase in the cost of power and water, if it brings about a cleaner washed coal, is commendable if this increase remains below the possible better price obtained for the cleaner product.

The cost of special work includes wages and cost of material for repairs and renewals. While the above-named cost can at least partly be predetermined, that of repairs appears only in the course of time, after the washers have been in operation. To arrive at the exact cost of repairs is difficult. Depending upon the time used for repairs, the absolute expense is much higher than the cost of labor and material expended, because we must take into account the loss incurred through the interruption of operation of the washery, which may in some cases reflect even upon the operation of the mine.

The breaking down of an elevator, with the bins full and no spare parts on hand, may be given as an example. Therefore, all important machinery ought to be fully guaranteed by responsible manufacturers as a safeguard against interruption of operation. This may, however, bring about an increase in the cost of installation, influenced by the heavier and better constructed machinery.

The cost of washing coal shows just as many variations as everything else connected with a washery. The following figures, however, can be given as an approximate guide:

	Cost per Ton of Raw Coal Minimum, Cents	Maximum, Cents
Amortization and interest of capital invested	3	5
Cost of operation (wages, power, water, light, stores)	8	20
Cost of repairs	2	5
Total	13	30

To the foregoing figures, however, must be added the cost of shrinkage, which will depend upon the amount of impurities in the raw coal and the degree of cleaning —that is, upon the yield. I have operated different washers making from 10 per cent. to 33 per cent. refuse.

General Arrangement of Washeries and Graphical Illustration of the Process

The design of a coal washery is a complicated problem on account of the extremely numerous factors influencing the arrangement. This becomes still more complicated when the separate requirements become contradictory. We have in the foregoing chapters fully discussed which requirements should be considered and which should be given preference. Drawings for a washery can be made in different ways, depending upon the purpose for which they are intended.

If it is only necessary to get an idea of the methods used and the succession of the operations, plain flow sheets will suffice. Flow sheets are of great help for preliminary estimates. They are indispensable when the operations become complicated, in order to comprehend quickly the correlation of the different processes. In Figs. 25 and 26 two flow sheets are shown. One for a fuel-coal washery taking 3-in. screenings from a distant mine and the other for a coking-coal washery directly connected with the mine. The flow sheet for the fuel-coal washery illustrates the operation of the washery shown in Fig. 29.

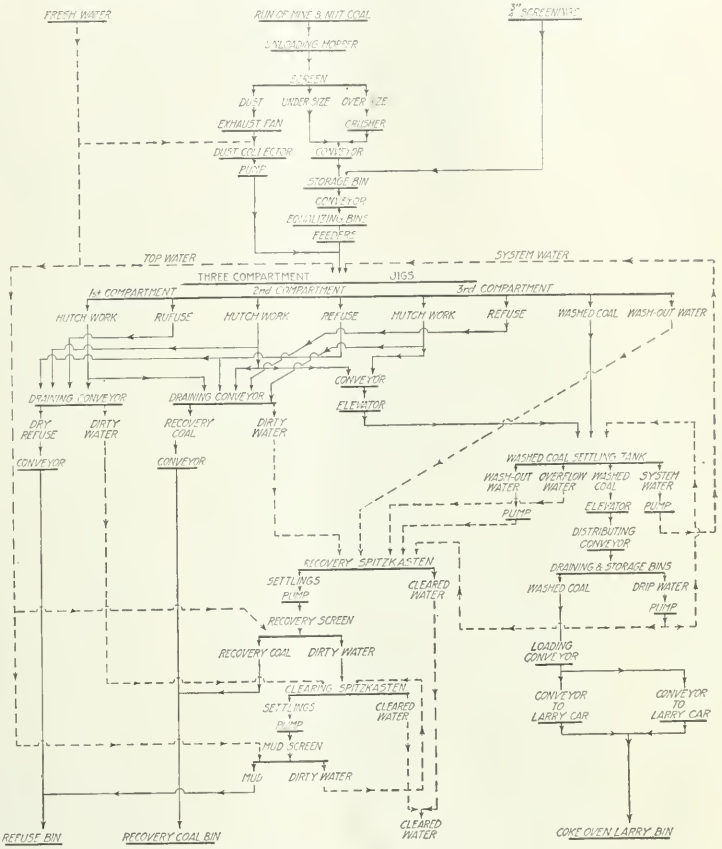


FIG. 28. FLOW SHEET FOR A COKING COAL WASHERY

In Fig. 27 a different kind and more elaborate type of flow sheet is shown for a washery making five sizes of fuel coal and a coking coal at the same time. In this flow sheet the different pieces of machinery are shown in outline and the separate units are shown in nearly the same juxtaposition as they are placed in the washery.

In studying this flow sheet we find: That the dry screened-off dust can be mixed directly with the washed fine coal. The middle products from the coarse coal jigs can be carried, according to their composition.

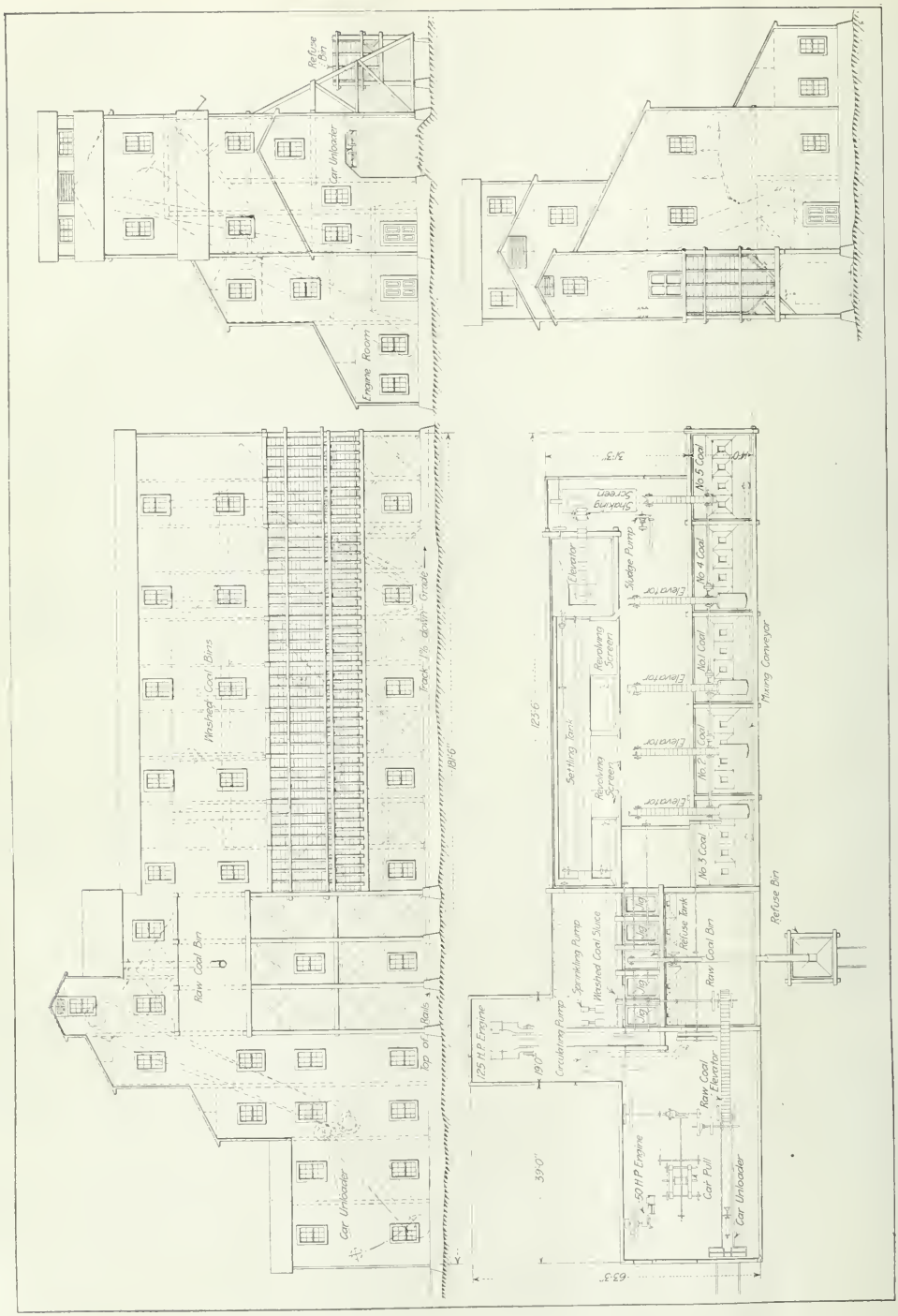


FIG. 29. SHOWING THE GENERAL PLAN AND ELEVATION OF A COAL WASHERY

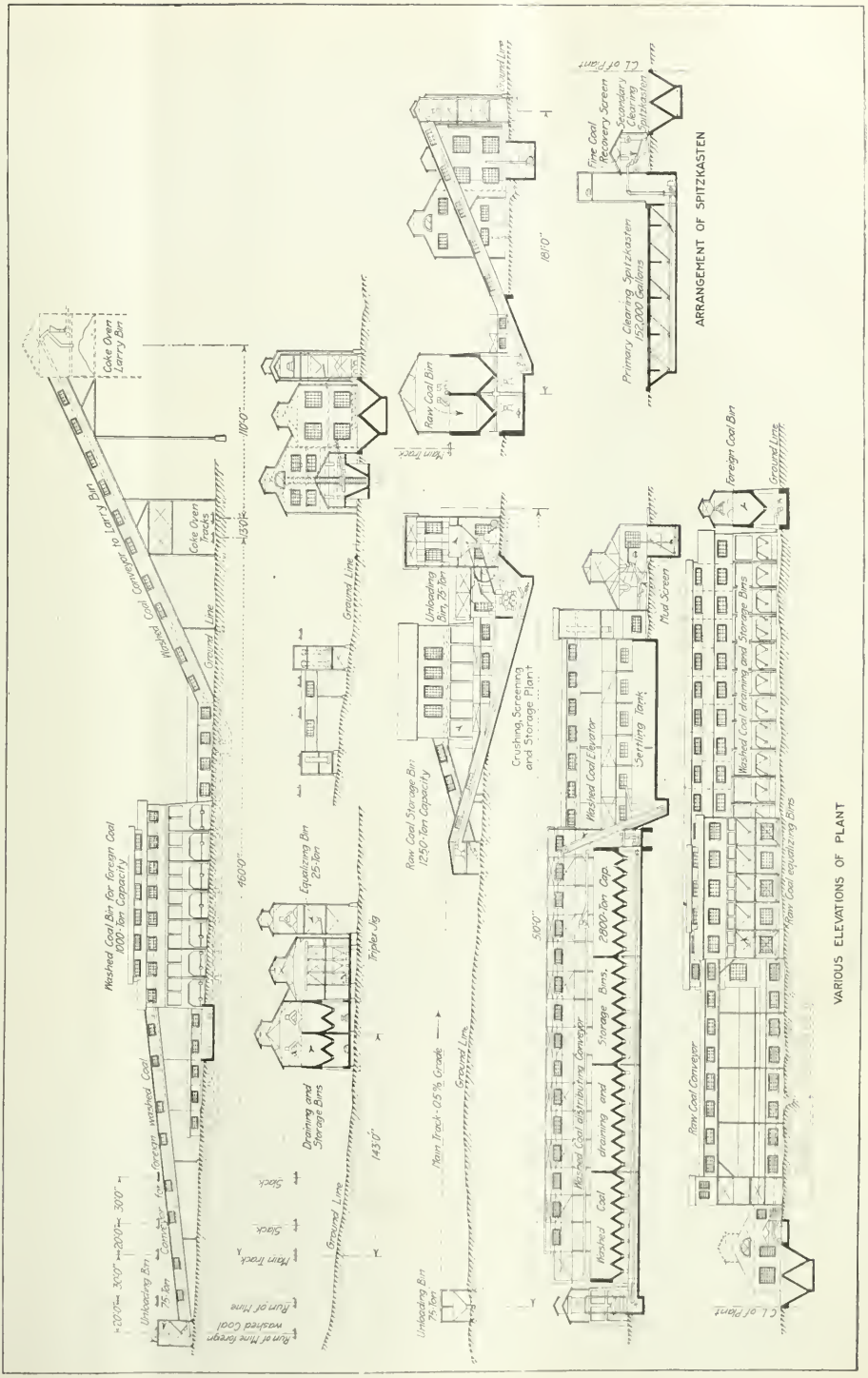


FIG. 30. DETAILED VIEWS OF THE VARIOUS ELEVATIONS OF AN ELABORATE COAL WASHERY

either back to the coarse coal jigs or to the rewash jigs. In the latter case only boiler-house coal can be made. If the amount of fine coal, screened out, is not sufficient for the supply of the coke ovens, some of the nut coal can be crushed and delivered in connection with some foreign fine coal to the coking coal bins.

In the sludge cistern the following materials are collected: (a) The drained-off water from the fine coal; (b) the sludge from the clearing tanks after being filtered through the screens; (c) the overflow water from the fine coal bin; (d) the water drained off from the crushed nut coal; (e) the overflow water from the boiler house coal storage bin.

from the screen is crushed and the crushed and screened coal is put into a storage bin, which also receives the screenings from other mines. From the storage bin the coal is conveyed to the equalizing bin, located in the rear of the jigs. From here feeders carry the coal to the jigs. At the feeders the dust collected at the screen house is mixed in with the coal. The jigs are three-compartment machines, making three products, which, depending on their composition, can be treated in different ways.

From the washed-coal settling tank the coal is conveyed to a series of draining bins to be dewatered, and from these bins it is conveyed to the coke-oven larry

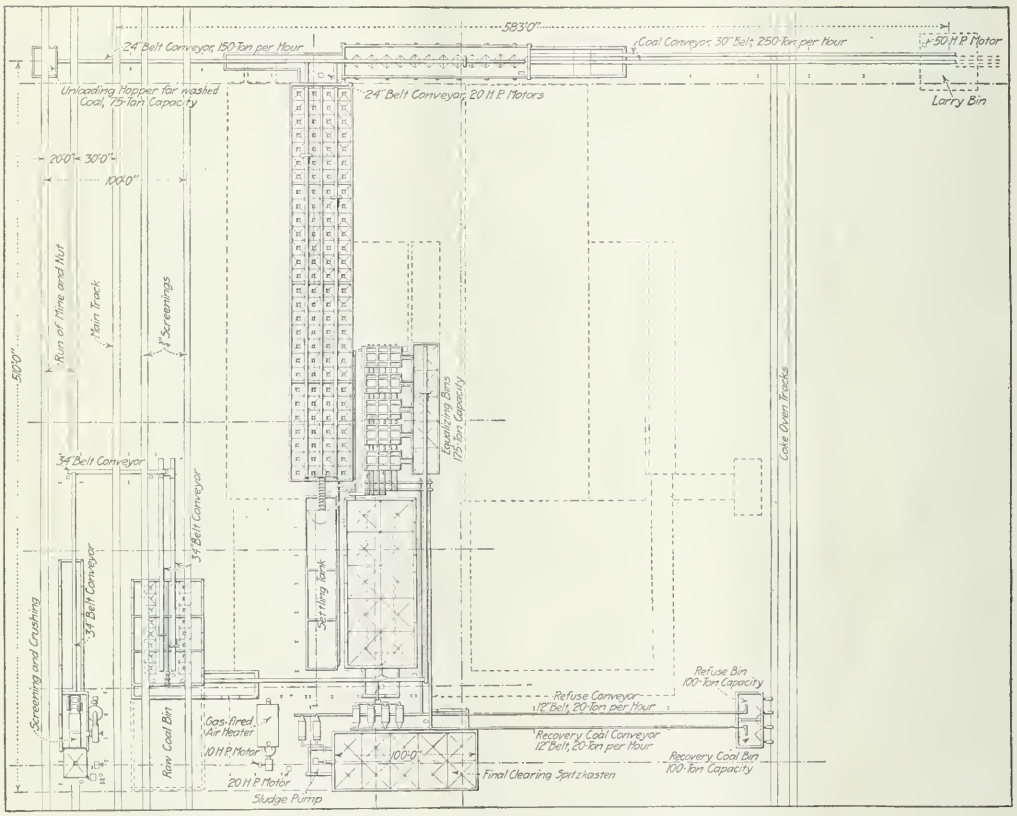

24" Belt Conveyor, 150 Ton per Hour
Coal Conveyor, 30" Belt, 250 Ton per Hour
50 H.P. Motor
Unloading Hopper for washed Coal, 75 Ton Capacity
24" Belt Conveyor, 20 H.P. Motors
Larry Bin
Run of Mine and Nut
Main Track
Screenings
Equalizing Bins 175 Ton Capacity
Coke Oven Tracks
34" Belt Conveyor
Settling Tank
Screening and Crushing
Refuse Bin 100 Ton Capacity
Refuse Conveyor 12" Belt, 20 Ton per Hour
Gas-fired Air Heater
10 H.P. Motor
Raw Coal Bin
Recovery Coal Conveyor 12" Belt, 20 Ton per Hour
Recovery Coal Bin 100 Ton Capacity
Final Clearing Spitzkasten
20 H.P. Motor
Sludge Pump

FIG. 31. PLAN OF A WASHERY WITH FLOW SHEET FIG. 28

The screw conveyors over the coking coal bins are used to mix the fine coal, the dry dust and the crushed nut coal with the foreign fine coal. The first clearing tank produces sludge, which can be used, but the second tank only during continuous operation, as after a shutdown the fireclay settles out on the bottom and must be removed to the clearing basins.

The flow sheet, Fig. 28, shows the progress of operation for a coking-coal washery arranged according to Figs. 29, 30 and 31. This washery is arranged to take coal from several mines. Run-of-mine is received in railroad cars and dumped in a track hopper. From this hopper the coal is passed over a screen. The oversize bins and thence to the coke ovens. The refuse is deposited in a refuse bin and carried away in railroad cars to a dump. The recovery coal, after passing over a draining or dewatering conveyor, is stored in a bin.

The dirty water from the recovery-coal draining conveyer, the overflow water from the washed-coal settling tank, the wash-out water from the jig tanks and the washed-coal settling tank, and the drip water from the draining bins is collected in a recovery *spitzkasten*. The settlings from this *spitzkasten* are further treated on a recovery screen and the resulting recovery coal mixed in with that coming from the jigs. The cleared water is collected in a cistern for reuse. The drip water from

the draining bins can also be conveyed back to the washed-coal settling tank.

The dirty water from the refuse draining conveyor and the recovery screen is treated in a clearing *spitzkasten*. The settlings pass over a mud screen. The resulting mud is mixed with the outgoing refuse and the dirty water from the screens carried back to the clearing *spitzkasten*. The cleared water from the *spitzkasten* flows to the clear-water cistern. The circulating pump takes the water from the washed-coal settling tank and puts it back under the jigs. Fresh water is supplied to the dust collector, the jigs, the recovery and the mud screens.

Care of Scales and Correct Weights

Proper Care of Scales Is the Chief Consideration in Securing Correct Weight—Importance of Keeping Platform Interstices Free of Coal

By E. C. Dodge
Denver, Colo.

THE first requisite for the correct operation of a track scale is cleanliness. Platforms should be kept clean and free from bind in all interstices next to the coping. A great help in this respect is to have all the interstices covered with 6-in. iron, or with belting fastened to the coping in such manner as to enable one to raise the covering on the scale side when this becomes necessary. These coverings, if properly placed, make it possible to sweep the scale platform without the dirt falling into the pit at the side.

As nearly as possible, rails should be kept 1 in. apart at each end; they should never touch. On a scale with an inclined deck, it is quite a problem to keep the rails in position. Many devices have been invented to accomplish this, but the best one, in my experience, has been the use, on each side of the rails, of straps about 4 or 5 ft. long, bolted to the rail at one end and provided with several holes in which lag screws long encugh to rench into the bearing timber are used. Lags ⅜ x 6 in. are the best size.

The approach rails at the upper end of the scale should not be higher than those on the scale platform. The absence of this condition is probably the cause of more trouble with scales than any single irregularity to which a scale is subject.

If the approach rails are too high, they cause the car to drop onto the scale; and while this not only stresses the pivots in the bearings immediately below, the jar is transmitted through the entire length of the scale and disturbs the whole adjustment.

The rails on the scale should be at least ¼ in. higher than the approach rails, for when the wheels strike the scale rails these rails naturally settle from ⅛ to ¼ in., regardless of how rigid the construction may be.

The height of the rails at the lower end of the scale, while not so important as at the upper end, should be kept as nearly that of the adjacent track rails as possible.

The pit of a track scale should be kept clean of coal, snow and water. Moisture is highly detrimental to the keen edges of pivots at points of contacts, since it soon causes these pivots to rust and they thus lose their sensitiveness. Rust and any accumulation of dirt in and around the articulated points of bearings should be removed at least once a month. To do this properly it is necessary to employ a jack screw in order to raise the levers so that the bearings are free to move. The dirt can then be cleared away by means of a pointed hook; also, a small hand bellows may often be used to advantage. The presence of rust in the bearings is often the main cause of irregularities in weights, as a knife-edge pivot is subject to change of position on a concave surface; and if impeded in its movement by an accumulation of rust, this will relatively change the fulcrum of the lever sufficiently to cause a variation in indicated weight.

Because of its delicate construction, the beam of the scale needs careful attention. The sliding poise on a tipple beam should not be bumped or thrown back to zero, so as to strike against the block at this point, as it only takes a few blows against the bumper to make a dent in the soft brass poise, allowing it to remain back of zero when balancing the scale and changing all weights in a like proportion.

The scale beam should (and can) be kept clean by rubbing it every day with soft tissue paper so as not to scratch the brass. The notches on a track scale beam should be kept free from dust and dirt with the aid of a small brush. The rollers on the poise should be oiled once a month, as this will preserve the easy manipulation of this weight.

Much more care must be exercised in weighing on a beam connected with knee lever extensions, as the extra vibration in the rods will not allow the beam to act as quickly as will a direct connection to the scale.

The fact that a beam will balance properly is not always indicative of the accuracy of the scale. All articulations must be in proper position, and loops and bearings plumb and level.

The load weighed must not be equal to, or greater than, the capacity of the scale; if it is, it will have a tendency to shorten the life of the scale by straining the levers and stretching the loops and connections, which are guaranteed to resist only a certain weight.

Legal Department

Scope of Timber Rights—A coal-mining lease conferring the "right to use the timber standing on said land" will be construed to grant the lessee the right to use timber only for mining purposes, unless broader powers are conferred on him in unmistakable terms. (West Virginia Supreme Court of Appeals, Paxton Lumber Co. vs. Panther Coal Co., 98 Southeastern Reporter, 563.)

Injuries to Minor Miners in Alabama—Under the laws of Alabama an owner or operator of a coal mine is liable for injuries to a child under sixteen years of age while employed in connection with a mine, coal breaker or coke oven. But where a mine is operated by one other than the owner, the latter is not liable for such injuries where he has not retained control over operations to such an extent that he could have prevented employment of the child. (Alabama Court of Appeals, Sparks vs. Brilliant Coal Co., 81 Southern Reporter, 185.)

Wrongful Mining of Coal—One who innocently mines coal under the land of another is liable only for the fair value of the coal in place, and not for its value at the tipple less the expense of mining and conveying it there. To justify assessment of treble damages under the Pennsylvania statutes as for wrongful removal, it must appear that the trespass was conscious. Individual owners who had no knowledge that a trespass was being committed cannot be held liable for treble damages because their coal in place. (Pennsylvania Supreme Court, Matthews vs. Rush, 105 Atlantic Reporter, 817.)

Résumé of Theories of the Origin of Coal

By C. W. Hippard
Urbana, Illinois

SYNOPSIS—*Many theories have been advanced concerning the origin of coal, some people especially holding that the various beds now rest where the vegetable matter from which they were formed originally grew. Others believe that the coal beds are the result of drift. It is quite probable that all coals were not formed in the same manner or by identical processes.*

IN THE early days it was believed that coal had an inorganic origin. According to this theory mineral bitumen, petroleums and asphalts were erupted from deep-seated sources and flowed over the surface of the ground or upon the floors of lakes and estuaries. Later these layers were covered with sediment. The presence of plant impressions was explained by the hypothesis that as the bitumen was deposited it incrusted these fragments that were present at the time of the flow.

The ash in the coal was accounted for by the mineral matter that would be picked up by the bitumen as it came through sandstones or as it rolled over the surface of the ground. This is possible, for we have a similar condition at the asphalt deposits of Trinidad.

The arguments against this idea are overwhelming. No dykes or pipes of bitumen penetrating the rocks associated with the coal beds have been found. Coal is quite unlike bitumen in both its chemical and physical properties. Also, if plant remains were preserved in bitumen, we would expect to find bitumen which had penetrated into the cells and interstices which have been preserved. This, however, is not the case.

Combination Vegetable-Volcanic Theory

Daddow and Bannon, in their "Coal, Iron and Oil," published in 1866, give a very interesting account of the vegetable-volcanic theory. They believed that the vegetation of the carboniferous age was of "the most vast and magnificent description, in comparison with which the most luxuriant of the present day would be as a 'drop in the bucket.' This was brought about by a soft and fertile soil, made rich with the decaying matter of ancient marine life and the resulting bitumen of the carburetted hydrogen gases, the atmosphere, warm and moist with heat and steam, and loaded with life-giving carbon dioxide so necessary to vegetable life."

Their greatest proof lies in the fact that they give nature the credit of being "a rapid worker and a wonderful chemist, instead of being slothful, mutable, complex, and time-serving." Other proof advanced is that the carboniferous rocks contain no fossils of animals or birds because the atmosphere would not sustain life. Tyndall made the statement that an atmosphere high in CO_2 would readily pass solar heat rays, but would not allow heat to radiate.

Early writers say that this luxuriant vegetation did not appear to form coal in a direct manner, but that the carbon it contained was distilled or expelled by pressure and heat, probably from volcanic origin, in the shape of oil, which must have been a carburetted hydrogen; and this would form coal.

This idea has at the present time been so thoroughly discarded that it is unnecessary to go into discussion of it. It might be well, however, to give a few of the points used to disprove the luxuriant vegetation idea. At the present time we have peat bogs in the course of formation, so it is not necessary to the vegetable origin of coal to assume that only in tropical climates could so much vegetation flourish. It can hardly be imagined that similar conditions of climate prevailed over vast areas, ranging from Greenland to India, occupied by carboniferous strata. In some cases thick coal beds are found scattered in different parts vertically of the earth's crust, and it is difficult to maintain that for coal formation a tropical climate was necessary.

Coal Is of Vegetable Origin

At present the theory that coal is of vegetable origin is almost universally accepted. This view is based on the fact that there is an intimate gradation existing between vegetable accumulation now in the process of formation and coal. Uusually by a series of slow changes the vegetable remains are transformed to coal, although it is possible that this action may be quickened by extreme heat and pressure. The following names are given to the products of successive stages of the process: peat, lignite, sub-bituminous, bituminous, semi-bituminous, semi-anthracite and anthracite. It is to be noted that these divisions are not sharp, but each grades into the one following.

The characteristics of each grade are as follows:

Peat.—This material, which represents the first stage in coal formation, is formed by the growth of plant life in moist places. A vertical section in a present-day peat bog would show on the top a layer of living plants, and below this a layer of dead plant remains which grades into a layer of dense, brownish black peat more or less jelly-like in character. Here the vegetable structure is often indistinct, and the carbon content is much higher than in the top layer of living plants.

Lignite, also called brown coal, represents the second stage in the coal formation. It is usually woody in texture, brown in color, and has a brown streak. The heating value is rather low, and the substance burns with a long smoky flame.

Sub-bituminous coal, or black lignite, represents an intermediate stage between lignite and bituminous coal. It is usually glossy black, rather free from joints, and has a heat value of from 7500 to 10500 B.t.u.

Bituminous coal represents the fourth stage in the series. It is more dense than the lignites, has a deep black color and is comparatively brittle. Sometimes it shows traces of vegetable remains, and under the microscope traces of woody fiber are seen. Cannel coal is a compact variety of non-coking bituminous coal. It contains a high percentage of volatile hydrocarbons, and because of this ignites readily.

Semi-bituminous and semi-anthracite are terms applied to those coals the volatile matter of which has been reduced to from 12 to 22 per cent. and to less than 10 per cent. respectively.

Anthracite represents the last stage in the production of coal. It is higher in fixed carbon and lower in volatile hydrocarbons than the preceding types.

While it is true that the foregoing classification may not be as complete as some think it should be, it is believed that for the purpose of tracing the formation of coal through successive stages it is sufficient.

Accumulation of Vegetable Matter

As previously stated, most geologists and others agree that coal was formed from vegetable matter; but they differ on the way in which the formation was brought about. These differences with respect to the accumulation gave rise to two prominent theories, the *in situ* and the drift theory.

By the *in situ*, growth-in-place, or antochthonous theory, is meant that the coal was formed at that place where the plant life grew. The following points have been advanced in support of this idea:

1. Upright carbonized tree trunks found in the coal seams of some localities, the roots of which extend into the lower clay, are believed by some to favor this theory.

2. Present day peat bogs and swamps, for example the Dismal Swamp of Virginia and North Carolina.

3. Perfect preservation of many plant remains, a condition unlikely to exist if plants were transported.

4. The purity of many coal beds that extend over large areas; for if the vegetable matter was transported it would have been mixed with earthy sediments, and the interstices of large trees partially decayed would have been filled with pebbles, sand, etc.

5. Uniform thickness of beds of coal over vast areas.

6. Clay bed under coal is often found with roots in position of growth.

7. The layer of rock overlying the coal bed often contains abundant remains of vegetable matter. This tends to prove that sediment was deposited first amongst, then on top of the vegetation.

8. The vegetable matter of coal beds is made up of trunks, small stems, leaves and fruit intermingled in such a manner as to make it seem as though the vegetation grew in place.

By the drift, transportation or allochthonous theory, is meant that the remains of plant lift were transported by water to a place where it accumulated in the form of a drift. The arguments advanced in favor of this idea are as follows:

1. Distinct line between coal as found and the underlying bed, which is often clay.

2. Plant life remains usually found lying horizontal.

3. Present day river drifts and delta accumulations.

4. Some known deposits of coal occur as thin wedges or lenses.

5. Fayol clearly established the validity of this theory in deposition of coal in deltas in some of the fresh-water basins, like that of Commentary in Central France.

6. Macerated and ground-up plant material are not rare in carboniferous rocks, and current bedded shales have been noted.

7. The splitting of coal seams by shale or other material is said to favor this theory.

(a.) It is believed by the adherents of the *in situ* theory that the fireclay beneath the coal bed was originally the soil on which the vegetal matter grew. Opponents of this theory have pointed out that all coal beds do not rest on fireclay. This clay seam, with the inclosing stigmariæ may be in the coal, above it, entirely out of contact with the coal, or missing altogether. The thickest coal beds often rest upon the thinnest clays, and meager coal beds may lie on thick beds. There is usually a sharp dividing line between the clay and the coal, for the clay does not grade into coal.

The *in situ* school say that the amount of clay has no relation to the thickness of the coal bed, for other conditions influenced this, and it has been pointed out that a soil is not absolutely necessary for the growth of some plant life in peat bogs, for at the present day some bogs are resting on a sand base without a layer of soil.

(b.) Upright carbonized tree trunks have been found, although they are exceedingly rare. The *in situ* school regard this as good evidence in their favor; but it is, however, a much disputed point whether this is always a safe conclusion or not. It is quite possible that the stumps observed may be *in situ*, but it must be remembered that a drifted trunk will often remain upright, for its center of gravity is sometimes so low that it is situated at the thickened base of the trunk.

Then, too, even though it is granted that the very few upright tree trunks that have been found grew in place, there is no valid reason why the remaining material could not have drifted to a place where a few trees grew. The exceedingly rare occurrence (where they ought to be common) of coal made of forest trees with their roots the stigmariæ is advanced to prove that the trees did not grow there, and it strengthens the argument against the *in situ* formation at all events from trees.

(c.) The lamination of coal beds in horizontal layers is thought by some not to afford any proof of growth *in situ*. For they argue that if trees grew there they should interfere with this horizontal banding. However, certain peat mosses in Scotland show successive layers of material due to a change in the dominant form of plant life.

(d.) The presence of occasional boulders and pebbles of quartzite and quartz in some of the underclays in Leicester and South Derbyshire, and the occasional quartzite boulders found in coal beds tend to support the drift theory.

Fresh-Water and Marine Conditions

Geologists are further divided on the question of whether this deposition took place in fresh-water areas or under marine conditions. A few of the ideas advanced on each side are (No. 1, fresh water; Nos. 2, 3 and 4, marine):

1. Coal-forming plants of fresh-water character.

2. Strata of rocks known to be formed by marine deposition as shown by fossils are often between the coal beds and overlie the coal.

3. Brackish water molluscs are found in some rocks of the coal basins.

4. The coal strata show a marked parallelism and a frequency of salt-water invasion.

Some geologists admit of both of the preceding ideas and classify the coal as formed into two classes: limnetic, accumulated in fresh water; and paralic, accumulated in salt water.

Dowling advances a theory to explain the actions which take place in the formation of coal from peat which is worthy of consideration. When the plants die they lose the power to form oxidized hydrocarbons, therefore chemical action sets in with the formation of other compounds of oxygen and carbon. The escape of some hydrocarbons leaves the material in a rather unstable condition and loss of marsh gas follows. If fermentation accompanies decay, new hydrocarbon compounds are formed and the reduction of oxygen is accomplished without great loss of hydrogen. When the mass is solidified by superposed load, as it is when the whole sinks below the water and layers of rocks are formed from deposition of sediment, the fermentation is arrested and pressure with resultant heat causes the subsequent alteration. Pressure favors the combination of oxygen with carbon or hydrogen. Heat causes the combination of carbon with oxygen and hydrogen. Pressure effects the alteration without loss of carbon, while heat wastes it.

Theories to Account for Difference in Coals

Some of the theories urged by chemists, geologists and paleontologists to account for the difference in coals are:

1. Difference in the kinds of vegetation from which coal is formed. There are many plants from which coal has been formed—trees, ferns, grasses, sedges, mosses, etc. Sometimes one type predominates and sometimes there is no predominating variety. At the present time the mosses predominate in Europe, aquatic plants, especially lilies, in America, and wild rice in Asia. Lignites and bituminous coals are said by some to be derived predominantly from the tissues of vascular plants; that is, plants containing vessels as part of their structure. Bogshead coal, a pure algal coal, was formed largely of gelatinous seaweeds. Paleozoic cannel and splint coals are characterized by great numbers of spores and pollen grains, and very little woody matter. Cannel coal is high in nitrogen, and Newberry pointed out that fish remains are abundant; from which he argues that the beds of cannel coal formed under water and that vegetable matter formed a carbonaceous paste in which the fish remains became embedded and which consolidated to form cannel coal. It has been noted in some of the Scotch peat deposits that the successive layers of peat are made up of the remains of plant life of widely different types, and one of the most striking features is the alternation of forest beds, which are now imperfect lignites, with beds of peat proper. This may account for the several bands of different kinds of coal which make up some of the Illinois coal beds and in other places where this feature is prominent.

2. Climatic differences in the various periods or regions. Naturally, if the type of plant life influenced the resultant coal, it is easily seen how the climatic differences have a part in influencing the type and rate of growth of the plants.

3. The relative length of time since deposition. As the actions involved require the element of time, this may have had something to do with the kinds of coal. Time alone in geology does not mean much, but it must be remembered that the evolution of gases due to heat and pressure require time; also it requires time for the deposition of thick beds of overlying strata.

4. Differences in the kinds, in the limits of activity, and in the products of bacterial action in past ages. Renault believed that the conversion of the dead plants to the compact brown pulp was brought about by bacterial action. Recent authorities believe, however, that the action of micro-organisms is doubtful. They abound in stagnant waters of swamps, and certainly have much to do with the earlier stages of vegetable decay. They start the process, but at the same time they generate antiseptic compounds which limit their activity. Peat, not far below the surface, is distinctly antiseptic and inimical to microbian life. Nevertheless a number of authorities have argued strongly in favor of these organisms as principal agents in the early forming of coal. Their remains have been found in lignite and coal in insignificant abundance and variety.

5. Enrichment by bitumen from other sources, especially from deep-seated rocks. This is one of the earlier beliefs and has little support at the present time, for no avenues through which this material could have come have been found; and a chemical analysis of coal does not support the theory of an addition of bitumen.

6. Great differences in depth of burial beneath other formations. As the pressure and heat are probably proportional in some degree to the depth, it seems entirely plausible that this may have been one of the factors, but by no means the only factor.

7. Changes due to chemical reagents in underground circulation. It is quite possible that this had a considerable bearing on the impurities found in coal. The slow filtration of mineral-laden solutions through the tiny pores of coal may have given rise to the deposition of minute quantities of salts of magnesium, calcium, etc., and the filtration of solutions through cracks and crevices in the coal undoubtedly deposited some of the pyrite of marcasite found in coal as well as the thin plates of calcite and gypsum so often found in the upper layer of the coal beds. It is hard to see, on the other hand, how underground circulation could have had any further action than this except perhaps to work in the opposite direction of dissolving instead of precipitating.

8. Heat effects of intrusive rocks. The result of heat from instrusive rocks can readily be seen in some coal beds where this action has occurred. In places coal grades into graphite or natural coke at the contact of the coal and the intrusive. In a lesser degree this action may have had its results from a greater distance and over large areas.

9. The porosity of the beds overlying the coal. This would allow for the escape of gases to a degree depending on the porosity, therefore to a certain extent it is believed to have some bearing on the subject.

10. Escape of volatile matter through joints in the coal and other rocks. In Rhode Island, where this cracking of the formations is highly developed, we find graphite. In Pennsylvania we find anthracite where there is less cracking than in Rhode Island, and westward we find bituminous where open cracks are practically unknown, although joints are common.

11. The dip of the strata should be taken into account according to some, for an inclined bed would al-

low of a better escape of gases. This point is open to discussion.

12. Differences in time exposed to the kind of decay which takes place in vegetable matter when immersed in water.

13. Crustal Movements—Many persons have appealed to movement in the earth's crust to account for the known variations in coal. M. R. Campbell says that a study of coals does not justify this. Folding of rocks into great synclines and anticlines has changed coal into anthracite in eastern Pennsylvania, but why has not the same movement in some of the isolated synclines of Pocono rocks in Maryland and Virginia produced similar coal? It has not done so; therefore the change to anthracite does not seem to be due alone to earth movement.

14. Spontaneous Combustion—J. F. Hofman has used the analogy offered by the spontaneous combustion of grain, flax and hay, and suggested that something of the same sort may have happened to some of the buried materials from which coal was formed. The idea is rather interesting, but so far as the formation of coal is concerned, the evidence to favor it is incomplete.

The theory of origin of slate, bone, etc., is that occasional currents brought in sediments during the accumulation of vegetable matter, so that the bed was divided into two or more parts. This sediment later became carbonaceous shale, often called "slate" and "bone." When this "slate" bed in the coal is narrow, it is called "parting."

Discussing the theory of natural charcoal, or "mother of coal," some paleo-botanists and chemists hold that "mother of coal" is the remains of cinders, such as the work of forest fires, which were washed into a bog or partially burned on the surface. David White disagrees with this, and believes it is the result of a partial dry rot of woody matter before immersion, or arises from a temporary exposure of the coal-forming accumulation to the air.

The following may be offered in disproof of the cinder theory: (1) Great amount of charcoal often in repeated layers. (2) Large size of some fragments. (3) Mutual relation of some fragments in the same layer. (4) Action of the fundamental jelly on the fragments. (5) Remains of fossils of delicate ferns. (6) "Mother coal" is high in carbon.

Graphite has been formed artificially in various metallurgical operations as a direct product of coal when subjected to great heat. In the retorts of gas furnaces large quantities of graphite are deposited on the inner sides of retorts from the gases driven off from coals. Moissan found that a small crucible of pure coke fitted with a lid was entirely converted into graphite by heating ten minutes in an electric arc. No fusion took place, as the lid of the crucible, which was also converted into graphite, was perfectly free in its place. A similar result was obtained with charcoal from sugar. Moissan also proved that when carbon is vaporized and afterward condensed graphite results.

From the foregoing information two origins of graphite are possible: Volcanic, where the graphite is deposited from volcanic action, as shown by its occurrence in igneous rocks; and vegetable origin, where coal is transformed into graphite by heat and pressure, as shown by the occurrence of graphite in beds that grade into coal.

Some believe that the diamond was formed from carbon which crystallized as the molten magma cooled, while others say that it is by no means unlikely that the diamond owes its origin to a metamorphism of carbonaceous matter by the heat of intruded igneous rocks.

Various attempts have been made to prepare artificial coals in the hope of gaining some information on the genesis of the natural product. Two lines of research have been followed, but no final conclusions have been reached. In the first case pressure alone was tried. It is reported that peat subjected to a pressure of 6000 atmospheres transformed it into a hard, black, brilliant solid which could not be distinguished from coal except by chemical means. Other experimenters found that there was no chemical change due to applying pressure to peat. In the second case heat both with and without pressure was used. Although coal has not been formed, it is possible to trace the breaking down of the original fiber of the peat.

At the present time there is a wide difference of opinion in regard to the manner of the vegetable accumulation and also in the mode of transformation. From the ideas advanced and data collected, it no longer should be held that all coal was formed in the same way. The idea is now being accepted by many that different coal measures may have had different formations, and it is no longer necessary to admit of any one theory to the exclusion of all others. Many theories are accepted for the formation of ore deposits; in the same manner it should be realized that all coal was probably not formed by identical processes.

WEIGHTS OF VARIOUS COALS, AS DETERMINED BY THE BUREAU OF MINES*

Source of Coal					Wt. per Cu.Ft.
State	County	Place	Mine or Name of Coal	Size	Lb.
Alabama	Jefferson	Pratt City and Ensley	Tennessee Coal and Iron group	R-o-m	54 0
Arkansas	Franklin	Denning	Denning No. 2	Lump	53.0
Colorado	Las Animas	Aguilar	Royal	Lump	50.5
Illinois	Williamson	Carterville	Barr C	R-o-m	55.5
Illinois	La Salle	Cedar Point	No. 5	80-15-5a	46.0
Illinois	Sangamon	Andrew	Cora	75-10-15a	48.0
Indiana	Knox	Bicknell	Tecumseh Nos. 1 and 2	10 15-75a	47 5
Iowa	Appanoose	Centerville	Streepy	60 25-15a	46.5
Kansas	Leavenworth	Leavenworth	Nos. 1 and 2	80-15-5a	50.0
Kentucky	Webster	Clay	No. 7	90 5-5a	46.5
Montana	Carbon	Bear Creek	Bear Creek	90-5-5a	52 0
New Mexico	McKinley	Gibson	Navajo	80-15-5a	46.5
Ohio	Jefferson	Piney Fork	Piney Fork	70 15-15a	47.5
Oklahoma	Okmulgee	Henryetta	Henryetta	35 45 20a	48 5
Pennsylvania		Delaware, Lackawanna and Western	Anthracite	Egg	58. 0
Pennsylvania	Schuylkill	Philadelphia and Reading	Anthracite	No. 1 Buckwheat	50
Pennsylvania			Anthracite	Egg	56.5
Pennsylvania	Luzerne	Wilkes-Barre	Anthracite	Egg	57.5
Pennsylvania	Luzerne	Beaver Brook	Hazleton District anth	Egg	56. 5
Pennsylvania	Cambria	Portage	Plymouth	20 10 70a	51 0
Pennsylvania	Clearfield	Curwensville	Caldwell	0-10 90a	51 5
Pennsylvania	Jefferson	Reynoldsville	Soldier Run / Trout Run	65 20-15a	50.0 5
Pennsylvania	Somerset	Somerset	Quemahoning Creek No. 1	20-20-60a	53.0
Tennessee	Campbell	Jellico	Indian Mountain	80 15-5a	47 0
Washington	Kittitas	Roslyn	Nos. 1 and 2	60 30-10a	53.5
West Virginia	McDowell		Pocahontas Nos. 3 and 4 beds	3-5-92a	57 5
West Virginia			Kanawha Region	75-15-10a	55.5
Wyoming	Sweetwater	Rock Springs	Bhairtown	75-15-10a	50 5
Australia	New South Wales	Abermain	Abermain	R-o-m	49 5
Canada	British Columbia	Michel	Michel	R-o-m	55.5
China	Shantung	Tsuchuan	Tsuchuan, Estratum	15-5 80a	58.5

*Technical Paper No. 184, Bureau of Mines, Washington, D. C.
aPercentages of lump, nut and slack.

NEWS FROM THE CAPITOL

BY PAUL WOOTON

Arbitration Board to Look After Interests of Public in Labor Disputes

The Chamber of Commerce of the United States has been requested to form an arbitration board through which differences between capital and labor may be settled and before which the remainder of the public may put forward its views. This is pointed to as one of the evidences that the public, other than the parties to the controversy, is reaching the point where a demand will be made that its interests be taken into consideration during strike periods. It is believed by students of the situation here that it is inevitable that the public eventually will take organized steps to protect its interests during periods of suspended production caused by strikes.

Car Shortage Inevitable This Fall and Winter Because of Poor Equipment

Traffic officials are unanimous in their belief that a serious car shortage is impending. This is due principally to the need for moving an unusually large wheat crop in one-third the usual time, and to the unprecedented number of bad-order freight cars. With the price of wheat guaranteed by the Government, every effort is being made to market it at the earliest possible moment.

The last two years have seen exceedingly hard service for all kinds of railroad equipment. Before the Government took over the railroads, each line repaired any damage to equipment which took place while on its rails. Under Government control, however, all cars were pooled and no accounts were taken of the line on which the damage occurred. The railroad administration wants the cost of repairing rolling stock charged to deferred maintainance. The individual roads object to this plan. As a result of this controversy, repairs have been held up. There are said to be 150,000 Pennsylvania railroad cars out of service awaiting repairs. The proportion of coal-carrying equipment in bad order is unusually large, since these cars have been subjected to particularly hard usage. The prediction that there is a good chance for the coal situation during the coming winter to approximate that of the winter of 1917-18 is not confined to coal operators.

Reports to the Railroad Administration indicate a very decided increase in the amount of coal loaded in the Pocahontas region, in the amount of coal dumped at tidewater and in the volume of coal handled on the lakes. It is believed that this marks the turning point and that there will be a brisk movement of coal from this time forward. The total dumpings at tidewater in June increased 14,000 cars over June of 1918.

Fuel Administration Announces That It Has Ceased to Function

The Fuel Administration is calling attention to the fact that it has necessarily ceased to function since June 30 for lack of appropriations, by pinning a slip to correspondence and other documents which are leaving its headquarters couched in the following language:

"The U. S. Fuel Administration, being without funds available for expenses after June thirtieth, has necessarily ceased to function.

"Matters pertaining to accounts can be taken up with the auditor of state and other departments for direct settlement; and legal matters should be taken up with the Department of Justice."

Miscellaneous Notes

H. N. Taylor, president of the National Coal Association, and J. D. A. Morrow, the vice president, are making a tour of the West and the Southwest, visiting the operators and associations in those sections.

Recent movement of coal through the Panama Canal, as reported by the Panama Canal office in Washington, is as follows: Steamship "Guanacaste," Baltimore to Punta Arenas; steamship "Goodspeed," Baltimore to Callao.

Senator Cummins and the members of the Interstate Commerce Committee have been urged to make provision in turning the railroads back to their owners for the divorcement of the carriers from coal-mining operations. It is understood that Senator Cummins, who is the chairman of the committee, is heartily in favor of such a plan.

Tests of Matanuska coal show that it possesses the necessary steaming qualities for Navy use. This is the opinion of Captain Sumner E. W. Kittelle, chairman of the Naval Commission, who recently visited the Matanuska coal fields. Moreover, Captain Kittelle believes that the Matanuska field can produce adequate quantities of coal for Navy use in the Pacific.

In the matter of advances on coal within the Chicago switching district, the Interstate Commerce Commission has handed down an opinion that the Chicago, Milwaukee & St. Paul R.R. should receive 20 cents per ton as its division of the through rates on coal and coke within the Chicago switching district. Increased divisions were authorized for deliveries at other points within that district. The ruling is to apply from July 1, 1917.

"Waste neither time nor money," said Benjamin Franklin. Money put in War Savings Stamps is not wasted; it's working for you.

COAL AGE

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High Prices Win

LET not those who, with *Coal Age*, recognized the probability of higher prices, have excessive pride of opinion. The logic of high prices was too clear for any one of judgment to question. It could not fail, with labor determined on shorter hours, more privileges and larger pay, and with capitalists increasing by scores and the sizes of individual fortunes steadily growing larger.

Large price increases are ever to be deplored. A fixity in price would always be far preferable, but the downward price advocated by many as the basis for renewed prosperity could not have done otherwise than wrecked our large national enterprises and caused a great loss to the wage earners of the country as the outcome of slow work.

Falling prices were not, however, misread in the signs though they were by the augurs. The psychology of the masses was all in favor of the prophetic utterances of the seers. There was almost doubt and hesitation enough to wreck the national prosperity, but the facts were lacking, and without a financial basis for disaster doubt and hesitation could not win.

Now, with the psychology turned or turning and the facts unchanged, one may fear that prices will go too high. They may well run fairly beyond control. The world buys either too charily or too lavishly. It is always in torpor or in panic. If we can only speed the buying early, we can so stimulate production that no buying panic will occur. If, however, it is left to the last minute, the market will be stocked and buyers clamorous, and prices will soar to outrageous heights. The parsimony of the buyer always leads eventually to inflated values.

"Entente Cordiale" in Mining

AN INTERESTING article was presented at a meeting of the West Virginia Coal Mining Institute, in the palmy days of its inception, on "The American Language." In it the writer emphasized the differences in the languages spoken by the American and British people. It is true that the citizens of the United States and Great Britain, especially the technologists, speak tongues alien to one another. Most people would, however, not agree with the author of the paper in his conclusion that the United States should stand by its peculiarities for the sole (and to him satisfactory) reason that they were peculiar and different, and because they emphasized those differences and peculiarities.

The sentiment today, it may be hoped, is changed. In this year 1919, we may be justified in hoping—as we ever were in wishing—that any differences that have crept in may be wiped out and that a common Anglo-Saxon tongue might be spoken by these allied and friendly countries, and that a language combining the good points of both might take the place of two languages each holding hard and fast to its own technical lingo, regardless of quality.

To stop generalizing and get down to the particular: The British miner is quite prone to use the word "thill" to express what we in the United States invariably call the "floor" or "bottom" of the mine. The words we have chosen to use are uttered quite generally in ordinary speech, and when applied to the mine are quite easily understood and their meaning memorized. The word "thill," on the other hand, has in all probability little use in Great Britain except as applied to the material under the coal. It is needless to say that it is not used here either as a technical or a nontechnical word.

It is not a word that is felicitously chosen. Originally it meant a plank, but the plank appeared to narrow up and eventually the word, as far as it came into anything like general use, meant a shaft on a wagon or a cart. Thus shriveled it was quite generally used adjectively in compounds, but it did not have much hold in the language as a substantive. At one time the word may have been locally applied to the planking of a floor; and the suggestion of the mine floor, for a short time, and over a small area of Great Britain, may have been natural and not forced.

But a word like "thill," which only in a certain section and only for a limited time had a small degree of applicability to the mine floor, should not indefinitely, it would seem, be used in that sense. If the word had been naturalized in the United States, it might have been well to have continued its use; as it has not been so naturalized, its discontinuance should certainly be favored.

Lucid writers on coal mines, such as Sir R. A. S. Redmayne in his "Modern Practice of Mining," use indeed simple and expressive words. To Redmayne's great credit much of his writing is intelligible alike to British and American writers. It is to the credit of the mining language of the United States that much of its technology, being couched in the common language, is quite readily understood on the other side of the Atlantic, to judge by its ready use without glossarial comment in the British technical journals.

The British have the unfortunate habit, by no means their own peculiarity, of sticking stolidly to certain words as "a mean thing, but mine own." As lawyers, physicians, electricians and other self-conscious persons hold fast to words and modes of expression solely because they are ancient and mystifying, so too many mining men here and in Great Britain hold with obstinacy to certain words of their craft or of their own coining, which are not nearly as plain as other words that might be used, and which they well know could be used, in their stead.

It is time for the mining men on both sides of the water to go through their prodigious glossaries and rid them of their redundancies, or at least go over them for the purpose of indicating preferences and marking mere localisms, so that writers on technical subjects may avoid the less favored words except on such occasions as demand the use, for purposes of good writing, of secondary words expressive of the same idea.

Sometimes it would be well to enrich the language of American mining with British words. The miners of the United States always term the pillar left to protect

the heading a "stump." Perhaps the British would call it a "stork." Of that many Americans are not clear, though a reference of Mr. Redmayne would seem to suggest that the word "stork" is used to express such a heading pillar.

It might, conceivably, be well to call a pillar heading created in the formation of a "double room," driven with two roads from the entry, a "stork." We might also retain the word "stump" for such pillars as are left when the room pillar is drawn back its required distance, for surely what remains is properly a "stump"; for a "stump" is truly the coal that is left when the main body of the pillar is removed. It is the part left like the "stump" of a tree, a leg, an arm, a tooth or a cigar. The "stork" (or should it rather be "stalk"?) a mysterious but perhaps an expressive word in some local dialect, would then describe a small pillar left, in the driving of a room, to protect the entry. The word "stump" would mean the small pillar left in the completion of the work of pillar drawing, to fill the same essential function.

As we strive as one nation to promote the common ends of our civilization, let us not be bored and hampered by a needless confusion of tongues.

Why Not the Union

AMID all the suggestions regarding the possibilities of welfare work, perhaps that made by Josiah Keely at the West Virginia Coal Mining Institute, is the most constructive. Why, said he, should not the union undertake to promote the welfare of the members by institutional welfare work? The union is a confederation of men to promote the interests of the mine workers, yet, though this is true, the union unfortunately does not have welfare work among its recorded instrumentalities. Thus, the principle and object "of the Union in District No. 2 (Central Pennsylvania)" is to unite all mine employees . . . to ameliorate their condition by using all lawful means to bring about a better understanding between employer and employee, to increase the wage and improve the conditions of employment of our members by legislation, conciliation, joint agreements or strikes.

A cold nonmoral statement is this, like the articles of incorporation of our business concerns. There is no soul in either, but much soul in those whom the instrument incorporates. Mark it well, the soul that the instrument excludes will find its way despite all forbidding. Already the coal companies have their welfare work proceeding industriously, and the union is beginning to take quite an interest in the safety, education and medical care of its members.

There never was a pure commercial organization so soulless and soulproof that it could keep out the moral consciousness of the men who compose it. The union will eventually do its welfare work. It is sometimes unduly jealous of the work being done by the corporations, but it will have no fear of its own. A clipping informs us that at Hanna City, Ill., the union has started a first-aid school and enrolled 52 men. Other similar schools are to be started. The Iowa and Illinois Bureau of Mines and the mine inspection service is back of the development. It may be added that this is by no means the first time that the union has aggressively backed the mine-rescue work of its members.

One great moral need of men everywhere—the practice of temperance—is now about to be supplied. The temptations toward inebriety will shortly be things of the past. The unions did not have the honor of doing anything toward this great revolution, with its bearings on poverty and accident, though the opportunities must have repeatedly forced themselves upon the attention of the union leaders. Charles Steizle, a man with a disposition very favorable to the working man, is quoted as saying in effect that, "as a result of a study of more than 1000 working men in several different cities I find that of their spare cash—money not spent for the necessities of life—they paid 34 per cent. for beer, wine and whisky.

There is room for an organized welfare movement in the ranks of the working people and we look forward to the day when the union will tackle it.

The Insatiable Coal Baron Again

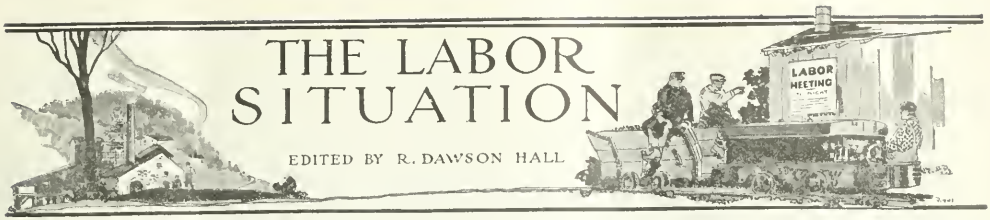
A CERTAIN metropolitan daily evidently believes that coal and all they that produce it are black—at least inside if not out. In a recent editorial it stated that so long as the United States possessed over half the known coal reserves of the world, there is no logical reason why this country should not have all the coal needed and to spare. Readers are told that there is no reason whatever for any prospective coal famine except the rapacity of the "coal barons." It states that mines were shut down "for weeks at a time" this spring, although the needs of the country could have been foreseen quite as readily this year as in previous seasons.

This daily contends that there is no exodus of mine workers in progress from the mining regions and that returned soldiers are deliberately refused employment through the "cussedness" of the operators. Shortage of labor and transportation, it asserts, "can always be played up to ten times their actual significance."

It should be remarked in passing that this is the same daily that a few months ago could not understand why the old culm banks of the anthracite region were not loaded out and shipped to market regardless of the ash, draft, transportation and other problems that the attempt at utilization of this low-grade fuel would inevitably involve.

It sometimes seems a pity that would-be reformers confine their efforts to "hot air." It is perhaps significant that the critics and carpers at the nefarious "coal barons" have never made a constructive practical suggestion. If the metropolitan daily referred to can solve some of the real problems of the coal industry —if it can show how the mine operators can safely store and reclaim a few million tons of bituminous coal each year without danger of either spontaneous combustion or bankruptcy or both—it will confer a boon upon both producer and consumer. One such constructive improvement upon existing customs or natural laws would accomplish more toward public weal than all the maligning its editors can pen and publish in unnumbered years of diligent effort.

A saving people make a safe government, for the habit of thrift is a shield against the insidious gospel preached by those who would spread discord and disrupt existing institutions. If a man has saved a little money nobody can bully him. The habit of saving is a good one to cultivate.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Members of the Anthracite Conciliation Board took prompt and effective measures on July 1 to adjust the difficulties between the employees of the West End Coal Co. at Mocanaqua and the company officials which resulted in a tie-up at the colliery for more than a month, the men demanding the removal of a mine foreman. The Conciliation Board adopted a resolution directing the men to return to work and, after adjournment, went to Mocanaqua, where they addressed a meeting of the workmen and explained the points at issue. The men on July 2 voted to return to work at once.

Several weeks ago the board members had drawn up a paper summoning the committee of the striking miners to come to the meeting, but the message failed to reach the strikers and their committee did not appear. Rather than wait for another call to go out, the board members adopted the resolution and then went to the mine and gathered the men together.

The men at this colliery went on strike contending that one of the mine foremen had failed to give them full yardage and had cut down their earnings. Mr. Mitchell, the foreman, offered to resign if the men would file one specific charge against him and would prove it. The men have not been able to do this as yet.

Apropos of the meeting on July 1 to inquire into the West End trouble is the statement of several union men of District No. 1 that the Conciliation Board has been tardy in handing down opinions and adjusting difficulties. The statement has been made by a number of union men interested in controversies that have been placed before the board that the present agreement, good until next April, will have expired before decisions are given in some cases unless members of the board speed up their work.

Because a number of their companions failed to produce their union buttons all the breaker boys employed at the Lehigh Coal and Navigation Co.'s Number 10 colliery went on strike on July 8, throwing 700 employees idle and tying up the plant.

A strike at the mines of the Buckhannon Coal and Coke Co. at Adrian, Upshur County, West Virginia, on the Coal & Coke Ry., lasted from Saturday, June 28, until the middle of the first week of July, the miners only returning to work then, pending a conference set for July 15. The strike involved 450 miners, members of Local No. 4443. The grievance of the men was that they were being paid for loading, not on a tonnage basis, as their agreement provided, according to their claim, but on a car basis. This the miners contended involved a failure to recognize their union. The plant of the Buckhannon River company is one of the larger operations in the Buckhannon field, the mine loading about 20 railroad cars a day. It is believed the matter will be amicably adjusted.

Striking miners caused a suspension of operations at the mines of the Loup Creek Colliery Co., at Page, W. Va., on July 1, for a period of two days. The trouble was the outcome of a grievance of the company's motormen who demurred at having to work 15 min. overtime each day in taking men into the mines at four o'clock. The strike declared was for the purpose of forcing action on the demands of the motormen for compensation for the extra 15 minutes.

A statement made by Laurence Dwyer a few days ago indicates that United Mine Worker officials in District 29 are determined if possible to force a closed shop in the New River and Winding Gulf regions. Dwyer in his statement said: "As the Charleston papers stated relative to the adjournment of the conference of the miners and operators that it was adjourned at the request of the miners, and that we would reconvene the conference to complete the contract at a future date, I wish to say that the conference, after holding sessions in Charleston and Atlantic City, adjourned sine die. The reason we couldn't agree was because we will not be a party to an open shop contract, and as that was all the operators would offer us we decided to continue under the present wage agreement until it expires, when we will make a new contract which will be one that does not compel us to work with non-union men."

Officials of District 17, United Mine Workers, have signified their intention of making an active campaign after July 15 to induce operators in certain parts of northern West Virginia to enter into contracts with miners. The drive will be made by officials in the Tygarts Valley, Scotts Run, M. & K., Elkins and Kingwood fields where, although most of the miners are organized, no contracts have ever been signed up. A period of 18 days will be devoted by mine workers' officials to the campaign for the thorough organization of all northern West Virginia fields.

Three mines at Willow Grove, Ohio, operated by the Pursglove-Maher Coal Co., are idle as a result of 800 men striking because of the importation of negro miners. A walkout took place when 20 negroes arrived from the South. They belonged to the union, but nevertheless the men went out.

Indiana Miners Want New Wage Contract

Leaders of the miners' union in southern Indiana are working on a new wage agreement for presentation to mine operators in the near future. The present wage agreement expired with the signing of the peace treaty. While the operators have been content to permit the wartime program to continue temporarily, the miners insist on a six-hour day and an increase in wages. Operators protest this, however.

Difficulties have been adjusted at the Mission Field Mine No. 6 after a shutdown of several weeks. The men have been ordered to return to work. The mine has been cleaned up and placed in good shape for resumed operation. The miners' train from Danville to Hillery is now running.

An exodus, growing in volume, of foreigners from the Illinois coal fields, is giving increasing concern to the operators, who foresee labor scarcity when the approach of winter brings an increase in the demand for coal. Steamship agents in St. Louis say that hundreds are leaving the country adjacent to that city every week for the eastern seaports. Most of these, outside of the city, are miners. By far the larger proportion of the mining in the Belleville and the southern Illinois fields is done by foreigners. These men, unlike the natives, are thrifty and when miners were receiving unprecedented wages during the war they saved their money and were able to pay their passage back to Europe and have a goodly sum left.

The only thing that sets a limit on the rate of egress is the difficulty of obtaining passage. It is reported that 600 foreigners are waiting at Staunton, Ill., for an opportunity to get started on the journey back to their home lands. In many places coal operators report that forces of 300 and 400 men and upward have dwindled 50 per cent. Without an adequate number of foreigners, there will be a lack of man power when the mines get going at normal rate again, and production will be correspondingly affected.

Carnegie Institute Recasts Course in Mining Engineering

Establishes New Four-Year and Two-Year Courses in Coal Mining—Will Promote Greater Efficiency by Co-operation with Mining Interests

ON MAY 27, 1919, twenty-five of the leading representatives of the coal-mining industry of western Pennsylvania met in conference with President A. A. Hamerschlag, of the Carnegie Institute of Technology, with a view to bringing about closer relations between the Institute and the mining interests. It was felt that the advice of the men in the field was necessary in the proper training of young men for mining work. A resolution was adopted at this conference which, among other things, called for a board of mine operators and engineers to serve in an advisory capacity with the Carnegie Institute of Technology. As a result of the counsel and recommendations of this Advisory Board, the Carnegie Institute of Technology, in coöperation with the U. S. Bureau of Mines, has recast its four-year course in mining engineering and has also established a two-year course in coal mining. To carry out this new program, there has been organized the "Coöperative Department of Mining Engineering" in the Division of Science and Engineering of the Carnegie Institute of Technology.

A large percentage of young men who are brought up in mining communities do not follow the line of work of their fathers. The question of keeping up the supply of trained men for the mines is therefore a difficult one. Few college men are attracted to the coal industry or realize that the possibilities of making a good income from coal mining and the coal business are probably greater than in any other branch of the industries. The desire of the Coöperative Department of Mining Engineering is to counteract these tendencies and to interest young men in the coal-mining industry.

Requirements for Admission

The four-year course is open to boys with a high-school education or its equivalent. Special endeavor will be made to attract boys who have been brought up in mining communities—sons of mine officials or mine workers. The course furnishes a fundamental training for the mining engineering profession.

The two-year course, planned for the man in the mine, is open to men who have had a common school education and two years of experience in or about mines, or in their management. The two-year course includes not only the fundamental and elementary subjects of engineering, but also their practical application in shops, laboratories and field work. The object is to give to worthy men, who have been compelled to enter the mines to earn a livelihood at an early age and who have made good as coal miners, an opportunity to prepare themselves to follow coal mining on a new and higher basis.

Both courses will begin Oct. 1, 1919. Nine months of college work and three months of practical work in or about mines will be required each year.

General inspection trips will be made monthly by students in both courses to different mines in the Pittsburgh district, as well as to the Experimental Mine, for the purpose of demonstration work. Lectures will be given by operators and engineers in the field, and by members of the staff of the U. S. Bureau of Mines. Mine rescue teams will be organized from the men who have had mining experience to act, in case of emergency, as a reserve to the rescue teams of the Bureau of Mines.

The Faculty

Professor Fred Crabtree, who is in charge of the Department, is a consulting metallurgist with the U. S. Bureau of Mines.

Captain Edward Steidle has been engaged to take charge of the Coöperative Department of Mining Engineering. He is peculiarly fitted for this position. He has been a mining engineer with the U. S. Bureau of Mines, and has worked in various mining districts in North America. During 1913-14, he was engineer in charge of the Mine Rescue Car No. 6, Pittsburgh-West Virginia district. He retains the status of consulting mining engineer with the Bureau of Mines.

Edward Zern, editor of *Mining Catalog and Coal Catalog,* and president of the Coal Mining Institute of America, will give a series of lectures on coal-mining methods and engineering. Mr. Zern was previously in the employment of the H. C. Frick Coke Co., the Jamison Coal and Coke Co., the West Kentucky Coal Co., as engineer and superintendent, and was professor of mining engineering at the University of West Virginia.

E. G. Hill, instructor of mining engineering, will give attention to metal mining methods and engineering, and the mechanical preparation of ore and coal.

Dr. C. R. Fettke is assistant professor of geology and mineralogy and will have supervision of the work in this department.

Expenses

The approximate total cost, including board and lodging, of pursuing the courses in mining engineering and coal mining during the nine months of the college year is $50 per month. Any man who is interested and eligible for either course is invited to communicate with the Registrar, Carnegie Institute of Technology, Pittsburgh, Penn. A personal interview is required of all students, both of the four-year and of the two-year courses. A certain amount of financial assistance will be made available by the mining industry for men who take the two-year course. About fifteen men will be accepted each year in the four-year course and twenty men in the two-year course. Classes will be limited in size, in order to insure close relations between faculty and students and the best results from inspection trips.

Advisory Board

The Advisory Board will advise on all matters pertaining to the Coöperative Department of Mining Engineering. Its advice will aid in giving to the courses of instruction the practical and business features which are necessary to develop the type of mining men especially demanded at this time in the coal industry.

The members of the Advisory Board are as follows: W. A. Luce, general manager (chairman), Ellsworth Collieries Co.; W. L. Affelder, general superintendent, Hecla Coal and Coke Co.; J. M. Armstrong, general manager, Pittsburgh Coal Co.; W. R. Calverley, general manager, Union Collieries Co.; C. E. Cowan, chief engineer, Jamison Coal and Coke Co.; W. H. Glasgow, assistant general superintendent, Frick Coal and Coke Co.; E. A. Holbrook, mining engineer, U. S. Bureau

of Mines; Phillip Murray, district president, United Mine Workers of America; John I. Pratt, mine inspector, Department of Mines, State of Pennsylvania; Capt. Edward Steidle, mining engineer (secretary), Carnegie Institute of Technology.

The Carnegie Institute of Technology and the Experimental Station of the Federal Bureau of Mines are in close proximity, and the students in the Coöperative Department of Mining Engineering will have the advantages of the Bureau's laboratories and equipment and library, as well as the advice and instruction of its technical staff.

The object of the coöperation of the Carnegie Institute of Technology, the mining industry, and the U. S. Bureau of Mines, is to bring about better mining conditions and greater efficiency in mining operations. Decreasing coal deposits and increasing costs of production make it urgently necessary for the coal operators to take advantage of everything which modern science, machinery and methods can contribute. The interests concerned believe that one of the best ways to provide for the future is to offer to selected groups of promising young men in the Pittsburgh district, who may have had a certain amount of mining experience, an opportunity to fit themselves to study the broader phases of coal mining. At the recent meeting of mine operators and engineers mentioned above, the following action was taken: "Resolved, that this group give its approval and moral and material support to the form of education proposed for the Carnegie Institute of Technology, by which students may receive a combined technical, practical and business training necessary to fit them for service in the coal-mining and allied industries."

President Hamerschlag says: "We are located in the very center of the greatest bituminous coal-mining district in the world. This new project, with all interests concerned behind it—labor, capital, the government, and a teaching staff of engineering experts, should do much in the course of a very few years in producing improvements in coal mining that should bring great returns both in harmonious and successful mining operations and in the satisfaction which all the interest involved will have in working out together the necessary solutions of their common problems."

American Institute of Mining and Metallurgical Engineers

From a technical point of view, the Chicago meeting of the Institute, Sept. 22 to 26 inclusive, promises to be one of the most interesting in its history. The wealth of material in the shape of technical papers for discussion is greater than has been offered for any previous meeting; upward of 150 papers have been submitted to the committee, who found it no small task to arrange a program to present this number with a minimum of conflicts among papers on allied subjects.

One of the excursions to be made by the Institute as a body during this meeting is to the LaSalle district. A special train leaving Chicago early Thursday morning will take the members and guests to LaSalle, Ill., where automobiles will convey the different parties to the coal mines, cement works and zinc smelters. For the ladies and others of the party not particularly interested in these industrial operations, the LaSalle hosts plan an automobile trip to Starved Rock.

Reinforced Concrete in and About the Coal Mines of Great Britain

By M. Meredith
Liverpool, England

Use of reinforced concrete as a building material has made rapid strides in Great Britain since its introduction about 25 years ago. It is now recognized as one of the standard and best materials for various classes of construction. The Government departments have adopted it for important works and encouraged others to use it, especially during the war, when the shortage of steel was felt.

Plant at coal shafts can be economically and satisfactorily constructed by this method. The advantages over timber construction are seen in its fireproof qualities. In fact, the Board of Trade of Great Britain does not permit timber construction at new shafts at the present time.

With steel work, the constant painting and scraping is an important item on structures of large size; this has been entirely dispensed with by the employment of reinforced concrete. Concrete should be constructed more economically than structural steel; concrete construction is heavier and therefore steadier than buildings of steel or timber. This, under certain circumstances, is an important consideration.

Reinforced-concrete mine props have been used as supports on main entries of colliery workings for some time, and they have proved to be so satisfactory that it is doubtful whether the operators would return to the use of timber, even if it should become cheaper. Reinforced concrete cannot be recommended for use at the coal face because in that case it is desirable at times to change the length of props, and it is not practicable to do this with concrete. On the main entries concrete props are ideal; a great advantage being their long life.

The aim has been to make the concrete prop the same strength, or as near as possible, as the timber prop required for the place in question. It was found by test that in the case of a 5-in. timber prop the breaking load was in the neighborhood of 25 tons. A 4½-in. concrete prop reinforced by 4⅜-in. bars and hoops had a breaking load in the neighborhood of 25 tons. The coal miners are beginning to appreciate the advantage of these props, which can be so designed that the top is the weakest portion; when they give way the prop can be taken out, the concrete chipped away, the reinforcing iron can be sawn off and the prop (although reduced in size), can be used again. One prop was used three times over in this way. When it was first tested it carried 25 tons or thereabouts. The top was cut off, and the second time the prop carried a little more. The third time it carried 25 tons or thereabouts. Sometimes a squeeze came on, and whatever was put in could not resist that weight—something must give way. In that case the top of the prop would go and the prop would then be taken out and used somewhere else, after the top had been cut off.

The following concise and pithy expressions appeared in *Power* recently and are well worth being passed along: Adaptability means doing the next best thing in the handiest way. Efficiency is knowing just how and fitting it to just when. Loyalty consists in being decently considerate of the boss. Responsibility lies in having grit enough to risk a call down. Opportunity is the same thing as being born lucky. Reliability shows the capacity for staying put longest. Integrity is the Sunday name for plain weekday honesty.

He Who Rides with a Powder Keg Joy-Rides with Death

Many cars are, to all intents and purposes, powder magazines on wheels; in these cars are men with open torches, and the risk is always present that at any time the powder will become ignited and kill every man on the trip. Can you take that chance?

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Living Conditions at Mines

Letter No. 6—I have followed with deep interest the letters published in *Coal Age* regarding the improvement of living conditions in our mines, and beg to state that this is a very important subject and one that needs prompt attention and concerted action on the part of coal operators in this country.

Particularly is this true in these days of reconstruction when the atmosphere is diluted with dangerous propaganda and Bolshevism is crying in a false tone for better living conditions that they are determined to gain by force. The poor and ignorant classes influenced by this propaganda do not realize that the carrying out of their program would only mean hardship and suffering to themselves.

The successful promotion of better living conditions in our industrial centers requires the coöperation and support of every American, in this enterprise. A country-wide campaign should be undertaken, advertising in the daily papers that better living conditions can only come through the friendly coöperation of better citizens, who, by kindness, will be able to overcome those of their fellow workers who are bent on tying up industrial enterprises, which can only make life miserable for the workers.

The Census Bureau statistics recently published show that there are over 14,000,000 foreign-born residents in America, less than 10 per cent. of whom are naturalized American citizens, who make up the thrifty class of our foreign-born workers.

Exodus of Foreign-Born Mine Workers

It is rumored that millions of our foreign population are preparing to return to Europe, as a result of the well-organized propaganda now being circulated throughout the country. The keynote of this propaganda is "Cash in your Liberty bonds; bring your bank accounts to us and come back to your own country where you will be enabled to enjoy the freedom and unrestricted personal liberty for which you have long been striving."

One cannot help but wonder whether the broad-minded American employers are going to stand idly by and allow this propaganda to result in a calamitous withdrawal of bank and savings accounts and a shortage of labor that must bring about increase of wages, strikes and industrial unrest, with all the attendant evils that prevail in Europe today.

The question will be asked, "What can be done to prevent this condition in our own country?" The answer is, Make life worth while for the working classes, by giving them the pleasures to which they are entitled and improving their home life and health to an extent that they must recognize that the treatment they receive in America is better than what they could hope to gain elsewhere.

No one doubts that, today, we are entering upon the most important period affecting the future of this and other countries. It is a time when regard for one another's welfare must take the place of that selfish ambition developed by the "get-rich-quick" idea, by imposing on our workers conditions they cannot endure.

In closing, let me say that employers here in our country should be proud to prove to the world that they consider the profits of their industries of less importance than the welfare of their workers. The question is, however, how can this idea be impressed on the minds of workmen, that the interests of each one are bound up in the interests of all.

Success means coöperation in establishing a community of interest, to the end that employers and workers in every industry shall strive for the common good. Let me add that not until capital and labor stand, foot-and-foot, on the same elevation, in respect to life's privileges, will the working classes recognize and enjoy the ideals for which America stands—Freedom, Justice and Equality.

Joseph R. Thomas.

Plymouth, Penn.

Robbing Pillars, Anthracite Mines

Letter No. 2—I was deeply interested in the letter regarding the robbing of pillars in anthracite mines, by Joseph R. Thomas, *Coal Age*, May 22, p. 938. The work of robbing pillars is always dangerous and requires much skill and good judgment. Especially in the anthracite region where conditions are so variable, no special rules can be given to guide those engaged in the work. Practically, the only general rule to be followed is that, in order to secure a fair percentage of recovery under these varying conditions, rapid and well directed effort is necessary.

As Mr. Thomas has remarked, the cost of timber required for this work is high, and it is true that much timber is being wasted where a considerable amount of robbing is being done. When the pillars are small, more timber is required than where ample pillar support has been left in the first workings. However, it is too late now to overcome this difficulty. The problem that confronts us is how to recover as much of these small pillars as possible with the least expense and the greatest amount of safety to the men.

One of the chief factors in the work of robbing is the character of the roof strata directly above the coal. A strong sandstone roof requires little timber. Indeed, timber supports are of no avail to resist the roof pressure in this case; but posts are stood merely to serve as a warning of impending danger. Under a strong roof, it is important to make every effort to induce a fall back in the waste, as a large standing area greatly increases the weight resting on the pillars and makes the work of robbing more difficult and dangerous.

With a weak roof under a considerable cover, more timber is required for the protection of the men. Strange as it may seem more accidents occur when working under a good roof than where the character of the roof requires the miner to be always alert to the danger that surrounds him. The work of extracting pillars is much more hazardous in anthracite than in bituminous mining. In the anthracite region, the coal measures are much disturbed and the coal must be mined often on heavy pitches where the falling roof slides down the pitch and endangers the miner.

Much extra work is required on steep pitches to avoid loose material falling into and choking the chutes and manways, which would then have to be cleared or a passage opened to take the coal to the gangway below. Much extra labor is also necessary in order to get the timber up these steep pitches, especially in a thick seam where the length of the props required may vary from 10 to 16 ft. It is nothing unusual to find one or more of these props discharged by a blast and carried some distance down the chute, from which they must be recovered, taken up the pitch and again set in place to support the roof.

Factors That Determine the Direction, Size and Strength of Pillars

Another important factor and one that controls both the laying out of the chambers and the robbing of the pillars is the pitch or inclination of the seam. Naturally, owing to the difficulty of handling water and coal on the dip, the chamber must be driven either on the strike of the seam or to the rise, the former being generally preferred. However, pillars running with the dip present the maximum resistance, and there is not the tendency to overturn as when the pillars run parallel with the strike of the seam. For this reason a greater width of pillar is required where the chambers are driven on the strike.

The strength of pillars varies inversely as the thickness of the seam and directly as the cosine of the angle of inclination. A greater width of pillar is therefore required in mining thick seams on steep pitches than is required in working thinner coal having a less inclination. The character of the coal is also an important factor, a greater width of pillar being required where the coal is soft and friable than where it is hard and tenacious. As a general rule, also, the roof pressure is greater in the basin than in other portions of the mine, and a greater width of pillar is required as the workings advance to the dip.

In anthracite workings, it is seldom that the dip of a seam remains constant; changes are frequent and these will require, at times, some change in the development of the work. Such changes are apt to lead to much confusion and require a careful study to determine the effect produced in the roof pressure.

Importance of Drawing All Post Timber

Regarding the question of drawing timber, asked by Mr. Thomas, let me say that the Pennsylvania Coal Co., operating in this locality, has followed the invariable practice of drawing all standing props as quickly as the pillars are removed. This work is performed by special prop pullers and much timber is thus saved. The Cooper vein will average about 12 ft. in thickness. The props seldom split through the center, but bend or break off about 3 or 4 ft. from the floor. These broken timbers are taken out and sawed off for use in the smaller veins. It is evident that the use of prop pullers effects a much needed saving, as timber is becoming more and more scarce each year.

While the use of steel and cement supports has been a saving, it does not seem that this has greatly decreased the consumption of mine timber, which appears to be steadily on the increase. The tendency of most miners, today, is to set too little rather than to use too many props, but the one thing that needs careful watching is to see that miners do not allow props to become buried and lost in the waste. Some willful miners allow good props to be covered up rather than make any effort to recover such timbers. The entire work of drawing back pillars and recovering timbers should be in charge of experienced and competent men capable of exercising the best skill and judgment and detecting the presence of danger where the casual observer would not be conscious that such danger existed. Richard Bowen.

West Pittston, Penn.

Cost Reduced in Machine Mining

Letter No. 3—Kindly permit me to offer a few words in reply to Thomas Hogarth, whose letter appears in *Coal Age*, May 8, p. 887, commenting on my previous claims of the work that *can* be and *is* accomplished in our mines, in cutting coal with the Sullivan machines. From Mr. Hogarth's remarks I can see plainly that he is a Goodman-machine man.

First, in regard to my statement that our cutters left 4½ or 5 in. of bottom coal, let me say that this was according to my instructions to the machinemen. I do not consider that the coal they left represented a loss. There was a reason for doing this that I do not care to explain further than to say that conditions often oblige a mine foreman to make some slight concessions to his men, in order to avoid extra expense. If my friend is a mining man of experience, he will understand my meaning, as he has probably been in positions before this that required him to study out a plan to extricate himself from a difficult position. In order to get the best results from machine mining, a mine foreman must be on the move and study carefully the work done in the mine, in all its details.

Foremen Can Expedite Work of Coal Cutters

Now, regarding the amount that I stated my cutters can advance, let me say that this very largely depends on what the boss accomplishes in getting the places ready and in condition to cut, so that the machinemen are not delayed in their work. At times, it is necessary to change the angle of driving the places so as to overcome water conditions. Everything depends on adopting a good system and seeing that the men live up to it and in making it plain to them that you are the boss.

Another point Mr. Hogarth mentions is the kind of bits used in our machines. Regarding them, let me state that this is another point that I do not care to discuss more than to say that these bits represent some hard study, which has enabled me to overcome certain difficulties in the cutting of coal.

In regard to caring for the machines, let me say that a machineman who is not capable of keeping up his own machine is not competent to run a machine. Fur-

ther, if there is any doubt in Mr. Hogarth's mind regarding my statements, I will bring cutters and come myself and prove the truth of my claims. In closing, let me add that I can have the coal cut on the slate bottom, or leave any thickness of bottom coal that I choose. I have observed in some mines that the cutters are boss, and not the foreman, which will explain the results accomplished.

JOHN H. WILEY.

Oliphant, Penn.

A.C. vs. D.C. Current in Mines

Letter No. 3—At the Pittsburgh meeting of the Coal Mining Institute of America, last December, there was a discussion of the question, "Is the underground use of alternating current more hazardous than the use of direct current?" Since then several writers have discussed the matter in *Coal Age*, and expressed their views regarding the relative hazard of these two types of current. While many points are involved in an answer to this question I will attempt to cover the most important ones pertaining to life and fire hazard in mines.

As direct current is more generally used than alternating current, in coal-mining operations, it is better understood by mining men, both in respect to its applications and hazard. The general impression is that alternating current is more dangerous than direct current. Is this a fact and, if so, what is the reason? Can it not be made just as safe as direct current; or is there something about alternating current that makes it inherently more dangerous? These are a few of the questions that naturally arise and require an answer before a decision can be reached as to which of the two types should be installed, in a mine, in respect to the hazard, or other considerations of cost, upkeep, application and suitability. The items last mentioned are apt to occur in such a variety of combinations and of varying degrees of importance that any given case must be made a study by itself.

Relative Danger Carefully Analyzed

The danger involved in the use of either d.c. or a.c. current is the chance of shock, by men and animals coming in contact with live wires or equipment. The hazard of accidental contact can, of course, be reduced by protecting all wires and equipment; but in coal mining it is next to impossible to maintain ideal conditions even with a thorough system of inspection and maintenance. This applies not only to electrical equipment but to mining conditions in general. The question then resolves itself into asking which form of electricity is the more dangerous, assuming that the same attention is paid to installation and upkeep.

The impression that a.c. current is the more dangerous type is probably due to the generally higher voltages than in the use of d.c. current underground. In the early days of mine electrification, it was natural to adopt the 500 or 600 volts used in railway practice and because this high voltage reduced the initial cost of installation and the line drop in the transmission of power.

In those days, the question of life hazard was not urged as forcibly then as now, and the danger from a live trolley wire 15 or 20 ft. over the track was nothing in comparison to what it is when that trolley is brought down within striking distance of a man's head. Moreover, the damp and wet underground conditions increased the danger of using a high voltage. Fortunately, however, the danger was quickly realized and at the present time 250-volt direct current is used for haulage, and in many instances for power in mines. This voltage is now considered as the standard for underground work.

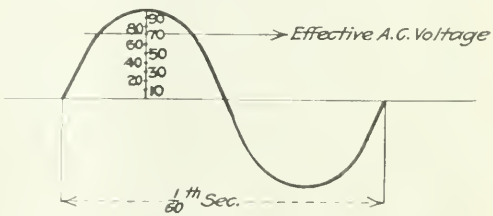
However, in the later development of mines, difficulty arose in transmitting the necessary electric power long distances to the working face, owing to the increased line drop and consequent loss of power. For this reason, it was necessary to employ a.c. current and, today, many new mines are thus equipped in the start, in order to forestall such difficulties arising later in their development. Another important reason for the general adoption of a.c. current is that many mines are now purchasing power from central stations, or are producing it at other distant mines and using it as such or converting it, in part or entirely, to d.c. current, at convenient points.

Increasing Use of Alternating Current in Mines

To those who have studied the trend, it is apparent that a.c. current is here to stay, and is being more generally used for mine electrification the better it is understood. The question of safety that arises in every contemplated installation is, How does a.c. differ from d.c. current, and does it involve a greater hazard when used in mines?

As far as the hazard is concerned, the difference lies in what the workman thinks is the relative danger and what that danger actually is; or what is the relative effect on the human body or an animal when coming in contact with a live wire.

The average mine worker, thinking that one current is more dangerous than another, will take risks with the



VOLTAGE CURVE, SINGLE-PHASE, A.C. CURRENT

one he thinks is less dangerous. He knows nothing of the nature of the current, its voltage, frequency, etc., and, in all probability, will expose himself to a sadder experience with the kinds of current that he knows less about. But, as unfortunate as such an attitude in an employee may be, we will pass this by and discuss the matter on a purely scientific basis regarding the physiological action of both kinds of current.

The nerves of the body are analogous to the wires over which electric current is sent and, strange to say, there is a close resemblance between the *mental stimulus* putting a muscle into action through the nerve force and an *electric shock* producing a similar action, by coming in contact with a live wire. The effect produced depends on: (1) The kind of current; (2) the voltage; (3) the thoroughness of contact.

Now, in respect to kind of current, as its name implies, alternating current is constantly changing. From a maximum in one direction the voltage reduces to zero, then increases to a maximum in the opposite

direction and again reduces to zero, increasing then till it reaches the maximum from which it started. This alternating change in voltage is indicated by the curve shown in the figure just given, which represents a complete cycle. In a 60-cycle system, this is repeated 60 times a second, or 25 times in a 25-cycle system, and produces the continuous stinging sensation experienced when coming in contact with a live wire carrying a.c. current.

On the other hand, d.c. current consists of a steady flow and there is no perceptible sensation after the first contact, notwithstanding the current is flowing through the body. In other words, contact with a live wire carrying d.c. current immediately gives the muscles a twitch, after which there is no discomfort provided the contact is light; but the twitch of the muscles will be repeated on breaking the circuit. In alternating current, the continuous reversal of the a.c. voltage causes stimulation of the muscles of the body as long as contact with the wire is maintained. Generally, there is difficulty in letting go of a wire charged with a.c. current, because of the stimulation of the muscles.

Harm Done Depends on Energy of Current

For the same power transmitted, the voltage determines the amount of current flowing, assuming an equal degree of contact with the wire. The harm done is usually considered to be represented by the energy, which is the product of the voltage and the current passing. If the voltage is extremely high and the current immeasurably small, as in many of the stage exhibitions of passing "millions of volts" through a human body, no more harm is done than when a larger current passes under a lower voltage.

The amount of current flowing under a given voltage will depend on how good a contact is formed. The surface contact of the human body is rather high and if this should be punctured it will allow considerable current to flow through the body, even though the pressure is as low as 50 volts. Also, much depends on the amount of surface in contact. A man who is very wet from perspiration and standing in water will receive a serious shock on making contact with a 250-volt circuit, even with the inside of his hand, which is considered the thickest insulation of the human body.

Harm that comes from accidental contact with live wires depends also, to a great extent, on the makeup of the individual. It is a peculiar fact that a mule is more sensitive to shock than a human being. It has been frequently observed that it takes less voltage to kill a mule than a man.

The voltage of an a.c. current, as measured by an instrument is not the maximum voltage that occurs at the peak of the cycle just described; but, in case of the sine wave, is about 70 per cent. of that value, as indicated by the horizontal line in the figure. The injury or shock resulting from contact, however, depends on the maximum value of the voltage. Consequently, a 100-volt, d.c. current would be equivalent to about a 70-volt a.c. current; or a 220-volt, a.c. current would be equal to about a 315-volt, d.c. current. This is borne out by my own experience, and one frequently hears it remarked that a.c. current stings more than d.c. current of the same voltage. If the a.c. current voltage gives a sharp saw-tooth wave instead of a sine wave the shock is all the more severe.

The bare trolley wire required in mine haulage is the chief source of danger and must be guarded at all exposed points in the mine. As far as the other wires and equipment are concerned, there is no reason why they should not be installed and maintained so as to prevent any injury from accidental contact and all equipment made safe by grounding. Even then, after every precaution has been taken, many cases of willful contact for play or to win a wager will occur. There are, in this country, however, comparatively few installations of a.c. current for haulage purposes and, neglecting these, it is fair to state that an a.c. installation underground should represent no more hazard to life than d.c. current, even though, as has been stated, for the same voltage, the shock from a.c. current is slightly more severe than that from d.c. current.

So far we have considered the comparative effects of a.c. and d.c. current of the same voltage. It is obviously unfair to the former to compare its behavior at high voltage with that of the latter at low voltage. The high a.c. voltage is necessary to deliver the power to distant points, which could not be reached as economically with d.c. current, unless the latter were of a similarly high voltage. In such an event, there would be just as much harm to life from the high voltage d.c. current as from the a.c. current. In other words, when adopting a voltage above the 600-volt class the danger is, of course, very much greater; but the kind of current makes very little difference in the hazard. Practically all the installations of a.c. current underground are of 1100-volt or higher. It has been found that the best voltage for electrocution is somewhere between 1800 and 2200 volts. It is therefore obvious that the utmost precaution must be taken to install a.c. current of this high voltage properly, in order to reduce the life hazard.

High-Tension Lines Safe If Properly Insulated

In carrying a.c. current of high voltage into a mine, except when it is taken down a borehole, there is the natural feeling that high-voltage wires of any form whatever are objectionable where they may be exposed on a passage or traveling way. But, cables properly insulated, covered with lead and otherwise protected mechanically, are undoubtedly safe to install anywhere, provided they are properly grounded. Such cables, however, are not foolproof against malicious damage, and it is possible for them to be deliberately damaged and cause shock by contact or by grounding. Men are, as a rule, afraid to tamper with such cables; they have heard how some fellow got it by trying some stunt to put the mine out of business; whereas, he put himself out of business and the mine continued to run.

The fire hazard, as far as arcing from the voltage is concerned, is practically the same whether a.c. or d.c. current is installed. If there is any difference it is in favor of the former, because an a.c. current arc will not sustain itself like a d.c. current arc. The a.c. arc tends to go out when the voltage passes through zero of the cycle. As far as the heating effects are concerned, they are practically the same for both types of current, except that in a.c. current a wire is more apt to be overloaded, especially if the motors are operating at low-power factor and allowance for this has not been made in the installation of the wire.

In dealing with a.c. current of 1100-volt and higher, it is quite usual to find in every installation, oil-immersed transformers installed underground and also oil used for oil switches and starting compensators. It must be admitted that the use of this oil is a fire risk, particularly in the case of transformers. A similar fire

risk is not present in a low-voltage, d.c. current installation, and in this respect the use of a.c. current is slightly more hazardous than d.c. current. However, if it is necessary to install a.c. current, there are well known ways of guarding against this fire hazard, by locating such equipment where fire will do the least harm, and safeguarding it both against fire, and protecting the remainder of the mine, in case of fire, by providing suitable means for confining the fire and extinguishing it should one occur.

H. M. GASSMAN,
Birmingham, Ala. Consulting Power Engineer.

Firebosses as State Officials

Letter No. 8—Since reading the letter of Edward H. Coxe, *Coal Age*, May 8, p. 876, who, as general manager of the Snowdon Coke Co., at Braznell, Tenn., is opposed to the employment of state firebosses, I have been wondering if he recalls, as I do, the terrible explosion that occurred in the Braznell mine, Dec. 23, 1899.

In the Braznell explosion, every man in the mine was killed, nineteen in all, if I remember correctly. It was known that there was a good deal of gas in the mine, but the fireboss did not dare to report it when making out his daily report, fearing that he would be fired. It was a well known fact that the mine foreman would frequently work places containing gas. Other places were left full of gas, until the adjoining rooms could be driven up far enough to put a crosscut through so that the air current would drive off the gas.

The same condition existed in the Grindstone mine, about a mile from the Braznell mine. An explosion had occurred in the former, owing to the same cause, about six months previous to the Braznell explosion (July 24, 1899). I was working in the Grindstone mine at that time, being employed as a machine runner. I also made one of the rescue party, at the Braznell mine, some weeks after the explosion in December.

These occurrences lead me to think that if our firebosses were authorized to act as assistants to the mine inspectors, such conditions would not exist in the mines, and gas would be reported whenever found. A fireboss, then, would not fear the loss of his position by reason of reporting gas. It is natural to understand that a general manager would prefer to employ his own fireboss, so as to control affairs in his mine according to his own will, which a state fireboss would prevent.

Cumberland, B. C., Can. A. TRUBIE.

Letter No. 9—Referring to the discussion on this subject, I am convinced that if our firebosses were clothed with the authority of state officials no harm would result as some writers have predicted. Instead, I believe that it would prove a boon to both operators and miners.

Accepting, as we must, that it is the general desire of all operators that their mines shall be kept safe and in the best possible condition, I fail to see that it matters whether a fireboss when making his examination of the mine acts for the company or for the state. Operators have invested thousands of dollars in the development of their mines, and it is only to be expected that they require their superintendents and foremen to abide strictly by the laws of the state.

This being true, the employment of state firebosses would seem to appeal to most operators as a move that would yield better results and prove a big factor for safety. Operators who oppose the plan are largely those who object to receiving orders from their firebosses. They know that if a fireboss was to be clothed with state authority and act as an assistant mine inspector they would be obliged to sit up and listen, or close their mines.

In my opinion, if daily reports were required to be sent to the state officials as well as to the officers of the company there would be a vast improvement in the condition of our mines that would prove a great boost for safety. It would make all mine officials more efficient.

It must be admitted that in a few instances a state fireboss might require the foreman of a mine to perform some unreasonable work; but this possibility could be safeguarded by placing restrictions upon the kind of work that would be under the fireboss' jurisdiction. The argument, however, furnishes no grounds for opposition to the plan. It would be understood that a rigid test would determine the capability of a fireboss acting for the state, and only those showing the highest efficiency would be authorized to act as state examiners of mines. This would insure the employment of capable men, whose word should be law, in respect to safe mining conditions.

HANDICAP OF STATE MINE INSPECTORS

Admitting that there are deputy mine inspectors who are paid to visit and inspect the mines for safety, is it not true that the territory in charge of each inspector is too large to enable a thorough inspection and insure safety at all times? Is it not true, also, that the term of office of mine inspectors is generally too short to make them thoroughly familiar with conditions in the mines in their charge? This being the case, a mine inspector may be easily misled by the arguments of a mine official who is disposed to take chances, and has no desire to comply with a request of the inspector. This could not happen where the fireboss stationed at that mine acted with the authority of the state.

Although, in my experience of a number of years of firebossing, I have worked under many good and honest mine officials, it has happened, at times, that the situation in a mine had to be dealt with forcibly and caused some unpleasantness before the mine foreman would comply with my orders. Some years ago an incident occurred at the mine of which I now have charge that I will cite as an illustration of the need of a fireboss being given a free hand.

At that time, a flood was raging in the district and the mines were not working. The fireboss was ordered or told to be on hand in the morning when the men went to work and no previous inspection of the workings was made. A few hours later a sledge was needed and one of the daymen was sent down a certain entry to hunt for the tool, with the result that his naked light ignited gas that had accumulated there and an explosion followed killing four men.

This is but one incident of many that cause the high death rate in mines throughout the country. I am confident that if we could hear many weak-kneed firebosses relate the results of mine foremen and superintendents not complying with their orders the narration would startle the public and show the need of greater authority being given the firebosses employed in our mines. J. H. TAYLOR.

Athens, Ind.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Fatal Hoisting Accident

Recently a fatal accident occurred, killing one of the employees of a contractor who was engaged in excavating and enlarging a cellar under the house shown in the accompanying photo, Fig. 1. The accident was due to the breaking of a manila rope used to hoist the excavated material up an incline that extended into the cellar. The steel rope shown in the foreground was used after the accident and until the job was finished. The man was killed by the loaded car running wild down the incline when the rope broke.

FIG. 1. HEADFRAME TOP OF INCLINE

In order to quickly and conveniently remove the dirt from the cellar, an incline track had been erected, as shown in the diagram, Fig. 2. This incline was about 49 ft. in length. Commencing at the top or outside dump, the incline pitched 6 deg. for the first 6 ft.. then 22½ deg. for 27 ft., and then 10 deg. for the remaining 16 ft., after which the track ran level for 35 ft. About 20 ft. from the end was a shunting track.

Two mine cars were procured for the purpose of conveying the excavated dirt up the incline, and a full-sized, ⅝-in., or more likely 1 5/16-in., rope was used, a team of horses being employed to pull the loaded cars

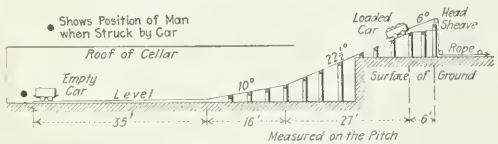


FIG. 2. SHOWING PROFILE OF INCLINE

up the incline. The rope had just been bought for a best quality of manila rope and was new when put on this work. However, in my opinion, the rope was much inferior to the best grade of manila rope.

This new rope was put in and the work started Thursday morning. Some 200 cars had been pulled out of the cellar and when a loaded car was being hauled up, on the following Saturday afternoon, the rope broke about a foot from where it was coupled to the butt-stick of the horse's harness. The gross weight of the load being hauled was 2730 lb., the car weighing 840 lb. and the dirt 1890 lb. There was some dispute among the men regarding the weight of the load, and to ascertain this fact the loaded car was pulled out and weighed, showing its weight to be 2730 pounds.

At the moment when the rope broke the load was on the steepest part of the incline, approaching the knuckle, as shown. At the point where the break occurred, there had been more wear on the rope, for some two feet or more, than on any other part of the rope. I presume this was owing to the rope trailing on the floor when the car was being lowered.

The car had a sidedump and, after being emptied, was lowered by backing up the horses. The descending empty car kept the rope tight, until the car had reached the bottom of the incline. Then the car had to be pushed over the 35 ft. of level track, and the rope would trail on the floor. The extra wear on the rope was plain to be seen at the point where it broke close to the butt-stick, which was heavy and would have a tendency to hold the rope down on the floor.

The rope passed over three pulleys, as shown in the figure, a 9-in. pulley on top of the headframe, angle of deflection 70 deg.; a 9-in. pulley at the foot of the headframe, angle 90 deg.; and under a 5-in. pulley to hold the rope down.

We want to ask, What would be considered a safe working load on this incline, with the pulleys fixed as shown in the figure and using a ⅞-in. rope of this description, assuming the strength of the rope is decreased, say 15 per cent., due to wear? Also, what time would it take for the loaded car to reach the man, counting from the time the rope broke to the moment it crashed into the empty? The incline and track were in excellent condition.

MOSES JOHNSON.

Lethbridge, Alta., Can.

The load on the hoisting rope, at the moment of rupture, is the sum of the gravity pull and the track resistance. Calling the angle of inclination a, the weight of the loaded car, in pounds, W, and assuming a track resistance, in this case, of 30 lb. per ton normal pressure on this incline, which makes the coefficient of track resistance 30/2000 = 0.015, the load on the rope when the car is approaching the knuckle is

$$L = W(\sin a + 0.015 \cos a)$$

But, $W = 2730$ lb.; $\sin a = \sin 22\frac{1}{2}° = 0.38268$; and $0.015 \cos a = 0.015 \times 0.92388 = 0.01386$; giving for the load that broke the rope

$$L = 2730(0.38268 + 0.01386) = 1082+ lb.$$

The breaking strength of the best grade of manila rope (average of different makers) ⅞ in. in diameter is 6000 lb. The safe working strength of such rope should not exceed 800 or 1000 lb. It seems likely that, if this rope was of "best quality," its fibers had been badly injured and cut by the horses' hoofs and otherwise worn, which caused the break. Nothing but a ⅞-in., 6-strand, 19-wire, crucible cast-steel rope should be used for this work.

Calculation shows that, under fair conditions of car and track, the loaded car would reach the man in exactly 4 sec. after starting from the knuckle.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Mine Managers' Examination, Springfield, Ill., April 8, 1919

(Selected Questions)

Ques.—What is meant by the natural division of the air current in a mine, and what necessity arises for a different division of the air between the several districts of the mine?

Ans.—The natural division of the air in a mine is produced when no artificial obstruction is introduced into one or more of the airways traversed by the current. In other words, the air divides naturally between the two or more airways that may be open to its passage through the mine, the larger quantity of air circulating through those airways having the lesser resisting power; or, in other words, the airways having a larger potential, as expressed by the ratio of the sectional area to the square root of the rubbing surface of the airway.

It often happens that airways, or sections of the mine, that are more extended or which have a contracted sectional area require the larger proportion of the air circulating through the mine, owing either to a greater number of men working in the airway or section, or to the generation of gas. In such a case, it is necessary to place an artificial obstruction in the airway or section that would otherwise receive more air than its rightful proportion.

The obstruction placed in an airway increases its resistance and has the same effect as lengthening the airway, or decreasing its sectional area. In other words, it diminishes the potential of that airway or section with the result that the larger proportion of air is made to circulate through the other airway. This arrangement is described as "proportionate division" of the air.

Ques.—How is the resistance of a regulator calculated?

Ans.—In order to calculate the resistance of a regulator, it is necessary to multiply the unit pressure due to the regulator, by the sectional area of the airway in which it is placed. The pressure due to a regulator is equal to the difference between the natural pressure of the free or open split containing no regulator, and the natural pressure due to the passage of the required volume of air through the regulator, after it has been placed in position in the airway. The difference between these two natural pressures is the unit pressure due to the regulator, and which results in increasing the resistance in the regulator split. The increase in resistance, or the resistance due to the regulator is found by multiplying the difference in pressure just mentioned, by the sectional area of the airway.

Ques.—A fan running at 80 r.p.m. delivers 100,000 cu.ft. of air per minute in the mine; how much air will this fan deliver under the same conditions when running at 100 r.p.m.?

Ans.—Approximately, under fairly normal conditions in mining practice, the volume of air in circulation varies with the number of revolutions of the fan per minute. On this basis, the speed of the fan being increased from 80 to 100 revolutions a minute, the ratio of increase being $10/8 = 5/4 = 1.25$, the increased circulation will be $1.25 \times 100{,}000 = 125{,}000$ cu.ft. per min.

Owing to the change that takes place in the efficiency of a fan when its speed is much increased, this increase of quantity is not realized, in practice. More accurately, the fourth power of the ratio of increase in speed is equal to the fifth power of the ratio of increase in quantity; and, in this case, we have for the increased quantity when the increased speed ratio is 1.25, $100{,}000 \sqrt[5]{1.25^4} = 119{,}500$ cu.ft. per min.

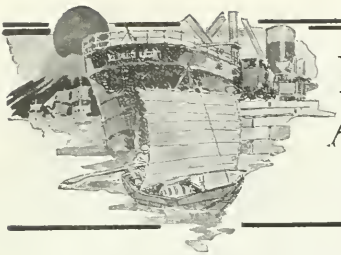
Ques.—How would you conduct your examination of a gaseous mine to ascertain its true condition?

Ans.—Such an examination must be made with an approved form of safety lamp that has been examined and tested. Before entering the mine observe that the ventilator is running uniformly at its regular speed. Then, proceeding to the foot of the downcast shaft or intake entrance of the mine, follow the air current in its course throughout the mine, examining in order each working place in each separate section of the mine, making a careful test at the face of every working place and observing the condition of each place to detect any danger that may exist, either from the presence of gas or bad roof.

Where gas is found, it should either be removed at once, by erecting the necessary brattice to deflect the air current so as to sweep the place where the gas is lodged; or, if this is not done, all entrances to the place must be safeguarded by a proper danger signal that will warn men not to enter. In this manner, the working faces must be examined, in each of the several sections of the mine, and the quantity of gas circulating in each section noted. Notes must also be made of the condition of each section of the mine, in respect to the presence of danger from bad top. A full report of the examination must be entered in a book kept for that purpose, immediately after the examination is finished.

Ques.—What load will a round iron bar one-inch in diameter carry, the tensile strength of the iron of which it is composed being 56,000 pounds?

Ans.—The tensile strength given is the ultimate or breaking strength of bar iron, in pounds per square inch, and assuming a factor of safety of 4 or 5, the safe strength of the iron may be taken as, say 12,500 lb. per sq.in. The sectional area of a bar 1 in. in diameter is $0.7854 \times 1^2 = 0.7854$ sq.in. The safe load, or the load such a bar will carry is, therefore, $(0.7854 \times 12{,}500) \div 2000 = 4.9+$ tons.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

America's Export Coal Trade Dependent Upon Return Cargoes

Our Export Trade in Coal Is Bound to Increase, But Permanency in Foreign Markets Depends in Great Measure on the Way We Treat Foreign Consumers

Great interest has recently been manifested by the Government Departments concerned with matters of foreign trade in the question of the coal export trade of the United States. The world's rapidly increasing consumption of coal and the dominant position of the United States as the owner of 55 per cent of the world's coal reserves seem to make it inevitable that the United States should participate to an increasing extent in the coal trade of the world. Not all of the coals of the United States are of a quality which would enable them to compete in the markets of the world. Reserves of high-grade bituminous coal which might successfully compete with British coals are mainly in the Appalachian field, and while large, possibly in excess of 40 billion tons, are far from inexhaustible. Furthermore, the ratio of annual coal output to reserves in the high rank coals is at present nearly tenfold that of the lower rank coals, indicating that our best coal will be the first to be exhausted.

Furthermore, although it seems assured that there will be available in from one to two years sufficient tonnage for the exportation of largely increased amounts of coal, nevertheless it is important that our ships should be used in the most advantageous manner; and from the standpoint of fostering domestic manufacturing industries it is better national policy to export manufactured products rather than raw materials. From the standpoint of economy in shipping space and profit, coal is a bulky and comparatively cheap commodity, and is therefore not an attractive cargo.

The small export coal trade in the United States is frequently compared disparagingly with the tremendous coal trade of Great Britain, but it must be remembered that Great Britain is essentially an importing nation and that much of her coal is exported in space that would otherwise be occupied by ballast. The United States, on the contrary, is in precisely the reverse situation, being essentially an exporting nation, and to force our export of coal under these conditions is to work contrary to normal tendencies.

In spite of the considerations just cited there are cogent reasons why the coal export trade of the United States is likely to materially increase within the next few years, and it is reasonable to believe that the United States may acquire a permanent foothold in many of the coal markets of the world. The information coming from Europe indicates that the coal production of Great Britain and Germany has been so reduced as the result of the war that there is now, and probably will be for several years to come, a great coal shortage in Europe unless the deficit is made up by the United States Neglected development work in many European mines during the war and the wrecking of mines in France add to the difficulties of early resumption of normal production. It is probable, therefore that the United States will as a measure of industrial relief be called upon to supply large amounts of coal to Europe; but, while American exporters may acquire a temporary foothold in certain of the European markets they will unquestionably face the possibility of being unable to compete in these markets when normal production is again resumed in Great Britain.

Certain other markets are virtually dependent upon the United States for their coal supplies—for example, the West Indies and Central America. Our present coal trade with these countries will presumably gradually increase, and may be extended permanently to certain parts at least of South America. An additional reason for encouragement of the export of coal is found in the added bunkering facilities which will be needed for our merchant marine so as to facilitate the export of products other than coal and to insure favorable coal prices for United States vessels bunkering in foreign ports.

Whether or not the United States eventually expands her export trade in coal to a magnitude comparable to that of British trade, the trade developed should be built upon the secure foundation of just and equitable treatment of foreign consumers, and, to insure this, provision should be made for grading and inspection of coal for export, either through the agency of the Government, the Coal Exporters' Association, or through some joint arrangement, so that the foreign consumer may be reasonably assured that he will receive the grade of material for which he places his order. Only through the building up, by such practice, of a reputation for integrity and efficiency can American exporters hope to retain permanently markets which may be acquired under the unusual conditions of the next few years.

Marine Strike Affects Exporters of American Coal

A threatened general tie-up of shipping along the Atlantic coast because of the refusal of private boat owners and the United States Shipping Board to grant the demands of the Marine Firemen, Oilers and Water Tenders' Union faces the coal industry. On Monday of this week the labor leaders claimed that between 250 and 300 vessels were idle in the New York harbor because of the lack of men and that men were leaving their vessels at all the ports from Portland, Maine, to Galveston, Texas.

The men demand a closed shop, three watches of eight hours each to replace the present system of two watches of twelve hours each, and an increase of $15 a month in pay. The Shipping Board and the American Steamship Association, the members of which are the private boat owners, have agreed to advance the wages of the men 10 per cent., but refused an eight-hour day except when the vessels are in port, and also refused preference to union workers in employment. This reply of the owners and the Shipping Board was rejected as not satisfactory by the union, and it was predicted that the strike would spread and that other unions would be involved. It was also predicted that the strike would spread to transatlantic vessels.

Coming at this time the trouble may prove of serious consequences to exporters of coal who are just developing foreign markets for this country's fuel. Many of them have closed contracts for large tonnages and prompt shipments, some of which are based on present freight rates. So far no serious delay has taken place because of the partial tie-up inaugurated. Shippers of bunker coals are already beginning to feel the effects of the strike, and unless it is quickly settled it is evident that embargoes will have to be ordered on shipments within a couple of days.

Lower Cost of American Coal Output Helps Export Trade

The advantage in the matter of exporting coal enjoyed by Great Britain and Germany is likely to be offset, under new conditions, it is pointed out by Dr. J. B. Umpleby, of the Foreign Minerals Division of the Geological Survey, who recently returned from the Peace Conference. The United States is handicapped by the fact that its export coal is from 300 to 400 miles away from tidewater and must pay an average freight charge of $1.40 a ton to place it at shipside. The effect of the rise in labor prices, however, is much greater in Europe than in the United States because of the greater output per man in this country. In support of such a contention, Dr. Umpleby cites the figures about to follow. The last figures available are those of 1912, but the general relation is the same. The value of coal at the mine and the output per person employed was:

	Average Value per Ton at Mine	Annual Output per Person Employed
Belgium	$3.24	155
France	3.05	200
Germany	2 52	269
United Kingdom	2.18	244
United States	1.44	660

The production and consumption of all classes of coal per capita in 1912, as shown by Dr. Umpleby, is as follows:

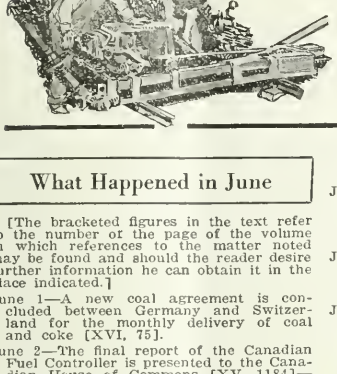
	Production, Tons	Consumption, Tons
United Kingdom	5.70	3.83
United States	5.00	4.82
Belgium	2.99	3.35
Germany	2.59	2.12
France	1.00	1.48
Austria-Hungary (1911)	0.31	0.52
Spain (1911)	0.18	0.31
Russia (1911)	0.15	0.19
Sweden	0.06	0 96
Italy	Small	0.28

In 1912, Great Britain exported 67,000,000 metric tons of coal. Germany exported, during the same year, 39,000,000 tons. In the five-year period from 1907 to 1912, British exports increased 1.4 per cent., whereas German exports increased 58.3 per cent., showing the great inroads that Germany was making in England's export coal trade before the war. The changed situation in Europe will curtail to a great degree, the coal exports of each of these countries, with the obvious deduction that the United States has a chance to get the business.

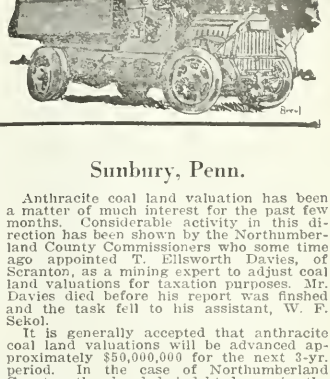
Cost to England of Control of Coal Industry

The parliamentary report of the London *Daily Telegraph* of May 19 states that the liabilities of the British Government in connection with the control of coal mines in the current financial year will amount to about $130,000,000, made up of: Wages and hours concession to miners, $100,000,000; compensation under control agreement, $24,000,000; emergency claims (advances), $5,000,000; indemnity to coal merchants, $750,000. The emergency claims are for the purpose of keeping open collieries which might otherwise be closed and making good extraordinary loss or damage, etc., while the indemnity to coal merchants represents the estimated loss arising during emergency arrangements for diversion of coal from its normal channels of distribution.

The Government of India will gradually relinquish its control of coal and abolish the present distribution system.



COAL AND COKE NEWS



What Happened in June

[The bracketed figures in the text refer to the number or the page of the volume in which references to the matter noted may be found and should the reader desire further information he can obtain it in the place indicated.]

June 1—A new coal agreement is concluded between Germany and Switzerland for the monthly delivery of coal and coke [XVI, 75].

June 2—The final report of the Canadian Fuel Controller is presented to the Canadian House of Commons [XV, 1184]—Senator Davis introduces a bill in the Pennsylvania Senate relative to mine cave conditions in the anthracite field [XV, 1101]—Mine workers at the Creighton and one other mine in Allegheny County, Pennsylvania, go on strike to compel a recognition of the miners' union [XV, 1132]—The final report of the Canadian Fuel Controller is presented to the Canadian House of Commons [XV, 1184].

June 3—The Second Pan-American Conference begins a four-day session at Washington, D. C., with delegates from North and South America in attendance —The Pittsburgh Coal Producers' Association holds an important meeting at Pittsburgh discussing the present and future coal situation [XV, 1102].

June 3 to 4—The West Virginia Coal Mining Institute holds its twentieth semi-annual meeting in Huntington, W. Va., at Hotel Frederick. Papers are read and discussed [XV. 1018].

June 4—The Pennsylvania Senate passes the McConnell bill relating to insurance [XV, 1101].

June 4 to 5—The Western branch of the Canadian Mining Institute holds a meeting at Nanaimo, B. C. [XVI, 66].

June 5—An ignition of powder takes place on a man trip in the Baltimore tunnel of the Hudson Coal Co., at Wilkes-Barre, Penn.; 92 men lose their lives as a result [XV, 1076].

June 10—The annual meeting of the West Virginia Coal Association is held at Huntington, W. Va., when officers are elected and the question of a continuation of Government supervision of the coal industry is discussed [XV, 1183].

June 11—The employees of Vesta No. 5, of the Jones and Laughlin company, return to work after a strike of eight weeks [XV, 1173].

June 12—A strike takes place at the mines of the West End Coal Co., in the anthracite field, 1500 mine workers going out [XV, 1173].

June 15—A secret session of past and present chiefs of the United Mine Workers of America is held at Atlantic City, N. J. [XV, 1172].

June 16—Two hundred coal miners at the Franklin-Tandy-Low mine near Brazil, Ind., strike when company ceases giving a bonus of 6c a ton [XV, 1173]—After a strike of one week, the Norfolk & Western Ry. motive power employees return to work [XV, 1173]—A strike of the Federation of Miners of France takes place, involving all the mine workers of that country, on a question of working time [XV, 1132].

June 17—The Flynn anti-sedition bill is defeated in the Pennsylvania House of Representatives [XV, 1183].

June 18—The coal mine superintendents of Peoria, Fulton and Tazewell counties, Illinois, meet at Canton, perfect an organization and elect officers [XVI, 36].

June 23—The American Federation of Labor meeting at Atlantic City declares itself in favor of a universal 44-hr. week [XV, 1172].

June 23-24—A conference of prominent educators is held in Washington, D. C.; the economic and business training of engineers being discussed [XVI, 65].

June 23-25—The coroner's jury sits at Wilkes-Barre, Penn., on the Baltimore tunnel disaster of the Hudson Coal Co. It refuses to fix the blame for the accident [XVI, 55-58].

June 25—Bills are introduced in each house of Congress proposing that the Federal Department of the Interior become the Department of Public Works [XVI, 17].

June 26—The Williamson Operators' Association holds a meeting and banquet at Williamson, W. Va. [XVI, 36]—Jerome Watson, chief deputy and safety commissioner of mines of the state of Ohio, sends a communication to the operators and miners of that commonwealth relative to the conveying of explosives into mines [XVI, 78]—A meeting of the executive board of the three anthracite districts of the United Mine Workers is held at Wilkes-Barre, Penn., to decide on details of the next tridistrict convention [XVI, 25].

June 26-28—The conferences started at Atlantic City commence anew at Charleston, W. Va. [XVI, 64].

June 27—The sedition bill is finally put through the Pennsylvania Legislature and signed by the governor. The bill amending the workmen's compensation law is also signed [XVI, 35]—Joint conferences of operators and mine workers are held in the Alabama district [XVI, 64].

June 28—The signing of the peace treaty takes place in Paris.

June 30—The Fuel Administration passes out of existence [XVI, 21]—An explosion occurs in the No. 15 mine of the Rock Island Coal Mining Co., at Alderson, Okla., with disastrous consequences [XVI, 79].

Harrisburg, Penn.

Coal producers in the central Pennsylvania field are complaining over the action of Secretary of the Navy Josephus N. Daniels in commandeering coal for the use of the navy. They do not question his right to do so nor the right of the navy to first consideration, but they do assert that he should expand his list of mines producing coal that would be acceptable to the navy. They contend that he steadfastly refuses to take coal from large producing mines, whose output is just as available for ocean shipping as that which he is now relying upon.

They also complain against his right to fix the price, pointing out that if coal is commandeered at a price below what they get in the market it is nothing more nor less than confiscation. An adjustment can only be obtained through the court of claims, which sometimes takes four or five years.

The operators in this section say there is no trouble at present in the car situation, but a shortage is anticipated later, particularly on the Pennsylvania lines. Many cars are being used in hauling coal to the Lakes for the Western trade and on the return trip they are utilized for hauling ore to the steel plants. The Pennsylvania R R. is usually shorter on coal cars than most of the other roads, for the reason that its lines extend through a greater coal producing district than most of the other roads, with the result that its cars must be sent over other lines in hauling the coal to its destination.

It is manifestly impossible to secure either labor or cars to handle a year's requirements of coal in seven months, which is what must be done if people will not place their orders for coal during the summer, when orders are needed, and it is for this reason that operators welcome a brisk demand at this time.

The Governor, on July 10, signed the Crow Bill, allowing coal companies to tunnel under rivers, providing they pay for the coal taken while tunneling.

Sunbury, Penn.

Anthracite coal land valuation has been a matter of much interest for the past few months. Considerable activity in this direction has been shown by the Northumberland County Commissioners who some time ago appointed T. Ellsworth Davies, of Scranton, as a mining expert to adjust coal land valuations for taxation purposes. Mr. Davies died before his report was finshed and the task fell to his assistant, W. F. Sekol.

It is generally accepted that anthracite coal land valuations will be advanced approximately $50,000,000 for the next 3-yr. period. In the case of Northumberland County, the bonded indebtedness is the reason advanced why taxes should be increased. There is a persistent demand that coal land valuations be increased and that it be not merely nominally. It is claimed that with the coal companies paying taxes on proper valuation, that it would be possible to pay off all county bonds as they come due. It is said that the valuation of all other lands in the county in question is about 50 to 60 per cent. of the full market value and it is thought that coal companies should be assessed on a like basis.

In his report to the Northumberland County Commissioners, Mr. Sekol recommends that coal in the ground be valued at 8c. per ton. In the case of the Susquehanna Collieries Co., Mr. Sekol's estimate as to the tons of coal unmined—29,000,000 tons—agrees closely with the result arrived at by the engineers of the Susquehanna company. The county commissioners assess the coal lands of the Susquehanna company on a valuation of $2,346,000 or about four times last year's valuation.

The appeal of the Susquehanna Collieries Co. from the assessments fixed for lands held by that corporation were heard on July 11 and it is understood that this company will carry the fight before the County Courts for final decision. The mine officials agree that some increase over present assessments is justified as assessments in general have gone up with values all over the country; the Susquehanna company is said to have agreed to double the former valuation in its appeal for a reduction of assessment.

It seems that a similar method of assessment is in effect in other counties. Furthermore in Luzerne County the assessment is from 14 to 15c. a ton on coal in the ground; in Lackawanna County the assessment is 22c. a ton. However, it is pointed out that in a comparison of rates of assessment, that conditions of seam occurence, cost of mining coal and other considerations should be taken into account.

Based on Mr. Sekol's report, the coal lands of the Philadelphia & Reading Coal and Iron Co., in East Hanover, Rush and Middle Paxton townships were assessed on a valuation of $1,372,814 or about $1,000,000 more than present valuation. The hearing of the appeals of the Philadelphia & Reading company were to be held on July 14.

Charleston, W. Va.

Mines marked time in West Virginia during the first five days of July, with not enough miners reporting during the week to produce much coal. While, of course, there was a general suspension of operations on July 4, miners frequently took the whole week off so as to be in at the demise of John Barleycorn in nearby states. Under such conditions production declined quite considerably. Indeed, it is doubtful if it reached as much as 50 per cent., taking the state as a whole, that being a loss of 25 per cent. or more for the whole state. However, it was regarded as certain that losses would be recouped to some extent during the second week of the month under favorable conditions. But for holi-

day conditions just described, there would probably have been an unusually good production because circumstances were favorable to full time operations; there were plenty of cars on hand in nearly all fields, while market conditions, generally speaking, were tending to stimulate the production of a larger tonnage. That was true beyond question as to smokeless coal both in prepared sizes and run-of-mine, the export demand for which was said to be lively; however, the demand for smokeless coal was not confined to export markets. In central southern West Virginia, territory production during June was in excess of that for June of last year, that not applying of course to the Pocahontas field where a strike held back production to a serious extent. While it appears to be difficult to move high-sulphur coal at the present time, on the other hand there is a pronounced demand for low sulphur fuel in eastern markets. At the outset of July there seemed to be a growing market for steam coal but such improvement as was observed was confined to eastern consuming areas. Prepared sizes of coal from the high-volatile fields were finding a ready market at better prices than in previous weeks, but mine-run and slack were not quite so active especially as to spot sales; there were a number of producers who were in no hurried mood to contract for delivery of their coal, in view of advancing prices and the prospect of further advances.

Losses in production followed in the New River and Winding Gulf fields in the early part of July, even though cars were furnished in sufficient number to make prompt loading possible, the dearth of miners being instrumental in lopping off many tons of production, the total tonnage mined not being over half of that produced toward the latter part of June. Far from abating, the demand for smokeless coal after July first was heavier than ever, producers reporting an extremely active export market as well as strong domestic demand from all consuming areas. The average price at which mine-run smokeless was selling, according to the best information obtainable, was $3.50 a ton while as for lump and egg, it was being quoted at prices ranging from $4.00 to $4.50 a ton and better. Smokeless producers hope it may not become necessary for the navy to adhere strictly to the requisition for smokeless coal, as Secretary Daniels recently indicated it was the intention of the navy to do.

Little attempt was made in the Kanawha region during the first week of July to produce any large amount of coal, it being out of the question with so large a portion of the miners away in quest of pleasure. Otherwise, so far as the car supply and markets were concerned, an increased production over previous weeks might have been possible, but for apparent reasons shipments were only about as large as during the last week of June or approximately 100,000 tons, perhaps not that much. Developments up until July 8 did not disclose much variation from previous weeks, at least as to mine-run and slack which are not as yet being produced to the maximum, this owing largely to the fact that there is not as lively a market for such coal as there is for prepared sizes. Producers gave it as their opinion that sales of mine-run, spot, were not being made on any considerable scale at the outset of the month; prepared sizes, however, quoted to jobbers at $3.25 and to the trade $3.50 being extremely active. The general average price for spot, mine-run, during the week was $2.10, contract from $2.25 to $2.35.

Fairmont, W. Va.

While the holiday at the end of the week made inroads on the output of northern West Virginia fields during the period between June 30 and July 5, yet during the first three days of the week in question a record for the present year was established in this section, shipments of coal exceeding in volume those for any like period since the latter part of 1918; at least that was true as to the mines in the Fairmont field. By the middle of the week, however, the mining and loading of coal began to diminish and for the last two days of the week production was light. The car supply during the first part of the week referred to was much better than that witnessed at the end of June. The number of idle mines in the field is being rapidly cut down. Shipments to Curtis Bay throughout June and, in fact, during the first few days of July, were unusually heavy, a large proportion of such coal being for export. The first week of July also brought a revival of the demand for northern West Virginia coal at Lake ports, there being a most perceptible increase in shipments to such points. There is this difference, however, in the sale of northern West Virginia coal: the low-sulphur coal is being readily sold while high-sulphur coal is not moving with so much alacrity. Formerly the high-sulphur coal was sold at Cleveland and other points, but adverse freight rates are debarring that kind of fuel from the Lake markets, it being found impossible to compete with Illinois and Indiana coals in that respect.

Huntington, W. Va.

An embargo of three days' duration as well as the holiday of the Fourth reduced production in the Logan mining district during the week ended July 5 to the tune of 57,000 tons or the difference between 237,000 and 170,000 tons. However, such a loss was rather to have been expected as production for the same period last year was only 175,000 tons. During the week ended June 28, a labor shortage was responsible for the loss of 8000 tons. In the following week the loss from the same cause was 33,000 tons. While labor shortage was on the increase, car shortage losses were being decreased from 30,500 tons to 10,589 tons. Mine disability losses were doubled, however, from 4600 tons to 9400 tons. But further improvement was observed in the market for Logan coal, there having been during the week ended July 5 a loss of only 6.49 per cent. of capacity amounting to 15,983 tons, as against a loss of 7.72 per cent. during the preceding week.

Figures compiled by the Guyan Operators' Association disclose the fact that the output of coal in the Logan field for June, 1919, was somewhat larger than the output of June, 1918; the tonnage for June, 1919, being 902,693 tons as against 902,484 for June, 1918, the average production for the month being nearly 70 per cent. Of a total loss in production during June, of 419,353 tons, the car shortage prevailing during the early part of the month was responsible for half or for 201,348 tons, there being a loss of 145,000 tons from no market.

The embargo, referred to in the foregoing paragraph, greatly reduced shipments from the Logan region to Lake ports via Toledo. It became effective July 3 and lasted over July 5, a congestion on Lake coal carrying roads and a shortage of vessels at the Lakes making it necessary to impose embargo restrictions.

Bluefield, W. Va.

As was true in nearly every other field of West Virginia, production was lowered in the Kenova-Thacker district during the week ended July 5 to the extent of 22,000 tons, dropping from 110,000 to 88,000 tons; this was, briefly, because of a shortage of miners due to the holiday, the shortage from such a source increasing from 4000 to 13,000 tons, or from 2 to 8 per cent. of full time capacity. On the other hand, the car shortage loss was cut down from 15 to 11 per cent., or from 26,000 to 18,000 tons. A better market was shown for Kenova-Thacker coal, the "no market" losses being cut in two, the tonnage loss coming down from 22,000 to 11,000 tons. Production only reached 56 per cent. of capacity as against 62 per cent. for the week ended June 28.

Largely because of a holiday among the miners lasting until Monday July 7, Pocahontas mines failed during the week ended July 5 to maintain the output at the mark of 336,000 tons set during the previous week, production dropping down for the time being to 237,000 tons, a difference of nearly 100,000 tons. An idea of the extent to which lack of miners affected production may be obtained from the figures covering that particular item of tons, 46,947 tons, as compared with 10,467 tons for the previous week. A loss of 27,000 tons, on the other hand, was cut off insofar as a shortage of cars was concerned. There was a market for all Pocahontas coal which could be produced. Coke production slumped to 4887 tons.

Duquoin, Ill.

The United States Fuel Co. has started operations installing large coke ovens near its mine at Benton, in Franklin County, and it is estimated that within the next few years practically all of the coal which is mined in this county will be transformed in byproduct ovens, into the three score valuable products which the commercial world is now using extensively. The United States Fuel Co. at the present time controls 33,000 acres of coal land in Franklin County and it has tested the coal in its mines in this district; the test proving successful, the company is now ready to do business on a larger basis. In addition to the many large and up-to-date mines which this concern operates in this section, it has also recently put into use the largest washer in operation.

Ground has been broken and tons of machinery are arriving daily, preparatory to the erection of the plant which will cost in the neighborhood of $3,000,000 and cover about 25 acres of ground. Heretofore only eastern mined coal in West Virginia and other places, has been successfully put through the retort oven process, but recent tests made by the company show that Illinois coal is capable of being successfully handled in the byproduct ovens. There are 12,000,000 tons of coal being mined annually in Franklin County by 13,000 miners and at the present there are 4 or 5 additional large mines being sunk. The sinking of these mines together with the installing of coke ovens will greatly increase both the tonnage of coal and the number of miners in this district. The entire output of the United States Fuel Co., will be put through the Semet-Solvay process in byproduct coke ovens.

In anticipation of an unprecedented increase in the volume of coal traffic in this section of southern Illinois coal fields, the various railroads operating through the section are making provisions for handling this business more efficiently and are appropriating thousands of dollars for this purpose. The Illinois Central has completed a large roundhouse in Duquoin and has five miles of new switching tracks to handle the thousands of cars which pass through here from Jackson, Williamson, and Perry and Franklin counties. The Illinois Central tracks in this city are the "clearing-tracks" for the long trains which come in daily from these adjoining counties. A large roundhouse has been completed at Carbondale to handle the business over the Carbondale-St. Louis, Carbondale-Herrin and Carbondale-Paducah, Ky., divisions. The Illinois Central has also commenced surveying in the southern part of Jefferson County, for a branch line to run through the coal fields in that region, which have had inadequate transportation facilities for some time.

Kansas City, Mo.

The board of directors of the National Coal Association held a meeting at the Baltimore Hotel, Kansas City, on July 9. The session lasted a little over an hour, during which time several important questions were brought up and discussed. Among these was a resolution urging the Director General of the United States Railroad Administration to make every effort to better the transportation conditions which have reached a crisis. Director General Hines was requested to make an official statement as to the present situation and also details of any action contemplated by the board to better the situation for the public's relief in the pressing coal shortage.

Vice President J. D. A. Morrow brought out the fact that the Government had failed to provide money to get out the weekly report on coal conditions and said that if the report was to continue, something had to be done immediately. President H. N. Taylor of the National Coal Association authorized the payment of a sum to carry on this work until the board could handle it. In the meantime the association would have Congress pass a bill to take care of the situation.

The Southwestern Coal Association presented an impressive and befitting testimonial to Mr. Taylor, in recognition of his splendid services to the Government, as assistant to Dr. Garfield, while representing the Railway Administration in the Southwestern territory.

Canada

Victoria, B. C.—Questions of direct interest to those identified with the coal industry in the Pacific Northwest came before the delegates to the International Mining Convention held at Nelson, B. C., June 19 to 21. Among matters discussed was the present strike of the coal miners in District 18 (U. M. W. of A. eastern British Columbia and the Province of Alberta). It was explained that the tie up in the Crow's Nest coal field was having a serious effect on the metal industry as the lack of coke interfered with the efficiency of the smelters, the industries referred to depend-

ing to a large extent on Fernie coke, to maintain operations. For this reason a resolution petitioning the Dominion Government to intervene in order that a settlement of the labor difficulties may be reached was carried unanimously.

Another matter receiving considerable attention was the use of powdered coal in British Columbia in the nodulizing of copper sulphide concentrate. Some difficulties of operation had been experienced but experiments seemed to show that powdered coal could be used provided proper equipment was employed. As coal dust firing was being used at reverberatory works and under boilers of various types in other sections and countries, a similar arrangement no doubt could be worked out for a nodulizing kiln. Touching on the question of costs it was estimated that between 12 and 14 tons of concentrates were treated with one ton of coal; the coal was charged at $5.00 a ton pulverized and in the bin. The popularity of powdered coal as a fuel was commented upon and it was thought that this development would result in making certain so-called semi-lignite coal of British Columbia a commercial possibility.

Dealing with the iron and steel industry in British Columbia, Dr. E. T. Hodge, professor of geology at the University of British Columbia, stated that there was plenty of good metallurgical coal available for the maintenance of a large smelter in the province. As to Vancouver Island coal it had been subjected to some experiments but he did not think that it could be definitely said that it was not a good coking coal until it had been tried in byproduct coke ovens. The coal of the Nicola Coalmont-Princeton Field, however, had been established as a fine metallurgical fuel. Coal dust, too, had been used to advantage in a blast furnace, so that, all things considered, there was no problem in connection with the securing of an adequate supply of fuel for the proposed iron and steel industry.

In connection with the mineralization of northern Manitoba, some of the problems to the development of this section were noted, among them being the fuel problem. Coke was priced so high that its utilization was almost prohibitive but it was thought that powdered coal might be used here.

The output for the coal mines of British Columbia for the month of May, 1919, was as follows:

VANCOUVER ISLAND

	Tons
Western Fuel Co., Nanaimo collieries	48,012
Canadian Collieries (D), Ltd., Comox collieries	44,297
Canadian Collieries (D), Ltd., Extension collieries	20,068
Canadian Collieries (D), Ltd., So. Wellington	7,783
Pacific Coast Coal Mines, Ltd., Morden colliery	6,170
B. C. Coal Mining Co., East Wellington colliery	1,508
Nanoose Collieries, Ltd., Grant colliery	397
Granby Consolidated M. S. & P. Co., Cassidy	6,887
Total	135,122

CROW'S NEST PASS COLLIERIES

Crow's Nest Pass Coal Co., Coal Creek colliery	26,064
Crow's Nest Pass Coal Co., Michel colliery	14,024
Corbin Coal and Coke Co., Corbin colliery	4,287
Total	44,375

NICOLA-PRINCETON DISTRICT

	Tons
Middlesboro colliery	3,108
Fleming Coal Co.	2,649
Merritt colliery	771
Coalmont colliery	706
Princeton colliery	1,095
Total	8,229

Alberta Province—Some interesting figures have been compiled by John T. Stirling, chief inspector of mines for this province. The figures show the coal output for the province during 1918 and indicate its relation to Canada's total production. During that year the consumption of coal was approximately 37,237,065 tons, of which 22,057,065 tons were imported from the United States; 2,559,041 tons of this amount were imported into western Canada. In 1918 there were produced in the province of Alberta 6,148,620 tons of coal, 160,470 tons of briquettes and 32,858 tons of coke. During the period in question 317 coal mines were in operation in Alberta. Seventy new mines were opened while nine old mines were reopened; offsetting this to some extent, there were 71 mines abandoned. To operate these mines an average of 2633 persons were employed above and 6141 below ground.

Anyox, B. C.—The byproduct ovens of the Granby Consolidated Mining and Smelting Co. are being heated up preparatory to their regular operation. This plant will provide the company's smelter with coke and also recover byproducts. When the company started this works at Anyox, the war was in progress and it was essential that the byproducts of coal should be retained in any coking that was done. Before its plans were completed, however, the armistice had been signed. Now the company proposes to operate its byproduct plant to secure coke for its smelter and recover, treat and market the coal byproducts entirely on a commercial basis. The company is securing the coal for its work at Anyox from the Cassidy collieries, Vancouver Island, where a new mine has been opened, a modern plant installed, and provision made for the housing or employees after modern ideas. Cassidy's output is constantly increasing.

Portland Canal District—The revival of interest in metalliferous mining throughout this district in northern British Columbia, has directed attention again to the Groundhog coal fields, as they are colloquially termed. These fields are situated about 90 miles from the mining town of Stewart. Judging from available reports the coal is of high quality and quite plentiful. To open up the district, railroad construction would be necessary and three feasible routes are being discussed. The shortest would be from Stewart, at the head of Portland Canal, from which point a railroad has been built 15 miles in the direction of the coal fields. Another route would be from tidewater up to Naas River, but this would be 80 miles longer; however, there would be less rockwork and an easier grade. A third possible route is from the Grand Trunk Pacific Ry., at Hazelton, about 150 miles southward. The Groundhog coal fields have been reported upon by a number of engineers and are known to extend some 70 miles, the strip being over 30 miles wide over which coal outcrops in different places.

PENNSYLVANIA

Anthracite

Lansford—Six men are dead and ten others are seriously and probably fatally injured as the result of an explosion of gas at No. 4 slope at a colliery of the Lehigh Coal and Navigation Co. at this place, shortly before quitting time on July 9. Most of the injured are in the state hospital at Coaldale. The cause of the explosion is not known; most of the injured were working up on a heavy pitch when the explosion took place, and were supposed to be using safety lamps. It may have been caused by a spark from an electric locomotive as the motorman was killed while working under his machine; or a large body of gas might have been ignited. Little damage was done to the mine workings, and the colliery was operated the next day. Several E. Bartlin, Chief of the State Department of Mines, has directed inspectors I. M. Davies, Evan G. Evans, A. B. Lamb and B. I. Evans to make a thorough investigation.

Wilkes-Barre—All the compensation cases growing out of the Baltimore tunnel disaster of the Hudson Coal Co. at this place were adjusted by July 9. It required exactly a month to settle satisfactorily more than 130 cases.

The estimated average compensation awarded in each fatal case where there is a widow or dependent parents is $4000, to be paid over a period of years. The compensation, exclusive of the disability cases, will amount to about $325,000; 138 children under 16 years of age will be benefited.

Agreements have been signed by 56 widows and 12 dependent parents. Of the 45 disability cases, 37 have entered into the compensation agreement; 36 out of the 37 men received the maximum compensation paid to them until they are able to return to work.

The promptness with which these cases were closed up and with everybody satisfied, may put a damper on agitation to compel the coal companies to carry their insurance with the state rather than in their own organization

Bituminous

Uniontown—The sale of the Nellie mines, one of the properties developed under the firm of Brown & Coheran, to Gaetano Corrado, for $20,000 was approved by Judge J. C. Work of the Orphans' Court on a petition presented by E. C. Higbee for M. M. Cochran, surviving trustee. The mine, located in Dunbar and Franklin townships, is now worked out. The mine was one of the first opened by Captain Samuel Brown and the late James Cochran in the lower Connellsville region. W. Harry Brown, representing the Brown estate approved of the sale.

Homer City—The Rochester & Pittsburgh Coal and Iron Co. have closed their Lucerne Shaft No. 3 mine at Lucerne mines, near here. All the coal from the No. 3 workings will be taken out through the No. 1 and 2 mines, thus saving the hoisting of the coal up the shaft. Men will be taken to their work in man-trips instead of being lowered down the shaft. The electric mine lamp houses have been combined and are now located at the sub-station at the entrance to the two drift mines. The new lamp house has about 1,000 lamps to give out daily.

Fayette City—Three men were killed and seven others were seriously injured on July 7, by a fall of rock and earth in the O'Neill mine of the Pittsburgh Coal Co., near this place. Approximately 300 miners were imprisoned in the workings by the cavein for 1½ hours. The rock and earth fell without warning and buried the ten men before they could escape. After an hour and a half of hard work the buried men were reached and removed from the mine. The men who were killed and injured were boarding a mine car to be taken to their working places when the accident happened.

WEST VIRGINIA

Richwood—The Elk Lick Coal Co. is about ready to begin the shipment of coal from its new plant near this place, in Nicholas County. All machinery is installed in the new tipple. The company has a large acreage of coal in the Sewell seam which it will develop.

Beckley—Twelve directors of the E. E. White Coal Co. were sufficiently interested in the employees to make a trip recently in a special train from Philadelphia to Glen White, near this place, to participate in the celebration there in honor of employees who have returned from service overseas.

Olcott—There was a disastrous flood in the Briar Creek Valley near Coal River, the bridge of the Kanawha Central railroad across Briar Creek near here being swept away. Of course that necessitated the cancellation of all trains and it is estimated that it will require a month to repair the damage brought about by the storm and flood. Several coal companies operate in the neighborhood of Olcott.

Short Creek—United States mine rescue crews have been fighting a fire in the Beech Bottom mine of the Richland Block Coal Co., of this place. The damage to the mine is heavy but it is hoped that the fire will be speedily subdued and that temporary repairs will make it possible to operate the mine. Several hundred employees are idle because of the fire. A short circuit following a fall of slate started the fire on July 3, at a time when only a few men were in the mine; fortunately they all escaped.

Hartland—Progress is being made by the Lima Coal Co. in getting its mine at Leatherwood ready for operation although considerable work yet remains to be done. The company is driving entry, is beginning actual construction work on its tipple and is also ready to begin laying track for the siding leading to its operation. As the Elk River will separate the mine from the tipple, a conveyor system is being installed. The secretary of the company, M. P. Goetschons of Lima, Ohio, is giving his personal attention to the work of construction.

Bluefield—Virginia and West Virginia business men have consummated negotiations with the Black Eagle Coal Co. for the purchase of about four thousand acres of coal land as well as for the other assets of the company, paying therefor in the neighborhood of $300,000, the property being in the Harlan field of Kentucky. The Black Eagle company has for some time been mining coal at two mines in the field. Among the purchasers of the land and mines referred to were F. C. Nelkerk, of Graham; C. B. Smith, of Maybeury; C. E. Wagner, of Bailey; C. M. Graham, of Graham; W. F. Harman, of Tazewell; W. R. Graham and E. T. Tyree, of Bluefield.

Mt. Hope—Two large companies in the New River field effected a consolidation on July 1 and in the future will be known as the East Gulf Coal Co. The companies combining were the East Gulf Coal Co. and the Small Coal Co. The latter is a new company organized a few months ago by Dr. Gory Hogg, S. A. Scott, J. Paul Stevens and others. Since its organization much headway has been made in getting a plant ready for operation. In order to cover the purchase, the capital stock of the East Gulf company was increased from

$500,000 to $800,000. The directors for the companies as reorganized include P. M. Snyder, J. L. Bumgardner, S. A. Scott and C. H. Grose. The officers elected were P. M. Snyder, president and general manager; J. L. Bumgardner, vice president; L. S. Tolly, secretary and treasurer; P. C. Thomas, assistant general manager.

KENTUCKY

Mt. Savage—The Frostburg Big Vein Coal Co. has taken over Union No. 1 and No. 2 mines, formerly operated by the New York Mining Co. By this transaction the new company, it is stated, will become the second largest producer of "Big Vein" coal in the Georges Creek region.

Jenkins—The Elkhorn Collieries Co., of Huntington, now operating here, is opening a new mine near Wheelwright, Ky., on the Left Fork of Beaver Creek, in Floyd County. The new location will be known as Redhall and shipments are expected to be made from this place by the end of summer. The mine is being opened on the Elkhorn seam. The company recently increased its capital stock to $100,000. The officers are as follows: B. L. Priddie, president; H. B. Hagen, vice president; R. W. Brunk, secretary and general manager—all of Huntington. These officers, together with J. F. Ratcliff and R. E. Bruns, compose the board of directors. Arthur Brunk is manager of the mine at Jenkins.

Louisville—While movement of river coal has not been very heavy the river coal companies have been bringing down enough coal to fully supply all concerns with equipment for handling river business. The T. J. Haifield, one of the largest tow boats on the Ohio, recently took a large tow of empty boats from the Falls Cities to the West Virginia mines. There have been excellent river stages.

There is no relief for the 1,000 shop men out at Louisville, under orders af the Railroad Administration, and not much prospect for improvement of car conditions. It has been announced that the lay-off will continue through July; it is not known what plan will be followed in August. However, many of the men are going into other industries, which will probably result in a shortage for shopmen, and a long period of bad cars.

The coal operators of the Louisville district, in fact the coal trade as a whole in this section is mighty glad to see John Barleycorn put out of business. While the average coal man is not a prohibitionist, he has been forced to recognize the effect of booze on labor, and troubles that come up, which could be averted if whiskey did not reach mining camps, especially during labor troubles. The greater part of the coal mining regions of the state have been dry for some time past, but booze has slipped in regardless of all efforts to keep it out. In the eastern Kentucky mountain district the moonshiners have been a thorn in the side of the coal operators since development was first started, and prospects are for a long and hard fight in this connection. Moonshining has been prospering in the ranges of the Cumberland Mountains in spite of the "revenuer" and has been especially noticeable since taxes climbed and values became greater. However, reduction of outside competition will result in keeping the miners closer at home, and reduce week-end trips to wet territory.

ILLINOIS

Springfield—Ten coal mines near here have been closed down because of the lack of work, these being the Capitol, Dawson, New North, Old Citizens, the two at Lincoln, two at Girard, one at Cantrall and the Tuxhorn mine. Other mines in the Springfield territory are working about two days each week.

Christopher — The inspection of Mine No 10 of the Old Ben Coal Corporation, at this place, Franklin County, is now being made by Joseph C. Thompson, director of State Department of Mines and Minerals and Archie Nelson and James Taylor, state mine inspectors. A recent explosion at this mine on June 6, in which three men were killed, is the reason for this inspection

Herrin—The surface plant of the Hafer Washed Coal Co., at Carterville, was destroyed by fire on July 8 when the engine room caught fire from defective wiring. The blaze started about 5:30 p.m. after the day shift had come up and before the night crew went below. The structures were of wood and the estimated loss is over $100,000. Several coal cars were also destroyed.

The large new $90,000 power plant of the Big Muddy Coal and Iron Co. at Clifford was put in operation on July 1. This plant furnishes power to No. 7 mine here and to No. 8 at Clifford as well as a washer at each of these places. The Public Service Corporation power supply was so irregular that the installation of this plant was necessary. Other mines are expecting to have to follow suit.

Sesser—The Old Ben Coal Corporation has acquired the big mine here of T. C. Keller & Co., of Chicago. The daily output is 3500 tons with 6000 acres of unworked coal. This gives the Old Ben people eight mines in Franklin County making them one of the leading producers in the field. The other mines operated by this company are: three at Christopher; two at West Frankfort; one at Buckner and one at Pershing.

Westville—The United States Fuel Co. recently completed 60 new houses near its mine at Benton, and these houses were immediately filled with families who have been waiting for months for their homes to be finished. During the past year this company has been greatly handicapped for the lack of men, mainly because there were no houses for them to live in. It is said that the company contemplates the erection of more houses in the near future.

Benton—The Supreme Court has decided an important case in options on coal rights. Farmers around Waltonville gave 18-month options on their coal without accepting the dollar mentioned in the option. The West Frankfort Coal Co. took options and covered the coal optioned previously. The first option owners sued the farmers and made the coal company a party to the suit. The Supreme Court decided as did the Circuit Court that the first options were not valid. That method of taking options is still prevalent in some sections of Illinois.

INDIANA

Georgetown—The Illinois & Indiana Coal Co. is developing a strip bank east of here. A switch has been put in and the smaller of two steam shovels to be used have been set to work. The company has purchased four tracts which will be used as sites for new mines.

Vincennes—The Washington-Wheatland coal mine, located on the county line between Knox and Davies counties, has been sold to a new organization known as the Standard Coal Company. The capital stock is $350,000. The new owners are John T. Oliphant, who has an interest in the Oliphant-Johnson mine; Ira D. Schaffer and John L. Baker.

Terre Haute—The Indiana Bituminous Coal Operators' Association was the host July 10 to about 40 mine inspectors from different parts of the United States, who were returning from the Mine Inspectors' Institute which convened in Indianapolis just previous to the Terre Haute visit. Carey Littleton, chief mine inspector, was in charge of the party. The visitors were taken up the Wabash River on the steamer Reliance and a barge and after a bountiful box luncheon inspected the Ferguson and Spears mine at Tecumseh. This mine is known as the "Sub-marine Mine," from the fact that the main entries are driven under the Wabash River to reach the workings that lie on the opposite side. Luncheon was served after the inspection. The following day the visitors went to Vincennes where they were entertained and banqueted by the American Coal Mining Co., after inspecting their mines at Bicknell.

Vincennes—More than 40 United States mine inspectors visited Vincennes July 11 and were taken for an automobile ride over the city, and then to Bicknell where they visited mines Nos. 1 and 2 of the American Coal Mining Co., in Knox County and returned to Vincennes for a banquet in the evening. Among the mines visited were the American mines near Bicknell, which for months held the world's record for hoisting in one day.

ALABAMA

Birmingham—Official figures as to the coal and coke output in Alabama for the year 1918 given out by C. H. Nesbit, chief state mine inspector, show 19,521,840 tons of coal and 4,344,726 tons of coke. The by-product coke production last year amounted to 2,611,215 tons, and beehive oven coke 1,733,511 tons. The coal production in Alabama in 1917 amounted to 20,412,841 tons, and 1916 to 18,234,625 tons. Coke in 1917, went to 4,868,598 tons, and in 1916 to 4,235,483 tons.

State Mine Inspector C. H. Nesbit will hold the mid-year examination of applicants for certificates of competency as mine foremen and bank bosses in his offices in the Chamber of Commerce Building the fact that the adjourned session of the Alabama Legislature will undoubtedly pass a Workman's Compensation Law, which will naturally cause an increased demand for men holding certificates of competency in the above line of work.

The coal output of the mines of this district for the week ended June 14 was 264,531 tons, an increase of 16,550 over production for the preceding week —an increase of 14 per cent. The increased consumption is largely due to the blowing in of idle furnaces. The Tennessee and Woodward companies have resumed operations at the Alice and Vanderbilt furnaces, respectively. Another of the bessemer furnaces of the Tennessee company will be blown in soon, it is stated. The active stacks of the district will be 20 compared with the recent 16.

A majority and also a minority report is to be submitted to the Alabama Legislature on the convict lease system. An effort is to be made to take the convicts out of the mines and work them upon the state highways. The majority report reviews conditions of convict labor at various industries in the state, citing statements of many witnesses as to inhuman conditions existing in convict camps. The matter is attracting much discussion and there is strong feeling that many of the abuses cited, at least as far as the convict miners are concerned, are much exaggerated. What may have been true years ago seems to have been largely corrected and today those in the mining camps are said to be humanely treated.

WASHINGTON

Seattle—Two new appointments as deputy mine inspectors were announced recently by James Bagley, State Mine Inspector of Washington. The two men receiving appointments were the following who successfully passed examinations held at the University of Washington: John Parker, of Black Diamond, and George T. Wake, of Roslyn, take up their duties under the new safety law which creates places for two deputies instead of one. S. H. Ash, the former deputy, vacated his place to take up other work.

Personals

Cleave Fuqua, formerly mine manager of the No. 6 mine of the Madison Coal Corporation, at Divernon, Ill., has been appointed master mechanic of this company's No. 10 mine at Central City, Ky.

Frank J. Hayes, president of the United Mine Workers of Illinois, has been able to leave an Indianapolis sanitarium after a few days treatment. He has been spending a few days at the sanitarium in rest and recuperation.

J. F. Wellborn, president of the Colorado Fuel and Iron Co., was elected director at large of the National Coal Association to succeed the late John P. Reese, of St. Louis. He will have supervision of the association's territory west of the Mississippi River.

Robert Henderson, fire boss at the Harewood Mine, Canadian Western Fuel Co., has been appointed manager of that mine in the place of Richard Batty, resigned. Mr. Henderson formerly was manager at No. 4 mine, Canadian Collieries (Dunsmuir), Ltd., Cumberland.

John A. Garcia, mining engineer, of the Allen & Garcia Co., Chicago, Ill., left on July 7 for a combined business and pleasure trip to Alaska. He expects to investigate the possibility of developing the coal fields in that section, returning the first week in August.

Charles G. DuBois was elected president of the Western Electric Co. to succeed H. B. Thayer; the latter was elected chairman of the board. Mr. Du Bois went with this company in 1896; his long association with Mr. Thayer in the administration of the company insures a continuity of policy and methods in the conduct of its business.

J. G. Bradley, of Dundon, W. Va., has been appointed by H. N. Taylor, president of the National Coal Association, as chairman of the new subcommittee on Railroad Relations of the general committee on Government Relations. Mr. Bradley is one of the directors at large of the National Coal Association as well as president of the West Virginia Coal Association.

Ralph E. Sunderland, of Omaha, vice president and general manager of the Colonial Coal and Timber Corporation, vis-

ited Charleston, W. Va., recently to establish general headquarters for his company. The Colonial company is a $10,000,000 concern and will start active work on its properties shortly. Mr. Sunderland's headquarters will now be in Charleston. **Walter L. Strickler** is the president of this new company.

F. S. Pfahler, general superintendent of the Northwestern coal properties in Illinois and Iowa, was appointed the successor of the late John P. Reese as general manager of the coal operations of this company. Mr. Pfahler has made Gillespie, Ill., his headquarters.

General Richard Coulter, of Greensburg, Penn., has accepted the appointment of Governor Sproul as one of the three brigadier generals to organize the National Guard of Pennsylvania. His appointment has been confirmed by the state Senate. General Coulter is president of the Keystone Coal and Coke Co., one of the largest coal companies of Westmoreland County, Penn.

L. C. Sprague, formerly district manager of sales of the Chicago Pneumatic Tool Co., at New York, has been appointed manager of western railroad sales, with headquarters at the Fischer Building, Chicago. **H. G. Barbee** has been appointed manager of eastern sales with headquarters at 52 Vanderbilt Ave., New York City. **Nelson B. Gatch,** formerly district manager of sales at Chicago, has been appointed district manager of sales at New York succeeding Mr. Sprague.

Eliot Blackwelder, head of the Department of Geology of the University of Illinois, whose resignation at the university becomes effective September 1, has already entered upon his new work with one of the large mining companies of Montana, which will take him immediately to New Mexico to do field work. During the coming winter he will furnish the basal ideas upon which a staff of younger geologists will work. Prof. Blackwelder began this work a number of years ago and it will constitute a detailed geological history of the Rocky Mountain region. While with the University of Illinois he has also given courses at Leland Stanford University. Prof. Blackwelder has been appointed a member of the geological division of the National Research Council.

Judge E. H. Gary, chairman of the board of directors of the United States Steel Corporation, accompanied by a number of officials of the company, went aboard a steamer on the Monongahela River at Ronco recently and inspected coal roads and the new byproduct plant at Clairton. It is intimated that this visit of the Steel corporation officials anticipates some important changes in the coal and coke producing plants of the company. It is expected that the mines in the upper pools will be pushed to the limit, while other workings will have to be changed to deliver their product to the river. Additional tonnage may have to be found by opening up new properties for the big Clairton plant in operation; it will be the largest byproduct plant in existence when completed.

Obituary

Elias Hopkins, inside foreman at William Penn colliery, Penn., shot himself through the right temple while in the mines on July 3. The act was committed in a fit of despondency due to poor health. A widow and five children survive.

Vincent Mauck, active in the Danville, Ill., mining field since Civil War days, died July 4 at the age of 84 years. He owned and operated a number of coal mines in the Danville territory. Four of his sons are interested in the coal fields near Danville.

John Wood, of Pottsville, Penn., died on July 7, at his home at the age of 70. He had been a superintendent of the Philadelphia & Reading Coal and Iron Co. for 29 years. Among his survivors are George Wood of Hazleton, Penn., division engineer for the Lehigh Valley Coal Co.

W. S. Hurst, of Williamson, Mingo County, W. Va., met his death in the New York Central wreck at Dunkirk, N. Y., on July 1. Mr. Hurst was a director of the Winifrede-Thacker Coal Co., of Nolan, and had been re-elected as a member of the Executive Committee of the Operators' Association of the Williamson field only a few days before his death. He is survived by a widow and one son, W. R. Hurst, who was also injured in the same wreck in which his father was killed.

Coming Meetings

New York Coal Merchants' Association will hold its annual meeting Sept. 11-13 at Alexandria Bay, N. Y. Executive secretary, G. W. F. Woodside, Albany, N. Y.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

The National Commissary Managers' Association will hold its annual meeting August 5-7 at the Sinton Hotel, Cincinnati, Ohio. Secretary, D. J. Eichoff, Manhattan Building, Chicago, Ill.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting July 23 and 24 at Reading, Penn. Secretary, W. M. Berolet, Reading, Penn.

National Exposition of Chemical Industries will hold its fifth annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

The National Safety Council will hold its annual meeting Oct. 1 to 4 at Cleveland, Ohio. Secretary, S. J. Williams, Chicago, Ill.

Recent Coal and Coke Patents

Ventilating Apparatus for Mines. D. F. Lepley, Connellsville, Penn., 1,297,191, Mar. 11, 1919. Filed Sept. 19, 1917. Serial No. 192,164.

Furnace Grate. W. M. Duncan, Alton, Ill., 1,297,116. Mar. 11, 1919. Filed Dec. 10, 1918. Serial No. 266,120.

Sectional Coal Auger Nut. J. H. Mason, Duncan Falls, Ohio, 1,297,215. Mar. 11, 1919. Filed July 22, 1918. Serial No. 246,251.

Trade Catalogs

Crushing Rolls. Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 1816. Pp. 16; 8 x 10½ in.; illustrated. Rolls of various designs are illustrated and briefly described.

Storage Battery Locomotives. The Ironton Engine Co., Ironton, Ohio. Folder including letter. Pp. 4; 8½ x 11 in.; illustrated. Facts and illustrations of industrial storage battery locomotives—also charging outfit.

Direct Current Motors and Generators. Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 1096-A. Pp. 20; 8 x 10½ in.; illustrated. Gives details of types "K" and "KC" motors and generators and notes their application in industries.

Stationary and Portable Air Compressor Equipments. Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin No. 1195. Pp. 7; 8 x 10½ in.; illustrated. General description given of electrically driven air compressors and accessories and equipment.

Direct Current Generating Sets. Engberg's Electric and Mechanical Works, St. Joseph, Mich. Catalogue No. 103. Pp. 32; 8½ x 11 in.; illustrated. Descriptions of engines and other parts of electric generators and accessories; working drawings given; applications of the generating sets illustrated.

Wilmot Complete Repair Parts. Wilmot Engineering Co., Hazleton, Penn. Catalogue. Pp. 118; 7 x 10 in.; illustrated. Notes particulars about all the necessary parts applicable to the various types of machines and equipment built by the Wilmot company. Numerous illustrations and full instructions specify information required in ordering material or equipment.

Industrial News

Elkins, W. Va.—Work has recently been completed by the Elkins Coal & Coke Co. on the complete electrification of its mines and plants in the Elkins district.

Richwood, W. Va.—The Elk Lick Coal Co. has recently completed the construction of a new tipple and incline at its properties here and also the installation of mining machinery.

Grove City, Penn.—The Atlas Coal Co., of this place, intends making improvements to its plant in the near future by installing machinery and boilers. The improvements will cost in the neighborhood of $50,000, it is stated.

Roanoke, Va.—At a recent meeting of the board of directors of the Pocahontas Coal and Coke Co., Thomas Reath was elected assistant general counsel of the company, with an office in the Commercial Trust Building, Philadelphia, Penn. The secretary of this compay is O. Lynn Bottomley.

Wilkinsburg, Penn.—Frederick & Co. has recently completed negotiations for the purchase of 1200 acres of coal properties in the vicinity of Farmington, W. Va., and it is understood that the company is arranging to commence work at an early date for extensive development. Fred A. Sesler is president.

Whitesburg, Ky.—It is reported that the McKinney Steel Co., operating at Wolf Pit, is planning to install a large power plant in connection with development of about 40,000 acres of coal land. The company also expects to erect several hundred modern miners' houses, and develop on a big scale.

Baltimore, Md.—The Peerless Coal Mining Co., Munsey Building, of this place, is understood to be arranging plans for the development of coal properties comprising about 4000 acres located in the vicinity of Red Rock, W. Va. It is expected to have an ultimate output of about 2000 tons daily.

Pittsburgh, Penn.—The Edison Storage Battery Co. announces the removal of its district office here to Room 431 Union Arcade Bldg. The removal has been made necessary by the increase in the volume of business handled through this office. The new location provides better facilities and has large office space.

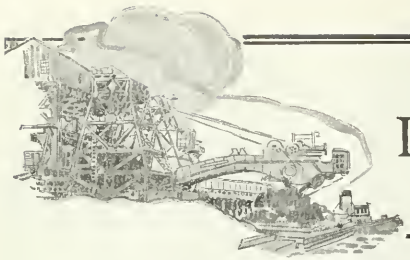
Henlawson, W. Va.—The Merrill Coal Mines, Inc., is the title of a $600,000 corporation organized here for the purpose of developing 3800 acres of coal lands in Logan County.

The improvements are to include a tipple to cost $70,000. Five hundred miners will be employed, and a town to accommodate that number will be erected. L. B. Conway of Roanoke, Va., is president of the company; C. W. Jones of Cora, W. Va., vice president and General manager, and C. G. Holland, of Roanoke, secretary and treasurer.

New York, N. Y.—The New York Steel Exchange, Inc., controlled by Mark R. Lamb, is having plans prepared for two coal plants in the Lens district of France. These plans are under the supervision of the Wood Equipment Co., and the Allen & Garcia Co., both of Chicago. The proposed equipment includes a revolving car unloader, skip hoist and modern efficient labor saving devices. The merger of Mr. Lamb's export business in mining and other heavy machinery with the export business in iron and steel products, provides facilities for handling the two groups of clients.

Reading, Penn.—Announcement has been made by the Pennsylvania Retail Coal Merchants' Association that the fifteenth annual convention of the organization will be held at this place on July 23-25, inclusive, with headquarters at the Hotel Berkshire. It is interesting to note that this will be the first annual meeting of the association since 1914, and it is expected that a very instructive program will be followed through. In connection with the meeting, the arrangement committee is planning to present an exhibition of the latest equipment in coal handling machinery, supplies, etc., at which a number of the leading manufacturers of these specialties will take an active part.

New York, N. Y.—W. H. Truesdale, president of the Lackawanna R.R., devotes considerable space in his report for the year ended Dec. 31, 1918, to the activities of the coal properties of the company, saying that the mining operations were somewhat reduced, owing in great part to the scarcity of labor, many of the mine employees either having been called into active war service or secured employment in munition factories, shipyards or Government work of other kinds, owing to the high wages paid. He says that although the wages of all mine employees were substantially advanced on two occasions, and that the prices of coal to the public was increased, these price increases did not prove sufficient to reimburse the mining companies for the wage increases plus the high cost of materials used in mining operations.



MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Soft Coal Market Tightening, with Prices Going Higher—Production Far Behind Last Year —Anthracite as Short as Ever—Steam Coals Moving Well—Output of Domestic Sizes Not Equal to Demand

AN INCREASE in the demand for bituminous coal was felt along the Atlantic Seaboard, and as a consequence the price of the quality grades has gone up. Operators and shippers were expecting the spurt, but labor shortage and inadequate car equipment militated against any record outputs being made. For the week ended July 5 (the latest statistics available) the production of soft coal amounted to 7,469,000 net tons. The output of the bituminous coal mines for the calendar year to date totals 220,361,000 net tons, or nearly 74,500,000 net tons less than than in the corresponding period last year.

Coal not under contract was eagerly sought at the various tidewater ports. The demand for New River and Pocahontas coals was even more urgent than formerly, and quotations for the former were given for twenty-four hours only and at around $6.25 at Hampton Roads for the standard used by the Navy Department.

From Pittsburgh comes the report that much uneasiness is being felt that production will not be sufficient to meet industrial requirements in that region.

As the season advances, the domestic sizes of anthracite are becoming more scarce. It is unlikely that this condition will better itself, as the lack of labor at the mines and the deficit in the production of hard coal are handicaps that it will be impossible to overcome. For the week ended July 5, the anthracite output was 1,408,000 net tons, making the total production to date 40,204,000 net tons, or 10,600,000 net tons less than in the corresponding period last year.

Finding it difficult to obtain the egg and stove sizes of hard coal, consumers are accepting either chestnut or pea in lieu thereof, and this is serving to relieve the situation somewhat.

Steam coals, too, are not so easy to obtain as they were a week or so ago. Buckwheat is readily absorbed by the trade, and rice and barley are firmer, owing to a decrease in production at the washeries.

WEEKLY COAL PRODUCTION

The production of bituminous coal in the week ended July 5 is estimated at 7,469,000 net tons, an average per day for the five working days of 1,494,000 tons, compared with an average per day of 1,576,000 tons in the previous week, as against 2,050,000 tons in the week ended July 6, 1918. The production for the calendar year to date was 220,361,000 tons, nearly 74,500,000 tons less than in the corresponding period last year. The average daily production, considering only working days, has been about 500,000 tons less this year than last year.

The estimated production of anthracite in the week ended July 5 was 1,408,000 net tons, compared with 1,735,000 tons in the corresponding week last year. The average daily production in the week ended July 5 (a 5-day week) was 282,000 tons, compared with 307,000 tons in the previous week and 347,000 tons in the corresponding week last year. The production of anthracite to date is estimated at 40,204,000 tons, or 10,600,000 tons less than in the corresponding period last year.

Returns from the operators for the week ended June 28 record a general improvement in market conditions, the loss of time on account of no market averaging 29.2 per cent. of full time in the week, compared with 29.3 per cent. in the week ended June 21, and more than 32 per cent. in the first half of June. Market conditions in Illinois and western Kentucky recorded a notable improvement. Less than 4 per cent. of the full-time operation was lost because of no market in western Pennsylvania, less than 9 per cent. in the Westmoreland and neighboring fields. Central Pennsylvania showed an improvement. Car supply in southwestern Virginia was better in the week ended June 28 than in the previous week, but in several of the other districts, including northern Ohio, Pennsylvania, northern West Virginia and eastern Kentucky, slightly greater losses of time were reported because of the lack of cars.

The production of beehive coke in the week ended July 5 is estimated at 262,410 net tons, compared with 579,000 tons in the week ended July 6, 1918, and with 283,600 tons in the last week of June, 1919. The production in the week ended July 5 was curtailed because of the celebration of the holiday on July 4.

Bituminous coal dumped at lower Lake Erie ports in the week ended June 28 was 934,901 net tons, compared with 1,058,273 tons in the week ended June 21 and 900,000 tons in the last week of June, 1918. The total lake coal dumped to the end of June of this year was 9,129,502 tons, compared with 7,699,423 tons in the corresponding period last year.

BUSINESS OPINIONS

Dry Goods Economist—The movement of dry goods over the counter continues to be steady throughout the country, and, in consequence, stocks of many lines of goods are becoming depleted. Due to the semi-annual stocktaking which will occur in most stores the last of this month, there has been the usual falling off of orders for many lines of goods.

Marshall Field & Co.—Current wholesale distribution of dry goods ran considerably ahead of the large volume of the corresponding week a year ago. More merchants were in the market than during the same week of 1918. All report retail business as excellent. Orders from road salesmen for both immediate and future delivery were very much greater than for the comparative period of last year. Collections continue satisfactory.

The Iron Age—Improvement in the steel situation is asserted in stronger terms this week. Mill schedules show it, particularly in the Central West. In a number of finished lines bookings are large and the opinion has been ventured that May output will stand as the low record of the year. Steel ingot production fell last month to an average of 85,000 tons a day, against 102,500 tons in April, a decrease of 17 per cent. The May rate represents about 26,000,000 tons a year, or about 55 per cent. of the country's capacity.

American Wool and Cotton Reporter—Wool is being held at very firm prices. Higher prices are being asked for wools in the West, although in some localities the clip is cleaned up. The demand for raw cotton may not appear exceptionally large but the supply is not so large as published figures indicate. The prospective demand from other countries or increased exports has not been discounted at all. The higher price for cotton is due to general inflation and to higher producing costs in combination with the ability of holders to keep their cotton.

Atlantic Seaboard

BOSTON

Appreciable hardening of prices on better grades. Light output causes renewed buying interest. Inferior grades dull, but gas coals are being rapidly sold up. Possible strike of marine workers a factor in water coal. Hampton Roads coals subject to slow loading. Future of market in this territory in doubt, due to uncertain requirements the next six months. Holiday interval leaves loading piers almost bare of anthracite. Shipments of pea urged.

Bituminous—The quality grades are noticeably firmer in price. Grades that were selling at $2.95 a fortnight ago are now commanding more than $3 for spot shipment. While there is no great pressure to get these coals forward, it is easy to see that the demand is improved. Those steam users who have ordinarily taken coal via water routes and this season made it a practice to test different grades all-rail have now had it forced on their attention that the tonnage of desirable coals available is much less than they supposed, and that for the balance of the season they will be obliged to take what they can manage to pick up from one region or another. It develops that a number of operators in making season contracts reckoned on much larger output than now seems possible, and the extent to which mine-workers have left certain of the districts is little short of alarming. It will take more than advanced prices to bring them back, as the situation looks now.

Extremely light shipments since July 1 have reminded buyers that they must be forehanded in taking on coal. There has been renewed buying on that account the past week, and should this continue there would doubtless be a further stiffening of prices for prompt shipment. Already there are operators who are charging 20c. advance for deliveries after July 31, and this reflects the present state of the all-rail market in New England. Only small ton-

nages are involved in present sales and reserves are still abnormally large, but there can be no question of a much more wholesome situation from the operator's standpoint than has prevailed for many months.

On the other hand, the inferior grades still meet with hard going. Coals from the Fairmont region, limited as they are by the tariffs to certain parts of this territory, are still being pressed upon unwilling buyers. Prices are unchanged on these grades, and efforts to contract meet with little response because deliveries from that section have usually proved undependable when railroad conditions were unfavorable. Already there are indications of large numbers of crippled cars being stored on various sidings, and in July this is hardly a good sign.

The better grades of gas coal have met with much better sale the past fortnight than during any similar period earlier in the year. The new impetus given the iron and steel industry is largely responsible, and not only are screened coals in better demand, but run of mine and slack are already commanding better prices. This is particularly true of the Greensburg district, where operations are now apparently well supplied with orders and output is as great as the labor supply will permit.

Coastwise trade has been upset the past week by the threatened strike of 40,000 marine workers. This was to be effective July 15, and steamers and tugs have been enabled to leave port the last few days only through promises on the part of owners that their wages will be adjusted. At this writing it is rumored that through intervention of the Shipping Board an increase of 10 per cent has been granted along with an eight-hour day while in port and preferential employment of American workers. A tie-up of coast-wise shipping would be serious in its effect on coal alone, for there are several distant markets in South America and overseas that are practically dependent upon current deliveries.

Steamers at Hampton Roads have been meeting with slow dispatch now for two or three weeks. Coal has come down in irregular volume and it has become increasingly difficult for the agencies to plan shipments. Current sales of Pocahontas and New River at this end are now being made at stated prices f.o.b. cars plus steamer demurrage. In some cases the latter item has amounted to 40c., and this is another reason for the improved demand for Pennsylvania coals all-rail. Receipts from Hampton Roads are still relatively light and are confined largely to consumers who take their supply at tidewater points. Spot coal at the piers is hard to get, but no material advance in price has yet been reported.

The outlook for September is favorable to a better market in this territory, but there is still some doubt whether we shall have the broad market which has been so freely predicted. Strange as it may seem, there is no apparent anxiety on the part of steam-users through New England, due partly to heavier reserves than used to be customary and also to the uncertainty what requirements are to be the next half year. Manufacturers are basing their probable needs on an output somewhat greater than present business would warrant, but there is not yet in sight the large orders that were expected.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$3.00@3.40
F.o.b. Philadelphia, gross tons	4.27@4.95	5.20@5.55
F.o.b. New York, gross tons	4.62@5.29	5.55@6.00
Alongside Boston (water coal), gross tons	6.10@6.85	7.00@7.50

Georges Creek is still quoted at $3.70 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $5.14@5.35 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $7.32@7.60, and on cars Boston and Providence at from $7.50@7.90 per gross ton.

Anthracite—Output was seriously let down during the July 4 celebration and as a result domestic sizes have been in extremely short supply at the Philadelphia and New York piers. Barges have been waiting ten days to two weeks for egg and stove, and at Philadelphia bottoms that were scheduled to load anthracite have been turned over to shippers of bituminous. All-rail shipments have been similarly disappointing and retail dealers especially in the larger towns and cities are much exercised at the slowness with which coal comes forward. This territory is flooded with circulars from various independent operators who on paper have offered their egg and stove at premiums as high as $1.25, but when favored with spot orders they seem quite as slow making shipments as the companies at circular prices.

Pea has been in long supply all season but only within a few days have retail dealers shown any disposition to take on straight cargoes of this size. The extreme shortage of the major sizes, however, has encouraged this to some extent and it is quite likely that a large tonnage of pea and buckwheat will be moved this month.

NEW YORK

Dealers are hard pressed for domestic coals, which are becoming scarcer. Demand from Canada and New England increases and quick deliveries are urged. Anthracite steam coals not so plentiful, with prices easy. Market for bituminous in better shape. Demand increases followed by slight advances in prices for various grades. Export and bunker business bit by shipping tie-up.

Anthracite—The trade continues to be pushed for the domestic coals, which appear to be getting tighter as the season advances. There is nothing ahead that would indicate a betterment of conditions outside of a heavy increase in production, and that is unlikely when one considers the present deficit in this year's tonnage figures and the lack of labor at the mines.

Local retail dealers are heavily booked with orders, and instead of having an easy summer season, as was the case a couple of years back, they are prepared for hard work. There is hardly a customer who does not want his coal "at once," notwithstanding that he may have many orders ahead of his. Because of this urgency and his inability to get as much of the domestic coals as he can use, the retailer has his own troubles trying to please everybody.

The situation regarding egg and stove sizes has not changed materially. These coals are hard to get from the producers, and as this is well known to consumers the dealers are not having so much difficulty as formerly in substituting either chestnut or pea size. This concession on the part of the consumer has served to reduce the supply of chestnut and pea at the docks.

Independent coals are much in demand, and while much is heard of premiums being offered for quick shipments, especially to Canada and New England, nothing has been heard that would indicate that anything more than $1 has been offered for coal to be sent to Canada. New England dealers are in the market for all of the domestic coals they can get. They claim to be far behind in stocks and are anxious to fill their bins before transportation difficulties set in.

The steam coals are in better shape. Buckwheat is not so free as it was a week or ten days ago, and more of it is being absorbed by the trade, especially when it is possible to secure either of the larger sizes with it. Rice and barley are firmer, due to lessened production of the washeries. There has been practically no change in quotations, a good grade of barley being quoted around $1.90 at mines.

Dealers are interested in the shipments of anthracite last month, which showed a decrease of 92,324 tons as compared with May, the larger part of this decrease being attributed to the smaller output of steam coals from the washeries.

There were 4908 cars of anthracite dumped at the railroad piers here during the week ended July 11 as compared with 5485 cars the previous week. The reports also show 2809 cars on hand as compared with 2773 cars on July 4.

Current quotations, white ash, per gross ton at the mines and f.o.b. at tidewater, at the lower ports, according to company schedule, are as follows:

	Mine	Tidewater
Broken	$5.95	$7.80
Egg	6.15	8.00
Stove	6.40	8.25
Chestnut	6.50	8.35
Pea	5.10	6.85
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The bituminous market is in better shape and the prospects are bright. Demand has increased and prices have stiffened slightly. But, on the other hand, is the threatened marine strike which may tie up much of the coastwise shipping and may menace transatlantic transportation. Such a tie-up would cause a serious loss to producers of bunker and export coals.

Producers and shippers for the most part have been optimistic for some time and were prepared for the spurt that developed during the past ten days. Free coals at the various tidewater ports were eagerly sought, and within a few days most of it had been picked up at prices slightly higher than those that prevailed for a couple of weeks back. While some of the buying no doubt was the result of the advertising campaign instituted by coal associations, more of it was due to reduced stocks in the bins of manufacturers, who have been entering the market in greater numbers the past few weeks. These heavy buyers now realize that if they want to be protected this fall and winter from the lack of coal they must begin now to replenish their bins. Contract holders are receiving their full allotment of coal.

The increase in demand was not confined to this market alone, but was spread over almost the entire eastern section of the country. Reports from along the railroads show a heavy call for coal and a slight increase in mine prices.

Operations failed to respond generally to the extra call. In addition to the slowness of labor the trade is now confronted with a slackened car supply besides poor equipment. Warnings have been given many times this spring that cars would be short this fall because of the heavy demands of the steel industry and the need of cars to move grains, but it was not expected that this demand would set in until later.

Supplies here are considerably smaller than they were a week ago, but there is no trouble to make shipments promptly. Some of the pools are almost clear of free coals.

There is a heavy demand for New River and Pocahontas coals. Quotations for the former are given for 24 hours only and are around $6.25 for Navy Standard at Hampton Roads. From Pittsburgh comes word of much uneasiness because of the fear that production will not be able to take care of the requirements of the industries. Youghiogheny gas coal of good quality was quoted early in the week around the $3 mark. Smokeless coals were moving rapidly.

Quotations for the various pool coals f.o.b. piers here ranged about as follows:

Nos. 1 and 71, $5.50 to $5.65; No. 9, $5.30 to $5.60; No. 10, $5.00 to $5.25; No. 11, $4.75 to $5.00; and No. 18, $4.35 to $4.50.

The range of prices for spot coals at the mines ranged about as follows:

South Forks (Best)	$2.95@3.25
Cambria (Best)	2.75@2.95
Cambria (Ordinary)	2.45@2.60
Clearfield (Best)	2.75@2.95
Clearfield (Ordinary)	2.45@2.60
Reynoldsville	2.50@2.75
Quemahoning	2.75@2.95
Somerset (Best)	2.75@2.95
Somerset (Poor)	2.15@2.35
Western Maryland	2.25@2.50
Fairmont	1.90@2.25
Latrobe	2.10@2.25
Greensburg	2.35@2.50
Westmoreland ¾ in	2.60@2.75
Westmoreland run-of-mine	2.35@2.50

PHILADELPHIA

Anthracite retail trade held back by light shipments. Premiums in other markets hurt local trade. All dealers want stove; chestnut and egg in strong demand, but pea plentiful and inclined to drugginess. Production fair. New ordering is light. Advertising and rumor of freight change cause some new business. Retail prices grow firm. Steam coals off, and storage increases. Bituminous high grades scarcer. Good business in other grades. Prices firm.

Anthracite—With plenty of orders on their books the local retailers are making little progress with deliveries. The shipments recently have been much below what they should have been to enable the dealers to do a really profitable business. Many times lately teams and men have been idle on account of the lack of certain sizes of coal. When the dealers complain to the shippers they have pointed out to them that even the tonnage they have received thus far this summer is much in excess of what they received in a similar period in pre-war times. The shippers do not deny that heavy shipments are going to western and New England markets, and on the part of the company shippers they point out that this has always been more or less a custom. As a matter of fact the shipments from Port Richmond via barge for eastern points has been quite heavy of late and will no doubt continue all summer.

The dealers are also annoyed by the reports of heavy premiums being paid in other markets. This they feel acts to the disadvantage of the local trade. It is known that local shipping offices have received offers of premiums running from 50c to $1 per ton over the announced July

prices of the individual houses. Even the South has lately come into the market willing to pay excess prices. It is felt in some quarters that this coal is not being delivered immediately, but is being stored for delivery later. It is certain that no appreciable amount of premium coal is being sold in this city, the only instances being in cases where dealers have been desirous of satisfying some choice trade and have been anxious to complete delivery.

As has been the case for weeks, the big demand is for stove coal and of the hundreds of customers who make personal calls at the offices of the mining companies they without exception ask for stove. Chestnut is also scarce and not growing much easier, but many local dealers have managed to keep a fair supply on hand. Egg has not as yet put in its appearance, and while the new orders for this size are rather light, nearly every dealer has a larger tonnage than usual on his books awaiting delivery. Pea coal is plentiful and if anything more so than at any time this summer. Some of the big companies have actually instructed their salesmen to make efforts to place heavier tonnage of this size. It is just barely possible that pea will be a little draggy for the balance of the month, but there is one thing that may help out the situation and prevent it from becoming actually troublesome, and that is, the dealers being short of the other domestic sizes place the opportunity to urge their customers to take a fair tonnage of this size, and it is believed quite a little has been placed in this way. Thus far all the heaviness in pea has been confined to the larger companies, as the independents claim to be able to place all of their tonnage without price concessions.

Recently a rumor has gone broadcast that an increase in freight rates might be ordered before the first of the year. This seems to be based on more than mere rumor, for while the railroad authorities have all along been averse to another increase, the report is that the deficit of the railroads is such that an increase cannot be avoided. By some this accounts for the heavy premiums which are being offered by dealers in outside territories, who hope to be able to recoup part of the extra expenditure by getting the coal in at the lower freight rate. One thing is certain, the consumers cannot expect to receive any reduction in coal, for the trend is just the opposite direction and it is believed that they have for the most part been convinced of this.

All of the above is reflected in the retail price situation, which shows signs of strengthening. The firm which has always led in price cutting is now asking $10.35 for egg, $10.60 for stove and nut, and $9 for pea coal. The improvement can readily be noted when these figures are compared with the prices of one of the largest dealers in the city, as follows: Egg $10.65, stove $10.85, nut $10.95, and pea $9.30.

This week the larger companies seemed to have more buckwheat than ever to offer and the quantity going to storage has considerably increased. When it is picked up the coming winter it is more than likely that the cost of storage will be added to it, as the companies have more than once intimated. There is no question that the coal will be in demand and it will be cleaned up long before spring arrives. The smaller sizes have also lately gone into the yards in increasing volume, but with the month close to half gone it is felt that all industrial plants will call for increased quantities for storage at their plants.

Bituminous—The only noticeable change in the soft coal situation is the growing tendency of the high-grade coals to become harder to get. It is believed that in order to meet this situation the operations are making better working time. While shippers show an inclination to book orders for such coals, practically none of them is willing to take on any heavy business at a price. The one result of this has been to create a better demand for the ordinary coals and some good spot business is being reported in those grades. The possibility of a freight increase has also stirred some interests to the point of endeavoring to increase stocks, but this is by no means general, as the tendency as yet is simply to drift along and buy as the coal is required.

There has been little price fluctuation and quotations are fairly firm within the following range, f.o.b. mine:

Georges Creek Big Vein	$2.95 @ $3.05
South Fork Miller Vein	2.95 @ 3.05
Clearfield (ordinary)	2.60 @ 2.75
Somerset (ordinary)	2.50 @ 2.65
Fairmont lump	2.50 @ 2.60
Fairmont mine-run	2.35 @ 2.50
Fairmont slack	1.90 @ 2.05
Fairmont lump (ordinary)	2.25 @ 2.35
Fairmont mine-run (ordinary)	2.00 @ 2.15
Fairmont slack (ordinary)	1.65 @ 1.75

BALTIMORE

Change in the bituminous situation is small. Prices continue firmer for domestic grades and the export trade is still the real business at this port. The supply of high-grade coals is fast diminishing and the demand of the domestic buyers grows stronger, sending prices up. For domestic use the price remains strong around $2.75, while foreign buyers have been paying in the neighborhood of $3 for the best grade of fuels.

Exports during the first part of July reached 44,105 tons cargo and 3,950 tons of bunker coal. These figures furnished by the custom house officials are for but three days, July 1, 2, and 3, on which days 10 vessels left port. The cargoes were destined, two each going to Holland, Cuba, Sweden and Switzerland, and one each to Norway and Italy.

Shippers continue to be bothered somewhat in obtaining bottoms from the United States Shipping Board. They obtained allocation of tonnage, but there is always a certain indefiniteness about just when the bottoms will be ready for use. On the other hand, bottoms obtained from private sources are always ready on time.

Notice was given by the Pennsylvania R.R. to all shippers using its lines that coals consigned to this port for foreign shipment must be loaded from the Canton pier of the company and not sent to the B. & O. pier at Curtis Bay. During the war the railroad administration closed the western Maryland pier at Fort Covington to foreign service and all exporting of coal was made from Curtis Bay piers, while the Canton pier was used exclusively for harbor lighterage business. The order did not meet with general approval, for shippers say the Canton pier, while modern in every particular, is not as well operated as the Curtis Bay pier

Light anthracite shipments continue to cause dissatisfaction among the dealers in general. The increase of the retail prices did not cause any let-up in buying, but added to the undelivered business already on file. Premium rates continue to go up and as high as 75 cents per ton were quoted. Some small dealers, probably for the first time in the memory of local dealers, paid premiums for anthracite in order to handle their business.

Lake Markets

PITTSBURGH

Market strength continues. Contracts not popular with operators. Production at 60 or 65 per cent. of full capacity.

The Pittsburgh district coal market continues to reflect the stronger undertone noted a week ago, some operators being quite averse to selling at $2.35 even for early deliveries, while there is not much disposition on the part of any operators to accept contracts for delivery to Apr. 1. Some grades of steam coal continue to be available at $2.25 and occasionally odd lots go at lower prices still. The differential between gas and steam coal is very narrow as compared with the market of early in the year. By far the largest differential is in the case of slack, in which it is about 40c., but this is a fortuitous circumstance due simply to the fact that the lake movement of ⅜-in is almost wholly in steam coal at present, thus causing heavy production of steam slack as compared with gas slack.

Labor conditions are about the same as formerly. There is still much talk of foreign-born miners and common laborers, particularly the latter, going back to the countries of their birth, but in some quarters the suspicion is growing that this prospective movement has been greatly exaggerated. Coal production in this district as a whole is at about 60 or 65 per cent. of full capacity; while calling capacity merely the full-time tonnage that could be gotten out with the present sized payrolls, the output is about 75 per cent.

We quote the market unchanged from a week ago as follows: Steam slack, $1.30@1.40; gas slack, $1.70@1.80; steam mine-run, $2.25@2.50; gas mine-run, $2.35@2.50; ⅜-in. gas, $2.60@2.75 per net ton at mine, Pittsburgh district. There is no movement in domestic coal and no definite market exists.

BUFFALO

Bituminous improving slowly. No great rush to buy yet. Prospect of increase till volume is good. Everybody confident. Anthracite active as ever. Lake shipments good.

Bituminous—The trade is in a much more healthy condition than it was. All prices, unless it be for slack, are strong, and this will soon be influenced by the condition of sizes. Nobody expects slack to be firm in summer, unless the general demand is rushing, so it does not affect conditions much. Steady improvement is looked for right along.

At the same time the amount of business is not yet large in this market. The Pittsburgh shippers thought they saw the stir coming and announced that it had arrived, thus being able to boost the market before the conditions were quite ready therefor, possibly helping the trade, possibly not. Buffalo was more conservative and waited till the real improvement was here. Consumers are not buying as freely as could be wished, but are mostly in the market in some way. They are still trying to contract at going figures, but shippers usually decline their offers.

There is every prospect of a steadily improving trade. Other industries are active. Iron is in better demand and the furnaces must have fuel. There is much less bituminous in consumers' hands than there has been, the war tangles are slowly straightening out. Only labor and the consequent high cost of living go adversely.

If the condition of slack should improve materially the whole bituminous trade would be strong. Prices continue at $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh, and No. 8 lump, $4.65 for same three-quarter, $4.20 for mine run and $3.65 for all slack, with $5.25 for Cambria County smithing and smokeless, all per net ton, f.o.b. Buffalo.

Anthracite—The trade is without much change. The demand exceeds the supply and this promises to continue. What it will be when the regular time comes for laying in the great part of the winter supply depends on the summer mining, which has not been satisfactory so far. There is much complaint that the miners are not working steadily and that they are going back to Europe at a considerable rate. The much-feared demands for higher wages have so far not developed and war wages still prevail.

Shipments by Lake continue good, the amount for the week being 107,100 net tons, of which 38,100 tons cleared for Chicago, 28,000 tons for Port William, 16,000 tons for Duluth and Superior, 12,800 tons for the Canadian Sault, 8,100 tons for Milwaukee, 3,000 tons for Houghton, and 2,800 tons for Marquette.

Freight rates continue easy at 60 cents to Chicago, 50 cents to the Sault, 47½ cents to Milwaukee, 42½ cents to Duluth, Fort William, Port Arthur, Houghton, Marquette.

The anthracite quotations for July advanced 10 cents a ton except on grate and buckwheat. Prices now rule as follows:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8 55	$10 20
Egg	8 75	10 50
Stove	9 00	10 70
Chestnut	9 10	10 80
Pea	7 30	9 15
Buckwheat	5 70	7 75

CLEVELAND

Demand for all grades of coal is slowly but steadily increasing, and prices are stiffening accordingly. The shortage of anthracite and Pocahontas borders on the acute.

Bituminous—Steam coal users continue increasing their buying. Southern and eastern Ohio mines now are being operated at about 75 per cent of full-time capacity, an increase of from 10 to 15 per cent. in most instances, and northern Ohio buyers are absorbing this increase. In addition, coal moving to the Lake decreased somewhat owing to the holidays, a temporary shortage of cargo space, due to freighters being bunched at the Upper Lake ports, and a three-day embargo at one of the big shipping points on Lake Erie on account of car congestion. While no trouble is encountered in placing coal, yet the supply on the local market is not excessive. All that is coming in is being placed. Prices are somewhat firmer, though no marked advance in either steam coal or slack is noted. In slack, the range continues quite wide, from $1.30 to $2.10.

Counting out the Fourth of July holiday, labor conditions at the mine show much improvement. Prospects of continued steady work have drawn back many workers who left. But car supply still is a source of much trouble. Reports that the Railroad Administration will take over and put into use the coal cars the carriers are refusing to accept because of their high cost are warmly received by Ohio

operators. Now that workers can put in a full day much less talk of difficulty over a new wage scale is heard.

Anthracite and Pocahontas—It may be safely said that for every ton of anthracite and Pocahontas local retailers are able to deliver they could place two. Some operators are even making personal trips to the West Virginia fields in order to obtain increased shipments. Prices have advanced on both Pocahontas and anthracite, dealers who had been holding back the 10-cents-a-month increase putting the entire burden on the consumer.

Lake Trade—Shipments of bituminous coal from Lake Erie ports in the last week of June totaled 1,010,957 tons, including vessel fuel, making the season's shipments to July 1 9,144,600 tons, compared with 7,650,000 tons up to July 1 last year. Where last season shipments did not really begin until July 1, it is believed shipments this season will not show any great gain from now on, owing to the big grain and iron ore movement later in the season. The first week in July will show shipments not much more than 750,000 tons, because of the holiday, it is feared.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg	$11.15
Chestnut	11 65
Grate	11 45
Stove	11.55
Pocahontas:	
Forked	9 50
Lump	8 75
Mine-run	7 50
Domestic bituminous:	
West Virginia splint	$7 75@ 8 00
No. 8 Pittsburgh	6.25@ 6.60
Massillon lump	7 50@ 7 60
Steam coal:	
No. 6 slack	4 20@ 4.40
No. 8 slack	4 70@ 5.00
Youghiogheny slack	4 85@ 5.15
No. 8 ¾-in. lump	5 40@ 5.55
No. 6 mine-run	4 50@ 4.60
No. 8 mine-run	4 90@ 5.05

DETROIT

Sales of bituminous coal fall short of the business usual at this season in Detroit, with buyers holding back.

Bituminous—Consumers of steam coal have not yet decided that the time for stocking up has arrived. Few of them are buying to any extent. Their procrastination occasions much uneasiness among jobbers and wholesalers, whose study of market conditions discloses a situation that, they say, is far from reassuring. Through members of the trade and Detroit's Board of Commerce, warning has been given the coal users that immediate action is imperative to assure obtaining coal in sufficient quantity to meet winter requirements. Still, a large number of the leading consumers of steam coal are holding back, seemingly exerting no effort to protect their interests. Coal is not being brought into Detroit in the quantity that should be coming at this time of the year, jobbers say, if adequate reserves are to be provided.

In the case of some of the buyers, it is pointed out that the reason for delay is found in the desire to free storage yards of the stock of inferior quality that was bought a year ago. The jobbers feel, however, that in following this course, consumers are assuming a risk that is likely to prove costly later. Some difficulties and delays in making shipments already have been reported as due to scarcity of suitable cars at various production centers. That the car shortage will increase as the season advances is certain, the jobbers assert.

Domestic lump from the Hocking district is quoted at $2.75 for net ton, f.o.b. mines. Mine run from Ohio is offered at $2, and slack is held at $1.50, though sales have been reported at a lower price. Gas or splint lump is selling around $3 to $3.25; 2-in lump from West Virginia at $2.75, mine run at about $2.10 to $2.15, and slack at $1.85 to $1.90. Smokeless coal is hard to find, and mine run is reported selling around $2.75 to $3, with freight charges and federal tax to be added.

Anthracite—Considering the trials and difficulties experienced by household consumers during the last two winters, the volume of business in anthracite is surprisingly light. Jobbers say stocks in possession of retailers would be exhausted speedily with anything like a broad general demand, and that their renewal likely would involve considerable delay.

COLUMBUS

More activity is developing in both steam and domestic grades. Householders are buying better, although many are still holding back. Steam buyers are now in the market as reserve stocks are generally depleted.

The domestic trade is now attracting more attention, although business is not yet up to the usual volume for the time of year. Retailers report a better run of orders, some of which care for immediate delivery. Retailers are also booking orders for delivery later in the season at the price prevailing at that time. There is a good demand for Pocahontas and West Virginia splints. Semi-smokeless grades are also moving fairly well. Retail stocks are only fair and there is still considerable storage space to fill. Hocking lump is not being stored to any extent and the same is true of Pomeroy Bend grades. The uncertainty as to houses and the likelihood of dwellings being leased over the heads of present occupants has the effect of causing householders to hold off on their winter's fuel.

The steam trade is also showing up better and the volume of business is slightly increased. Reserve stocks are pretty well exhausted and as a result quite a few large consumers are in the market. Iron and steel plants are buying better and quite a few have entered into contracts. Consumers are not buying off the open market as largely as formerly. General manufacturing appears to be more active and the fuel consumption is greater. Railroads are not taking any large tonnage and this is causing uneasiness among contract holders on railroad tonnage.

The Lake trade is rather active, although the holiday week showed a decrease in movement. There is still, however, quite a large tonnage to be moved to the Northwest. The docks of the upper Lake ports are not congested, as the interior movement is good. Vessels are plentiful, as the grain trade has not called boats into that service as yet.

Production is fairly good in every mining district of the state. This is especially noticeable in the eastern Ohio field where the output is estimated at 65 to 75 per cent. Pomeroy Bend is also showing up better as far as output is concerned. The Hocking Valley is producing about 65 per cent and the same is reported from Cambridge, Crooksville and Massillon.

Retail prices prevailing in Columbus are:

Hocking lump	$5 50@ $5 75
Pocahontas	7 50
Splints	6 00
White ash	6.50
Island Creek	6.50
Pomeroy Bend	6 00
Semi-smokeless	7 00
Wheeling Creek, Kentucky	6 75

CINCINNATI

Situation shows signs of improvement, with industrial consumers eager to sign contracts.

Cincinnati coal users have finally come to realize that there is to be no reduction in the prices. Where several weeks ago the dealers were notifying and pleading with their large customers to contract for the year's supply, they now are refusing to enter into big contracts. Labor conditions and the transportation situation to and from the mines are not what they should be, and consequently the dealers are hesitating about entering into contracts at this time.

The situation as regards the domestic user has improved greatly. Spurred on by the advertisements of the National Coal Association and the individual appeal of the local coal men, the domestic users have been brought to see the situation in the light that it is being painted by the dealers, and as a consequence they are not sitting back, waiting for lower prices, having been fully convinced that there is to be no reduction and they do not want to take a chance of there being a shortage.

The demand from all quarters is showing a great improvement, with the lump situation strong. The market on mine-run is good. Very little lump coal is being placed by dealers. All prices remain firm.

LOUISVILLE

Domestic demand strong, with producers refusing much additional business without accompanying steam orders. Western Kentucky market very weak on all grades. Retailers reporting better demand.

The operators are receiving such a strong demand for block and lump coal that many of them are refusing additional business, except where the lump orders are accompanied by orders for screenings, as the steam market is weak and it is impossible to load out screenings otherwise. Retailers are unable in some cases to secure as much lump coal as they desire, as they have not facilities for stocking or disposing of the steam coal.

There is a fair demand from the lake regions, and a slightly better general industrial demand, but stocking as a whole continues light on steam coal, and consumption apparently is below normal. Operators have been virtually giving away screenings for the last few weeks in order to move them, and have been making lump coal carry the loss.

Western Kentucky prices have been weak all along the line, owing to the fact that eastern Kentucky coal has been in good supply. Western Kentucky is not a good summer stocking coal, as it heats and fires readily. Last season western Kentucky was about the only coal available, and much dirty coal was shipped into Louisville in response to a heavy demand. The result was that with poor coal, and small knowledge of stocking, many concerns had trouble with it, resulting in a prejudice against this coal which has made it hard to sell.

Western Kentucky coal is expected to move much better by Aug. 1, when general demand should be better. Wide differentials are not helping movement materially just now, however.

There is some car shortage reported from the various mine sections of the state, while there is also a scarcity of labor in sections where mines are busy. Cars are in generally bad repair, with this condition growing worse.

BIRMINGHAM

Steam demand shows a slight improvement, a very good tonnage in the aggregate being covered by contracts. No change in the domestic situation. Shortage of labor and cars becoming a factor in production.

Reports indicate a better feeling in the trade, the steam market becoming more stable under healthy basic conditions. While there is no great amount of spot business being offered, consumers are signing contracts which as a whole represent considerable tonnage, government prices ruling. Prices range from $2.75 per net ton miles for Big Seam washed mine-run to around $3.85 for washed nut and slack from the Black Creek and similar seams. The Louisville & Nashville and the Southern Railway System have not as yet contracted for fuel for the year beginning July 1, the second bids asked of operators by the latter having been submitted, but no decision has been announced as to contract awards.

There is a sharp inquiry for lump coal, the mines having contracted for about all the coal they can expect to produce under present conditions and spot demand is brisk, prices ranging from $3.50 for medium grades of lump and nut to $5.50 for Cahaba and the like, with only a few cars to be had here and there.

Already some complaint is being heard in the coal fields of labor and car shortage, which all indications point to becoming serious factors as the season advances. Considerable labor is being taken from this section by labor agencies, and mines and ovens which are now starting up after several months of idleness are having trouble in securing the necessary forces.

Coke

CONNELLSVILLE

Spot furnace coke market reverting to former level. More ovens in blast. Negotiations by idle furnaces.

As soon as the holidays and celebrations in the Connellsville region were over the market for spot coke softened, bidding fair to get back to where it stood in the first three weeks of June, if not to a lower level. During the week of Independence Day the spot furnace coke market was firm at $4.25 as minimum, representing an advance of 25c. over the previous market. Early last week, however, a little coke began to appear on the market at $4, and while $4.25 is still quoted by a number of producers the limited demand that has developed up to date has been met in nearly all cases with $4 coke.

The foundry coke market, however, has maintained a stiffer tone and bids fair to continue on a higher basis. For many weeks the market ranged from $4.50 to $5, according to brand, the lower priced coke being of quite ordinary quality. In the past fortnight it has been only occasionally that any $4.50 coke could be secured, most makes that formerly went at $4.50 now commanding $4.75, while several choice brands that went at $5 have lately been bringing $5.25.

There is nothing particularly new in the contract situation. Almost all the furnaces in blast that use purchased coke have bought for the half year, while a few of the idle furnaces continue to negotiate for supplies on requirement contracts, shipments to depend upon whether or not the furnace chooses to run.

There has been a considerable increase in the number of ovens in blast in the past two or three weeks. Celebrations have interfered with output increasing in keeping with the increased number of ovens in blast and some doubts are entertained whether there will be ready absorption of all the coke made when operations proceed at regular rate.

The market stands quotable as follows: Spot and prompt furnace, $4@4.25; spot and prompt foundry, $4.75@5.25; contract foundry, $5@5.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended July 5 at 130,790 tons, a decrease of 7843 tons.

Buffalo—The trade revives slowly. Former reports of local furnaces not running or operated on slow time are not heard, so that the consumption is considerably increased. The prospect is for a steady, though not rapid increase of activity through the rest of the season. Prices remain as before, $7.85 for 72-hr. foundry, $7.10 to $7.35 for 48-hr. furnace, and $6.20 for off grades, with fuel sizes and breeze not moving much.

Middle Western

GENERAL REVIEW

Some signs of improvement noticeable. Steam coal trade not as good as it might be. Car shortage beginning to be felt.

Market conditions in the Mid-West are showing signs of some improvement, although one has to inspect the situation carefully to find this change for the better. The demand for domestic coals is continuing very strong, and in some cases premiums are being paid for high-grade Illinois and Indiana lump, egg and nut sizes. Steam coals are still continuing to be a drag on the market, although the demand was increasing to some small extent during the last week. This demand is probably explained by the fact that the mines were closed down over the Fourth.

The situation of steam coals in the central markets of this territory is far better than the situation in the East and near East, particularly in such cities as Detroit, Cincinnati, Columbus, etc. Hocking operators and West Virginia operators are flooding the market with cheap nut and slack. By cheap we are referring to coal that is being sold at 90c. per ton and under. Illinois and Indiana operators, as a general rule, have been maintaining their price on screenings at $1.50, or better. The Franklin County people have consistently been getting $2 or better for their screenings. Operators in the Mid-Western territory certainly deserve praise for being able to maintain their prices as well as they have, especially in view of the fact that a Hocking operator, with 100 or so cars of "distress" coal on his sidings, is selling a whole lot of it to a Chicago packer at a price below $1 per ton mines. Considerable feeling has developed from this sale, as Illinois and Indiana producers feel that they have enough problems on their hands without having their market demoralized by Ohio producers with poor sales organizations.

The long-heralded car shortage is beginning to be felt. We understand that several mines in the Springfield district, as well as the southern District in Illinois, have been affected, although plenty of cars are reported in the Indiana coal fields. A car shortage is coming, and coming fast. This is getting to be a well recognized factor in the coal situation. We understand that several important producing districts in Kentucky and West Virginia have already been seriously affected by lack of equipment in which to ship their coal. It is the general opinion that it will only be a matter of a short time before this will be true in our own producing districts.

CHICAGO

Steam trade dull and domestic demand strong. Prepared sizes of Pocahontas and New River moving for export.

The steam trade in this city continues to lag, although prices have been fairly well maintained because producers have intelligence enough not to flood the market with open consignments of coal, preferring to keep no bills at the mines rather than shipping to the jobbers in Chicago. Although prospects for a better steam market in this city are fairly bright, there has been little immediate improvement over last week, and no radical improvements are expected until two or three weeks from now.

The domestic situation continues strong. We understand that the more responsible Pocahontas operators have discontinued increasing the price of their prepared coals, as they believe that the public will not stand for prices over and above $5 on prepared sizes at this time. It is generally understood that the Pocahontas and New River operators are in an independent position, because they are able to send practically all of their coal to the seaboard for export, and at very nice price. We understand that the last export coal was sold at $3.56 mines, for run-of-mine.

The retailers of Chicago are beginning to stock coal in better quantities, although they claim in doing this they are taking a chance as the public has shown but little inclination toward purchasing at this time.

MILWAUKEE

Coal market quiet, with a falling off in demand. Cargoes arriving freely by lake. Coke in no demand.

Summer dullness rules in the coal market. Dealers report the situation as being quiet, with a falling off in deliveries. The Milwaukee public seems to be satisfied with the outlook for coal, despite the disturbing statements published by those best able to judge the situation at the mines. Coke is not moving as fast as the producers would like and stock piles are increasing fast.

There has been a steady run of cargoes at the docks thus far in July, and the aggregate of receipts continues in excess of last year. Up to the present time 254,764 tons of anthracite and 1,307,913 tons of soft coal have been landed on the docks, a gain of 71,750 tons of anthracite and 336,611 tons of soft coal over the receipts during the same period last year.

There has been no change in the price schedule.

ST. LOUIS

A runaway market on high grade, domestic sizes. All high-grade mines sold up. Steam market weak and no coal. Mines idle account of surplus steam sizes. Country demand good on domestic. Awakened public buy eagerly of better coals.

The past week has developed an unusual condition in the St. Louis territory. Every high-grade mine in the State of Illinois is oversold on lump and egg coal. Nut and screenings are so much in surplus that mines are idle on account of the failure to move them. With the continuous growing demand for domestic sizes and no chance at all of the steam conditions improving, the Middle West is confronting a serious shortage of domestic coal of the higher grade.

In the Williamson (Franklin County) field there is at the present time a mild car shortage. The movement in a general way of the loads is good, but the no bills of the smaller sizes from No. 1 nut down is so heavy at nearly all the mines that it is becoming a serious problem of the railroads as to what is eventually going to become of the no-billed cars. At the present time many mines are unable to get equipment for loading until they reduce the number of the no bills on their track. They are making a strenuous effort to work in order to keep their organizations together. Mines are working from two to four days a week, with the exception of a few mines in Franklin County that are getting full time, and a like number in Williamson County. The prices are being maintained in the Franklin County field without exception. The Williamson County independents are still below the circular.

In the Du Quoin field similar conditions exist, and prices are not maintained. This is occasioned by the fact that a few operators there are cutting, in order to move the smaller sizes. A fairly good railroad tonnage is going from both fields. The past week the railroad tonnage was increased considerably, which indicates that some storage railroad coal is being bought.

In the Mount Olive district there has been a noticeable increase in the movement of the domestic sizes the past week, especially to the north and northwest, and for country trade. Steam sizes from this field seem to move more evenly than from other districts and the situation is more satisfactory than elsewhere. The prices are maintained and the mines are getting better working time than in the surrounding fields.

The Standard field is still long on everything. Steam sizes are the most troublesome and some mines are idle on this account, while other mines have no bill lump, egg and nut, and are sold out on screenings. Cars are plentiful and train movement good.

Railroad tonnage shows an increase this week over last, and in a general way the working time of all mines has improved. Steam market for coal from this district shows no improvement, however, with the result that there is a greater tonnage of no bills than in any other district.

The local condition in St. Louis is remarkable. Dealers are getting orders for more Carterville coal than they can get from the mines. The same condition applies in a way to anthracite and smokeless. The Mount Olive demand is light, but seems to be growing, while Standard shows little if any improvement.

In the country a good movement of Standard coal is reported for domestic purposes and country steam business shows up somewhat better than for some weeks past.

Smokeless coal came in during the week to the extent of about 25 cars. Anthracite is scarce and little is coming through. No Arkansas anthracite has come in yet, but a few cars of smokeless that up to the present has not improved satisfactorily.

Coke is moving fairly good for domestic purposes.

Coal and Coke Securities

New York Stock Exchange Closing Quotations July 14, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	
Buros Brothers, Com	(BB)	150	155
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(Ck)	55	
Central Coal & Coke, Pfd	(CK)	63	
Colorado Fuel & Iron, Com	(CF)	51	52¼
Colorado Fuel & Iron, Pfd	(CF)	105	125
Consolidation Coal of Maryland	(CGM)	75	
Elk Horn Coal, Com	(EH)	38½	39
Elk Horn Coal, Pfd	(EH)		47
Island Creek Coal, Com	(ICR)	39	
Island Creek Coal, Pfd	(ICR)	75	
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	63	
New Central Coal of West Va	(NCC)	5	
Pittsburgh Coal, Com	(PC)	71½	71½
Pittsburgh Coal, Pfd	(PC)	96	98
Pond Creek Coal	(PD)	19	20
Virginia Iron, Coal & Coke	(VK)	66	69

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	97	
Clearfield Bituminous Coal, 1st 4s, Ser A, 1940	75½	
Colorado Fuel & Iron, Gen 5s, 1943	90	91½
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	80½	81
Consolidation Coal of Maryland, 1st Ref 5s, 1950	87	88
Jefferson & Clearfield Coal & Iron, Ser Mort. 5s, 1926	96	
Lehigh Valley Coal, 1st Gtd. 5s, 1933	100	101
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1913	79½	
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser A, 1954	90	
Pleasant Valley Coal, 1st S. F., 5s, 1928	80½	
Pocahontas Coal & Coke, Joint 4s, 1941	83½	84½
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	84½	87½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955		80½
Penn Coal, Iron & R.R., Gen. 5s, 1951	92	92½
Utah Fuel, 1st Sinking Fund 5s, 1931	87	
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85½	

COAL AGE

Volume 16 New York, July 24, 1919 Number 3

An Occupational Disease

By R. Dawson Hall

BY MANY a man is not considered a good executive unless he exudes seriousness, sobriety and even gloom. The man who would fill the ideal of the multitude must always be hurried and worried. The chief executive himself is also apt to think that because he has the distinction of control conferred on him, he is bound to exhibit a greater persistence in labors and a more ardent devotion to his duties than any of his subordinates.

As a result he breaks down in a few years. He loses his poise and develops executivitis—an occupational disease in which the stomach ceases to function, sleep is denied and the nerves give way. When, after a few months, you enter his office and spend a few minutes in his presence, you are convinced that his capable secretary or stenographer would be more able than he to fill his office. He has entirely lost his patience and sense of proportion.

This disease is not so common among men whose duties require the exercise of both mind and body as it is among desk executives who are moreover troubled by the fact that the work they are regulating is being performed or neglected by persons beyond the range of their vision and often beyond their immediate inquiry.

Most men newly appointed to executive positions assume and feel an overburdening sense of responsibility and an overmastering desire for intense activity. They feel that they are called upon to do something—they know not what—but whatever it is, to do it immediately. Yet perhaps what is needed more than anything else is just to fall back easily and restfully till the newness of the work loses some of its effect upon the nerves.

The first duty of every executive is to avoid worry and fatigue, for these are merely diseases of the mind which prevent its proper functioning. To acquire the right poise, all the duties that can be laid upon others should be disposed of in that way. One can nearly always find others in the organization who can perform any and all of the offices to be filled with a large degree of acceptability. They may even function in many ways better than the executive himself.

The thinking powers of the average brainworker are so cluttered with his labors that he cannot survey his work with any serenity. To some extent it is the work of the chief executive to do that for him, and if that executive is himself harassed by work and worry how can he visualize another man's difficulties? He has too much on his mind to visualize even his own.

Successful executives are neither self-conscious nor worrying. They are usually easy-going men. Their conclusions are reached and their actions performed without excitement or heat. They are not paid high salaries for large personal accomplishment or for mental distress, for the best men of this class do little and suffer less. They are paid to secure results from others, and such results cannot be obtained by those who worry crabbedly over the difficulties confronting them.

Too much has been written about the long hours, unflagging energy and minute information of great executives. Many have been led astray by such mendacious records and tried to make 100 yards in 5 seconds. It isn't in the range of human possibilities. It is not safe to crowd any man too hard, executive or worker, certainly not to a degree that will prevent either of them coming up smiling on every occasion, for it is the smile that wins.

Operating a Coal-Stripping Plant in Ohio

Stripping coal and loading the fuel into cars is not a novel or new proposition, but the details of this work often vary in the different coal fields of the country. The practice followed in the crop strippings in Ohio is here described. The overburden is handled by shovel entirely, and some suggestions are made for stripping by this method.

By S. B. Creamer
Cambridge, Ohio

THE amount and cost of production of coal from a stripping operation depend largely on the plant layout. There are two systems of loading coal—loading directly into standard-gage cars or by a tipple for the preparation of the coal. With the former system the layout is comparatively simple and consists of a standard-gage track laid directly into the open pit. This track is kept up to the loading shovel. On this layout a passing switch should be kept as near the loading shovel as practical, as it permits a dinkey to shift cars from the siding to the shovel with little loss of time to the loading crew. But if there is sufficient coal uncovered ahead of the loading shovel, a track of sufficient length to hold empties for a few days run may be laid, the cars being placed in the night or on overtime by the switching crew. These cars can then be pulled into place as the loads are removed, thereby preventing any loss of time on the part of the loading shovel.

Where a tipple and contractors' equipment are used, the layout is more difficult to plan, requiring a thorough survey and study of the property before the location is chosen. The tipple must be placed so as to have the proper height and yet make possible the building up of a haulage track for side-dump cars. These cars should dump into a hopper with a capacity of at least 50 tons the hopper discharging onto the picking table. The level of the dinky track should be at least 50 ft. above the level of the standard-gage railroad track under the tipple, in order to gain hopper room, pitch for the screens and height for the installation of a crusher. This requirement often makes the dinkey track layout difficult and expensive, but such an arrangement is essential to cheap production. The main haulage track ought to enter the track at the tipple on an easy grade.

It is important that all grades on the haulage track be kept under 4 per cent., preferably under 2 per cent. With easy grades it is possible for a 14-ton dinkey to handle a train of 15 4-yd. side-dump cars easily and expeditiously. Such a train of cars can be dumped by two men in from four to five minutes when the hopper has sufficient capacity to hold the coal from a full train. The easiest and quickest method of dumping such cars is by means of a pipe or bar, the usual length being about 5 ft. This lever is placed against a strip nailed to the dumping platform of the tipple and is caught under the bed of the car as the engine pulls the train ahead. This dumps the car, and the brakeman with a helper can right the car again and release the chains on the next car without stopping the train.

On a coal-stripping plant the stripping shovel controls the output, since it is possible to load out more coal with the loading shovel than can be stripped in the same length of time. The amount of coal that can be uncovered by the

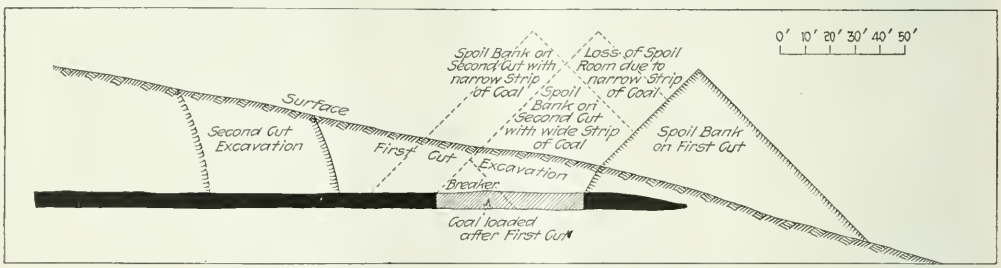

0' 10' 20' 30' 40' 50'
Spoil Bank on Second Cut with narrow Strip of Coal
Loss of Spoil Room due to narrow Strip of Coal
Spoil Bank on Second Cut with wide Strip of Coal
Surface
Second Cut Excavation
First Cut Excavation
Breaker
Spoil Bank on First Cut
Coal loaded after First Cut

FIG. 1. THE RELATION OF SPOIL BANKS TO COAL REMOVED
Loss of spoil room caused by leaving a narrow strip of coal after each cut

stripping shovel depends on the thickness and nature of the overburden. The average width of the first cut is about 110 ft., and this cut usually can be dug without blasting. The average thickness of overburden is about 10 ft. on the crop side of the cut and about 25 ft. on the "high wall" side. The amount of dirt necessary to be moved per ton of coal uncovered on the first cut averages about 3 cu.yd. This is naturally the cheapest stripping. In order to conserve spoil room the stripping shovel must be kept as near the spoil bank as possible. Spoil room is the limiting factor in the stripping of coal. It is possible to blast and dig any depth of overburden, but it is not always possible to dispose of the dirt without hauling. This method is out of the question.

In the loading of the cars with coal there should be a strip of coal at least 25 ft. wide left next to the "high wall." It is more desirable to leave a strip 40 ft. wide. On this coal the haulage track is placed. A wide strip of coal makes it possible to shoot the overburden of the second cut without covering the haulage track.

On the second cut it is usually necessary to haul the coal past the stripping shovel. This requires more care in the operation of the stripping shovel; also in the blasting and haulage. When a width of coal of 40

ft. is left, the operation on the second cut is made less expensive and a great saving of spoil room is made possible. The haulage track is kept on the edge of the coal and the stripping shovel is kept as close to this track as possible, to allow clearance for the dinkeys past the shovel. The haulage track is then thrown to the desired width for the loading shovel to operate next to the spoil bank. With the haulage track so far from the stripping bank it is possible to do much more effective shooting without the danger of delays and the expense caused by the covering of the track. Operating the stripping shovel so far away from the spoil bank makes it necessary to dig at a greater angle with the line of the cut, and this makes more of a swing for the stripping machine. But the saving in spoil room, more satisfactory shooting and less trackwork justify the loss of time due to the greater working angle of the shovel. Where the conservation of spoil room is not so essential, a strip of coal 25 ft. wide will serve very well, although the expense of track maintenance is greater and more skill is needed in shooting the bank because of the danger of covering the track.

The disposal of the spoil is one of the most interesting and most vital points in coal stripping, while to the casual observer it is seemingly of little importance. The amount of overburden it is possible to dig depends largely on the amount of spoil which can be taken care of; as stated before, the placing of the shovel in the cut greatly affects the amount of dirt that can be spoiled without loss of coal. The width of the cut, therefore, is governed by the spoil room available, height of the bank and swell of spoil. The apex of the spoil bank should be kept opposite the middle of the shovel (directly opposite) or behind it. There are times when this might be difficult to accomplish, but the failure to do this has lost hundreds of tons of coal that have been uncovered.

The most difficult time to keep the spoil behind the shovel is on a curve, when the cut is on the outside and the spoil bank on the inside of the curve. The average observer fails to comprehend the increase in volume due to an increase in radius of 100 ft. even in curves of large radius. The volume of bank is increased and the dirt on the coal due to rolling lumps of dirt and rocks is largely eliminated by the use of the "double spoil bank." This bank, Fig. 1, is formed by building a small bank with a low bucket; it acts as a "breaker" for all rolling material from the top of the main bank, which is often 75 ft. high.

In stripping it is often economical and advantageous to make a "boxcut" through a saddle or low place in a

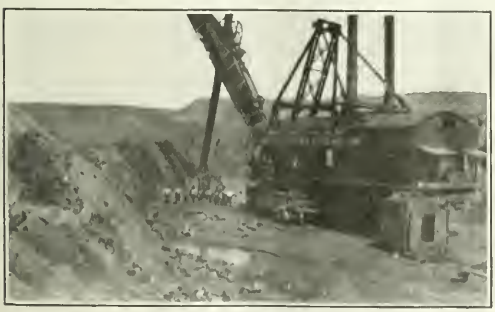


FIG. 2. SHOVEL IN CUT ABOUT COMPLETED

FIG. 3. CUT COMPLETED AND SHOVEL REMOVED

hill; while the only difficulty encountered is in the disposal of the dirt, it is sometimes hard to solve, especially where it is impossible to haul the dirt out. Figs. 2 and 3 show a "boxcut" 500 ft. long which was made at Apex, Ohio. The deepest overburden was 45 ft., for a distance of 300 ft. the cut was over 40 ft., and the shallowest cutting was 15 ft. The width of the cut was 81 ft. at the base and about 90 ft. at the top; the width of the cut was necessary to give clearance for the shovel. None of the dirt was hauled, but some of it was double cast. The second cast was made with a Marion "Model 36" caterpillar shovel. Fig. 2 shows the shovel where the cut is almost completed and Fig. 3 shows the finished cut.

The drilling and shooting of the overburden, if properly done, greatly facilitates the work; but if improperly done, it is practically money thrown away. Many seem to think the only thing necessary to be done is to drill a hole in the ground, pour in a little dynamite and powder, and satisfactory results will be obtained. But to do successful shooting it is necessary to have the holes drilled to within 1 ft. of the coal, and no damage is done if the drill touches the coal. These holes are drilled on about 25-ft. centers and 25 ft. back from the face. They should then be "sprung," and it might require 15 or more sticks of dynamite to do this, depending on the charge required. Usually 10 to 25 kegs of powder is sufficient to shoot the bank under ordinary conditions. Holes should not be loaded above the collar of the hole and should be well tamped. With good shooting, repair costs are materially lowered and the yardage moved considerably increased.

Stability of Methane

Mayer and Altmayer investigated the stability of methane and found the following percentages were stable in the presence of hydrogen:

Temperature, deg. C	250	450	550	750	850
CH_4, per cent	98 79	76 80	46 69	6 08	1 59

The reaction is represented by the expression $CH_4 = C + 2H_2$. At 850 deg. C. and atmospheric pressure 1.59 per cent. of methane is in equilibrium with hydrogen whose partial pressure is then 0.9841 atmospheres. As the partial pressure of the hydrogen decreases the equilibrium pressure of methane decreases also. The partial pressure of hydrogen in the furnace is small and the temperature much higher than 850 deg. C., therefore it is evident that only a very small percentage of methane can exist in equilibrium in a boiler furnace.—*Bureau of Mines Bulletin No. 135.*

Valuable Pyrite in Illinois Coal Beds*

By G. H. Cady

Geologist in Charge of Coal Studies,
State Geological Survey Division, Urbana, Ill.

SYNOPSIS — *More than a million tons of pyrite, readily available for commerce, is found in the coal excavated every year by United States' mines. Of this Illinois could furnish 200,000 tons. Native sulphur should not be used where pyritic sulphur is equally effective. Article defines the various types of pyrite, their modes of occurrence, and shows in what beds and sections these types may be most generally found.*

MUCH interest has recently been shown in the pyrite occurring in Illinois coal, and special investigations have been made into the matter during the period of our participation in the war. The investigations carried on by the geological surveys of the various states, in coöperation with the Bureau of Mines, had their origin in a desire to find near the market a source of raw material for the manufacture of sulphuric acid in a quantity adequate to supply the anticipated demand.

The purposes of the investigation were more than fulfilled, to the extent that a possible supply of pyrite of more than one million tons annually was found readily available, the recovery of which would entail an almost negligible financial outlay on the part of the coal operators. A much greater amount was found to be available if mechanical means were installed for its separation, but this would necessitate a somewhat greater financial outlay. It would, however, result in the production of cleaner and more marketable coal.

Inasmuch as the need for the pyrite was not as great as had been anticipated, much of the benefit that was expected from the taking of the inventory will probably not be realized. Since this is the case, other considerations, only incidental to the main effort of finding pyrite supplies, become of relatively greater importance and deserve some attention.

For instance, the conservation of our national resources seems to call for the recovery of at least the best of our pyrite supply; and, again, the successful recovery of clean coal in Illinois depends considerably upon the recognition by the engineer of the variation in the form and in the manner of occurrence of the pyrite itself. The present discussion is concerned with these two considerations arising out of the pyrite inventory, which considerations at the beginning of the inquiry were of relatively minor importance.

If the mines of Illinois saved all the pyrite that is picked out of the coal at the face and also concentrated the pyrite that is found in the washery refuse, most of which is now lost, about 200,000 tons of raw pyrite could be recovered annually. This crude material, including the mill concentrates, would probably average more than 75 per cent. pyrite having a sulphur content in excess of 45 per cent. Of the 25 per cent. waste probably more than half would be coal.

The milling and concentrating of the material would produce nearly double the amount stated above. Looking into the future, it will without question be necessary to work poorer and poorer grades of coal containing increasing amounts of pyrite, so that the available supply will increase rather than decrease. It is certainly reasonable to inquire whether this large amount of material, which can be manufactured into a material of great economic importance in our industrial life, should be wasted. If the failure to use the pyrite does not involve a permanent economic loss, it certainly suggests that such a loss is resulting from the present practice; and this possibility certainly merits investigation.

The possibility that the present practices are not desirable seems to involve at least two considerations. In the first place coal brasses must be recovered as the coal is being mined, for otherwise they will be either immediately buried in the gob of the old workings or thrown on the refuse heap at the shaft mouth where they will speedily oxidize. Accordingly, if the present practice is judged wasteful, new practice should be instituted at once to forestall further waste. Secondly, the use of native sulphur instead of pyrite for the manufacture of most of the sulphuric acid seems to involve the unnecessary expenditure of an extremely pure substance of which the supply is probably limited and which accordingly should be conserved only for necessary uses.

Pyrite Problem One of Many Angles

Conditions justifying the use of native sulphur in war time do not obtain during peace, and it is a question whether this material should be sacrificed to the ordinary processes of trade. The pyrite problem has many ramifications, and a decision as to the correct national policy as regards coal brasses can be reached only after a further investigation has been made, which should study the sulphur reserves, the method of manufacture of sulphuric acid and the adaptability of the coal pyrite to manufacturing processes. The continual waste of pyrite demands that such investigations be carried to a point where a correct decision can speedily be reached.

The pyrite inventory in Illinois has emphasized the possibility of waste in present methods of pyrite recovery. It is also the first systematic study of the relative character and occurrence of pyrite in the various coal beds and individual mines. The survey did not include mines in all the districts, but for such districts as were included the observations furnish a basis of estimating the comparative amount of pyrite present and its relative ease of removal. Such information carefully collected over the entire Illinois field and made generally available would, it is believed, be useful as a basis of judging the character of a coal and in esti-

*The pyrite inventory in Illinois was conducted as one of the activities of the Illinois Coal Mining Investigations under a coöperative agreement between the State Geological Survey, Engineering Experiment Station, University of Illinois, and the U. S. Bureau of Mines.

mating the results that might be expected from different methods of preparation between the face and the railroad car.

The large assemblage of chemical data available concerning Illinois coal has put selection as regards relative heating value on a definite basis and, accordingly, variation in the quantity and character of the ash has become a matter of much importance. Most of the chemical data is based upon samples from the working face and in consequence these samples are almost invariably favorable so far as ash is concerned; for in the collection of the sample, impurities with a thickness of $\frac{1}{4}$ to $\frac{3}{8}$ in. or more are supposed to be removed.

The possibility of removal of impurities varies considerably under working conditions in different mines, and this is as true of pyrite as of the other impurities. In fact, if any distinction is to be made it is even more true. Accordingly, since the presence or absence of pyrite in a coal commonly is the basis for a purchaser's judgment as to the quantity and fusibility of ash in a coal, and since there is such a wide variation in the possibilities of its removal at the mine because of the various ways in which it occurs, definite information concerning the character of the pyrite and of its mode of occurrence in the different coals and in the different districts is certainly desirable. In the following paragraphs the character of the different forms of coal pyrite in Illinois coals and their manner of occurrence are briefly summarized.

Forms of Pyrite in Illinois Coal

Pyrite has been observed to have the following habits of occurrence: As brassy, massive, metallic-appearing mineral without apparent crystalline structure or form; as a crystalline mineral; as a brown or gray mineral without metallic luster or apparent crystalline character, this form being commonly laminated; and as impregnations in a very fine state and probably crystalline. The material occurs in the following common forms: As balls and lenses of a well defined shape and easily separable from the surrounding coal (see Fig. 1); as balls and lenses with the outer parts more or less ramifying into the surrounding coal and hence not easily separated from it (Fig. 2); as a fine leaf mineral in finely divided state lying along innumerable joint cracks in isolated patches of the coal (Fig. 3); as typical vein filling, especially in "horsebacks" (Fig. 5); as replacement of limestone, forming "niggerheads" in the roof shale, and in other limestone masses found associated with the coal; as impregnations of mother coal and of the clay filling of horsebacks (Fig. 6); as balls in the floor clay (Fig. 9); as plates or sheets commonly found in the partings between benches (Fig. 7); as facings in joint cracks, commonly very thin plates; and as rosettes in the laminations of the black fissile shales found above some of the coals.

The habit of occurrence of the pyrite seems to bear relation to the form. Pyrite in balls and lenses easily separated from the coal is apparently nearly always of the brassy, massive variety. The lenses and balls of indefinite boundary are commonly the gray, stony variety; this variety, at least, seems always to have an indefinite outline. The plate and sheet pyrite is variable in its habit, but pyrite of metallic appearance seems to be the most common variety. Facings are composed of the bright pyrite. Vein fillings, the nodules in the fireclay, the rosettes in the roof slate and probably the impregnations of the clay fillings of horsebacks and of mother coal are all of a crystalline nature. Pyrite which replaces limestone takes on the form and texture of the original rock.

The ease with which pyrite is separated from coal at the face, the tipple or the washery depends largely upon the form of occurrence. As between the stony, crystalline and massive bright varieties there is practically no distinction so far as relative ease of recovery is concerned. The most easily separable pyrite is that occurring as balls and lenses of the brassy variety. It is plainly seen and its outline clearly defined, so that it is usually broken out by the miner at the face. There is little excuse for material of this kind ever appearing at the surface, unless it is present in unusually large quantities.

The pyrite occurring in the niggerheads and in limestone lenses or masses in the coal or near the boundary of the coal and the roof rock are also readily discarded. Next in relative ease of removal is the plate or sheet pyrite, provided the plates are of sufficient thickness to withstand the shattering effect of mining. If $\frac{1}{2}$ in. or more thick, the plates can usually be removed without difficulty from the coal in pieces, sometimes more than a foot wide. As the seam commonly parts at the pyrite band the material can usually be removed rather easily. Small pieces, however, commonly remain in the coal. If the plates or sheets are thin the proportion that is recoverable is small, since it is commonly so badly shattered in mining that removal by the miner is practically impossible. Such pyrite as this could be largely removed by washing the finer sizes of coal.

The removal of the brown, or gray, banded pyrite (see Fig. 4) in the mine is attended by more or less difficulty. It is not quite as readily seen as the bright variety, for not uncommonly it is rather dark colored by reason of the presence of a large quantity of what appears to be carbonaceous matter. Then also its outlines are indefinite. To remove this variety of pyrite much coal must, in general, be wasted if the entire mass of the lense is to be recovered. Coals having this form of pyrite in large quantity are almost sure to have a rather high pyrite content as shipped, unless all the coal is washed. If the larger sizes of coal were hand-picked at the tipple, large amounts of this material would probably be effectively removed. Pyrite present as facings is practically impossible of removal by any method of hand-picking except where, as in some rare localities, the facings become so numerous as to become practically a mass.

In some of the better Illinois coals pyrite occurs only as facings or as leaf pyrite (see Fig. 3). The removal of some of this impurity can be accomplished by crushing and washing the finer sizes, but it is probable that the actual amount of pyrite that could be thus removed would be negligible and would only in small degree affect the selling value of the coal.

Masses of leaf pyrite are commonly not discarded; although the mass may have a bright appearance, the actual amount of pyrite present is small. This is indicated by the fact that such a mass of coal filled with particles of leaf pyrite weighs but little more than pure coal. Furthermore, such pyrite is difficult to sep-

arate by washing, the small flakes of mineral remaining suspended and floating off with the coal. The problem of separating such pyrite from coal is yet to be solved.

The vein pyrite coal in Illinois (Fig. 5) rarely exceeds ½ in. in thickness. Its occurrence is practically restricted to the horseback fissures such as are found to be especially numerous in No. 5 bed. The coal adjacent to such fissures is commonly well impregnated with pyrite in finely divided state so that the entire mass is very hard. It is the common practice to entirely discard the mass of coal attached to the sulphur "spar," as it is called, for it is usually thoroughly impregnated with pyrite. The miner receives extra pay for the removal of this material so that impurity of this sort does not commonly reach the top, except where the "spars" are thin.

Clay veins also are commonly rich in a finely divided pyrite that is disseminated throughout their mass (see Fig. 6) and reaches out into the adjacent coal. This pyrite with the attached coal is discarded just as the pyrite and coal in sulphur "spars" is thrown away. In many mines the removal of the horsebacks is a cause of considerable waste, and in some instances serious consideration could well be given to the problem of its elimination in, at least, a large degree.

The impregnation of mother coal by pyrite gives a very hard black material with the general appearance of mother coal but with a slight golden tinge. The material is very hard. The substance is commonly called "blackjack" by the miners, though it is possible that all the "blackjack" of miners is not pyritized mother coal. The material is nearly as difficult to cut as the gray or brassy pyrite, and where it lies in relatively large masses is readily discarded. Smaller masses, however, especially if imbedded in large masses of coal, are less easily removed. "Blackjack" commonly sticks rather tightly to the surrounding coal and the removal of pieces less than a foot in length and an inch or two thick, except as they occur along partings, does not seem to be common practice.

The sulphur balls found in the floor clay and the pyrite rosettes found in the roof shale do not commonly get into the coal as shipped. They are rather interesting occurrences but of no special importance commercially, except that clays with these sulphur concretions are not adapted for burning.

Pyrite in the Various Coals

The distribution of pyrite of the various varieties in the coal beds of the state is a matter of some interest. It is doubtful whether any of the varieties are restricted to any one bed, but certain occurrences seem to be typical of individual beds. This is true to such an extent that the manner of occurrence of pyrite can be taken as one of the criteria for identification of beds.

In the four more important commercial coals in Illinois, No. 2, No. 5, No. 6 and No. 7, pyrite is present in characteristic form. But the widely spread pyrite in No. 6 coal varies somewhat in different districts. Without an intimate knowledge of all the operations in the state it is impossible to make any generalizations in regard to the occurrence of pyrite to which exception cannot be taken, but it is believed that the following statements are based upon a sufficient number of observations to make them generally applicable and to form a basis for more extended investigation. The character of the pyrite present in the four coals mentioned will be described in the order given.

Pyrite in No. 2 (La Salle) coal, mined at La Salle, Spring Valley and southward as far as Bloomington, Roanoke, and in one mine at Peoria, seems to occur characteristically as isolated bright brassy nodules (see Fig. 1), commonly found in the upper half of the bed. By the miners these are called "sulphur" balls. Their common size is 3 to 4 in. across and 1 to 1½ in. thick. Nodules exceeding a foot in thickness and 18 in. to 2 ft. across are found, but are rare. These sulphur balls generally comprise less than 0.5 per cent. of the total mass of the coal, but there is considerable variation in the amount present in different regions. They are usually readily removed from the coal at the face.

I am not aware that pyrite occurs in this form in the No. 2 coal at Murphysboro, in which area the sulphur content of the coal is very low, but in the northern part of the state, except possibly in the Grundy County field, such "sulphur" balls are quite characteristic of this bed. Other forms of pyrite are not conspicuous.

Pyrite Characteristic of Peoria and Fulton Counties

Several varieties of pyrite seem to be characteristic of the next higher coal, No. 5 (Springfield or Harrisburg) coal. The two most conspicuous forms are the gray or brown laminated pyrite and the crystalline pyrite found in horsebacks. The gray or brown, stony and laminated pyrite (Fig. 4) are quite characteristic of the coal in many mines in the Peoria and Fulton County region and they have been observed in this coal as far east as Bloomington. Such pyrite does not seem to be quite as common in the Springfield region, though it is doubtless present. It has been observed as far south as Lincoln in Logan County.

The crystalline pyrite or "spar sulphur" (Figs. 5 and 6) is generally found in the mines in the central part of the state. In addition to these two varieties of pyrite, there also seems to be present in this coal in central Illinois a greater proportion of "blackjack" or mother coal impregnated with pyrite, than is found in other coals. But the amount differs greatly in different mines and in different districts even for this coal. None of these forms of pyrite are found to be especially characteristic of No. 5 coal in Saline County.

Sheets and plates of pyrite are characteristic of the No. 6 (Herrin) coal. From Du Quoin northward, at least to Centralia, and west to the Mississippi valley the coal in nearly all the mines is interbedded with pyrite in sheet or plate form (Fig. 7). It is commonly found in the partings between benches. As the coal is somewhat differently subdivided into benches in different parts of the area, the varying positions of the rather persistent sulphur bands is more or less characteristic of the various fields.

However, the only thing significant about the variation in the manner of occurrence seems to be that in parts of the area the sulphur partings are few and each relatively thin, whereas in other parts of the district the partings are numerous and each rather thick, that is ¼ to ½ in. or more in thickness. There is a persistent sheet of pyrite found over large areas in this coal. This

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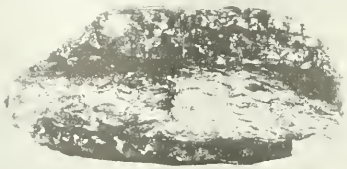
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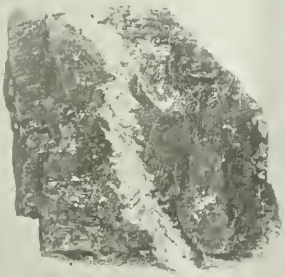
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1—"Sulphur" or pyrite "ball" with distinct boundary such as is commonly found in coal No. 2.

2—Lens of grayish pyrite such as is found in No. 5 and No. 7 coals.

3—Finely divided leaf pyrite such as is found in No. 6 coal in Franklin and Williamson counties. Contains less pyrite than the appearance of the specimen indicates.

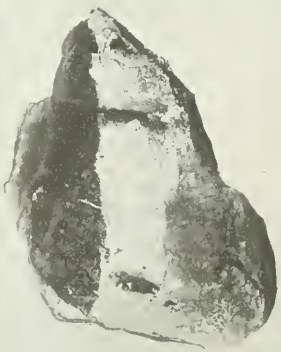
4—Laminated gray pyrite common in No. 5 coal. Contains a higher percentage of sulphur than its appearance indicates.

5—Pyrite vein or "spar sulphur" common in No. 5 coal in the central part of the state.

6—Fragment of clay "horseback" or clay vein from No. 5 coal in the Peoria district, impregnated with crystalline pyrite.

7 and 8—Two fragments of plate or sheet pyrite found in No. 6 coal in the Belleville region.

9—Small pyrite nodules found in the floor clay of No. 5 coal in the Peoria region.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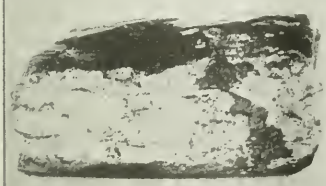
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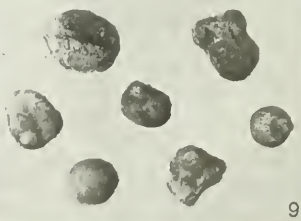
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Some of the Forms of Pyrite Occurring in Illinois Coal

The conservation of our national resources demands that the best of the country's pyrite supply be recovered. Furthermore, the successful output of clean coal in Illinois depends in great measure upon the engineer recognizing the many forms and the manner of occurrence of the pyrite itself

occurs about 4 in. above the blue band. If the sheets of pyrite are sufficiently thick to resist the shattering effect of mining they are rather easily removed at the face, otherwise they are broken up and can scarcely be removed by the miner. Such fragments of pyrite are, however, rather readily removed by washing the screenings.

The No. 6 bed of Franklin, Williamson, Jackson and Perry Counties includes a considerable area in which the coal contains less than 1.25 per cent. of sulphur. In this area the pyrite does not have any appreciable thickness. Isolated nodules of bright pyrite do occur here and there, but they are not common. The most common occurrence of pyrite is as leaf pyrite or as facings (Fig. 3). As has been stated the actual amount of leaf pyrite present may appear to be large when it really is small, for the particles being thin and of slight mass they evidence themselves more to the eye than to the scales.

Both No. 5 and No. 6 coal contain occasional nodules of bright pyrite in the upper part of the bed. These are not uncommonly 6 to 8 in. in thickness and a foot or more across, and in many instances appear to be more or less complete replacement of limestone by pyrite. They are not as clean and bright and probably not as pure as the pyrite found in the nodules of No. 2 coal.

The pyrite in No. 7 coal, which is now mined almost exclusively in the Danville region, occurs mostly as rather irregular elongated lenses of gray, and commonly stony, pyrite (Fig. 2). It is found at various positions in the bed. The pyrite is in some instances of the bright glossy variety, but it is not so massive nor are the boundaries of the nodules so well defined as in the nodules in the other coals. The lenses may extend 10 to 15 ft. laterally and be 3 to 4 in. thick at the thickest part. These masses of pyrite seem to have no persistent relation to any of the partings in the coal, being found at any position of the bed, and the separation from the coal is not as ready or as clean as is the case with the plate or sheet sulphur found in the No. 6 coal of some districts.

It is believed that the solution of the problem of furnishing clean coal to the public rests to a considerable extent upon an appreciation of the various ways in which pyrite occurs. If the preceding descriptions are accurate, it is apparent that the pyrite in No. 5 coal cannot be satisfactorily removed by the same methods that will successfully remove the pyrite from No. 6 coal. Furthermore, if the recovery of coal brasses ever becomes a matter of interest to the nation, some distinction should be made as regards the availability of the pyrite under the different conditions of its occurrence. It is probably true that there is sufficient variation in the character of the pyrite to warrant selection as to source, some coals possibly producing more acceptable material than others.

The numerous uncertainties expressed during the discussion is an indication of the need of further investigation before all the facts are assembled.

THE AVERAGE weight of a cubic foot of anthracite, bituminous coal and lignite in the solid is 97, 84 and 78 lb. respectively, according to L. S. Marks. The specific gravities of each of these fuels in the order given are also noted as 1.4 to 1.8, 1.2 to 1.5 and 1.1 to 1.4.

Breaking Up Concrete

Concrete structures, either plain or reinforced, are considered of the most permanent nature. It is, however, often necessary to remove or destroy such a structure. It may be an old concrete wall, bridge abutment or pier, a foundation under a building, the lining of a tunnel or an engine bed. Many times these objects are inside buildings and adjacent to valuable machinery, or the mass to be removed may be in close proximity to buildings, or to a street congested with traffic, or it may be under an office building.

The customary method of removing old concrete so situated is by drilling holes with jumper steel and sledges by hand and then breaking off the the material bit by bit with wedges. This is a slow and expensive way to handle work of this kind. The best, quickest and cheapest method to remove old concrete, brick or masonry, is by blasting with explosives. At first thought, most people would immediately say that explosives could not be used, as they would crack the walls of the building above or damage nearby machinery and be altogether too dangerous. As a matter of fact, explosives can be used with great economy of time and money in almost all cases and with absolute safety. As a general rule, concrete is easily cracked by blasting, and experience has shown that the better the concrete, the more easily it can be broken.

In doing this class of work care must be exercised to see that the holes are properly located—which, however, is true of all blasting—and that light charges of explosives are used. It requires no particular caution or ability to blast old walls of concrete, brick, etc., that are located in open places, where there is little likelihood of damage to surrounding property. But it is in cases where the structures to be removed are located close to and often are a part of valuable property, machinery and buildings that care and a nice sense of judgment must be exercised. An explosive of relatively slow heaving action, like ammonia 30 to 40 per cent. strength dynamite, is best adapted for such work rather than a quick and shattering explosive.

The drilling of holes is best accomplished by the use of self-rotating hammer drills, but when the size of the work does not warrant such equipment holes can be drilled by hand, using jumper steel or hand drills and sledge. It is best to demolish the structure by gradual steps or benches, or a little at a time, especially if located inside or under a building. Holes are drilled, as a rule, from 1 in. to 1½ in. in diameter, and in depth depending upon the thickness of the material, although 6-ft. holes are about as deep as should be shot in close quarters.

The following is an example of what may be accomplished in this direction: One of the concrete abutments under a bridge had become undermined and had fallen into the channel of the stream. The concrete block was straight for the width of the bridge and had wings at each end intended to brace and anchor it into the earth. The block was about 3 ft. thick and 7 ft. wide, and was covered with about 18 in. of water. The wings were out of the water and obstructing the channel.

Ammonia 40 per cent. dynamite was used. The shot broke off the two wings and broke the center section in two parts. The blocks left by the blast were small enough to be handled by laborers, and were used as the foundation for the new abutment, built shortly afterward. The entire job took just one hour.

Sectional Concrete Cribbing Displaces Retaining Walls at Embankments

A FEW years ago concrete cribbing was utilized for retaining embankments in railroad practice, the cribbing being in the form of precast ties and beams. The *Railway Review* states editorially in its May 10, 1919, issue that the use of such construction has now become quite extensive, concluding that it is evident it is being used to good purpose. Furthermore, there is much flexibility in the application of such cribbing, as it can be used either on ordinary slopes or even nearly up to, if not quite to, the vertical. As a matter of convenience and economy, a firm foundation or one extending much below the frost line is not required.

The cost of concrete cribbing construction is said to be less than that of a solid wall of laid-up stone or concrete masonry. Not only is an expensive foundation eliminated, but a yielding or settlement of such cribbing, with the settlement of embankments or of the original surface under it, is not necessarily detrimental to the cribbing. In the case of made ground a solid wall could not be built at all without due consideration as to foundation. A great advantage in the substitution of cribbing for solid construction lies in the salvage value of the former. Should an embankment be changed or taken out of service, the cribbing can be removed and used over again without loss of material. A decided advantage of this special construction is that the cribbing can be built and filled in with common labor.

In the same issue of the *Railway Review* is an article descriptive of a design which has been adopted by the Cleveland & Youngstown R.R. This road is a new electric suburban line from the business center of the city of Cleveland, Ohio, to East Cleveland. A considerable amount of construction is involved parallel or adjacent to existing railway lines and streets, about terminals or in suburbs where permanent cribbing is adaptable. Frequently this suburban line ran at a different level and at such close proximity to existing lines and streets as to require the shoring up either of its own roadbed or that of the lines it paralleled or approached. In view of the elaborate terminal improvements contemplated for the City of Cleveland, it was advisable that certain portions of this retaining wall construction be of a more or less temporary nature; a city ordinance in fact requiring the use of such construction at certain points. In endeavoring to meet this situation, the engineering department of the Cleveland & Youngstown R.R. cast about for a suitable type of retaining wall construction that would, at the same time, be sufficiently substantial to sustain the heavy traffic carried by adjacent roads and streets as well as that anticipated for its own lines.

Various forms of sectional concrete cribbing were investigated and finally there was located a considerable quantity of material in the form of 8-in. reinforced concrete I-beams which were being manufactured by a local concrete concern for use in building construction. This material was secured and laid up in the form of a cribbing or retaining wall with such immediate promise of success, that a study was undertaken with the idea of adapting similar material especially to this purpose.

Naturally where the same I-beam section was used both as header and stretcher, with the flanges of the stretchers in a vertical position, there was concentrated a considerable load in the edges of the flanges after the wall had reached anything more than a moderate height. This had been relieved somewhat by casting on, near the outer ends of the headers, lugs corresponding to the contour of the half section of the stretchers (Fig. 1), which served to distribute the pressure more evenly over the 8 x 8-in. area representing the intersection of the horizontal and transverse members. These lugs served primarily to resist such tendency as there might be to crowd the stretchers off the headers where such tendency (due to lateral pressure) might be in excess of the friction between the intersecting members.

It was soon observed that this arrangement would easily lend itself to a more permanent form of construction (Fig. 2) than that originally contemplated and that, with comparatively little embellishment, a type of retaining wall could be procured that would serve its purpose indefinitely; while it would at the same time offer so great an advantage in cost and dependability, as compared with the solid retaining wall,

YEARS ago retaining walls around mines and tipples and yard walls at coke-oven plants were frequently made of logs. Timber was plentiful and labor cheap in those days. With the exhaustion of readily available timber near the mines, other materials were utilized. At some of the most up-to-date plants stone and cement were used; this construction was permanent and answered the purpose much better than timber which quickly decayed and had to be replaced. In the long run the stone and concrete walls were no more expensive than the timber construction after several renewals of the latter.

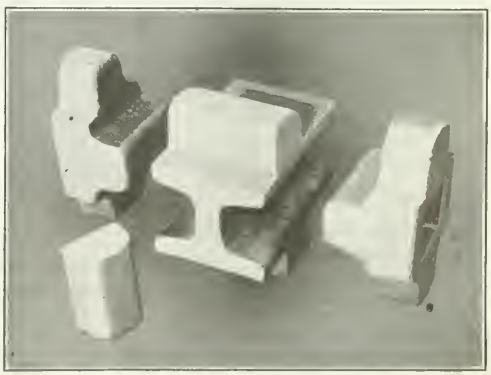


FIG. 1. DETAILS OF PILLOW BLOCKS AND FILLERS USED IN SECTIONAL CONCRETE RETAINING WALLS

FIG. 2. SECTIONAL CONCRETE RETAINING WALL IN PERMANENT FORM

as to warrant its use generally in preference to that form of construction. The problem to be worked out was that of securing a form or bearing between the headers and stretchers that would permit them to stand up permanently. By way of meeting this requirement there were devised the so-called pillow-blocks and fillers shown in detailed illustration herewith (Fig. 1). The pillow-blocks are in the nature of 8-in. square pieces 4 in. in thickness. Across one face of each is cast a lug of a contour corresponding to that of one side of the beam. Projecting at right angles from the edge of the blocks are lugs of the same transverse section and of a thickness equal to that of the block. A recess is cast in the back of each block to reduce the weight.

Each intersection of header and stretcher involves the use of two of these pillow-blocks and one filler block, the latter corresponding to the lug cast across one flange of the stretcher for the purpose already mentioned. In assembling these parts the headers and stretchers are put in position and the filler and pillow-blocks are inserted with sufficient grouting to make a unit structure and give a substantial bearing. In the completed wall this results in a series of substantial columns from bottom to top capable of carrying any load that is likely to be imposed on a structure of this kind (Fig. 2).

Headers and stretchers may be made in any convenient length. In the illustration, the headers and the resulting columns appear at 3-ft. intervals. It is to be observed, however, that only one-half of the apparent total number of headers in the completed wall are used, each alternate header being a dummy only 12 or 14 in. in length (Fig. 3). The manner of assembling is such as to stagger the dummy headers with the full length headers so that while the vertical bearings lines are

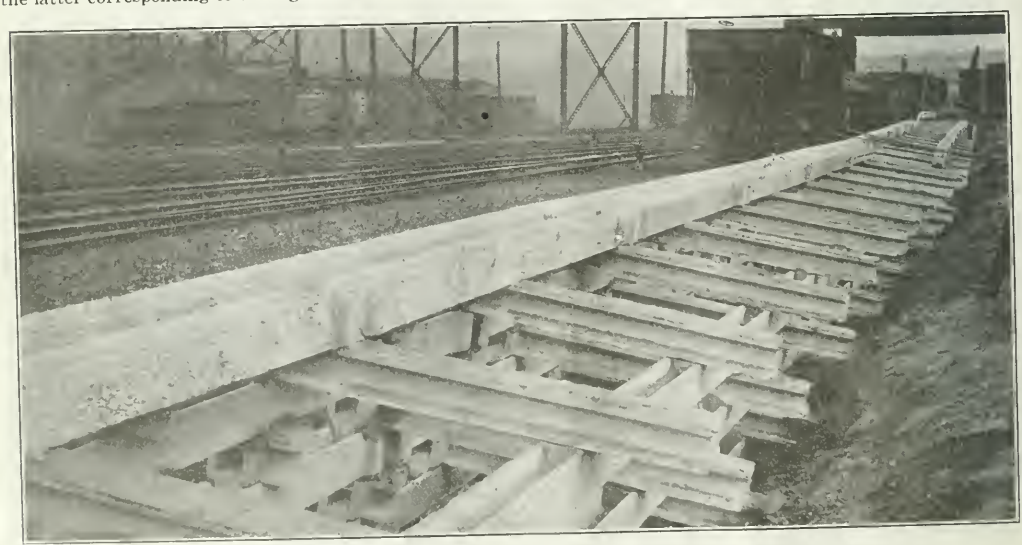


FIG. 3. REAR OF SECTIONAL RETAINING WALL, SHOWING USE OF DUMMY HEADERS

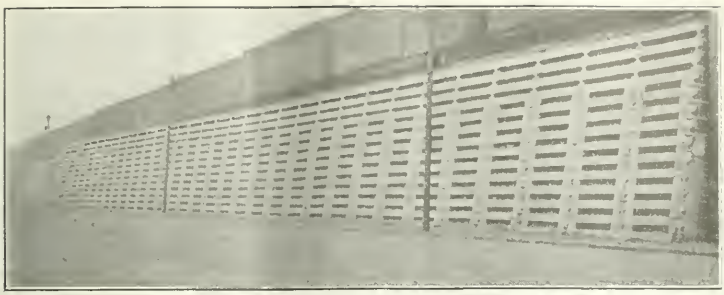


FIG. 4. TEMPORARY SECTIONAL CONCRETE RETAINING WALL

preserved, no element of irregular lateral stability is introduced. A further precaution whereby to secure this same result lies in the staggered joints of the stretchers. These details are clearly shown in Fig. 3.

In setting up the walls as illustrated a batter of 2 in. per foot has been allowed. This is provided for in the slope of the first series of headers and follows thereafter in the progress of construction as a matter of course since the supports for the inner end of the headers are 8-in. sections corresponding to the stretchers themselves. Back filling proceeds as the wall is built up, preferably with some porous material such as cinders, which is tamped sufficiently to insure a firm backing for the cribbing and at the same time drainage is not interfered with. At Kingsbury Run and Fifty-fifth Street, Cleveland, a wing-wall has been constructed after the manner just described. This wall is 35 ft. in height at its highest point and is stepped off to ground level as required by the contour of the slope behind it. A suitable coping slab has been designed to lay over the double course of headers at the top of the wall for use in finishing the tops of either wing or retaining walls.

To summarize, the simplicity of this form of construction, its cheapness, and the rapidity with which it may be erected, combined with its dependability gives it a very pronounced advantage over the solid retaining wall that it is designed to supplant. In preparing foundations it is necessary to go no further than the frost line. Permanent drains need or need not be installed, depending on local requirements. Common labor is all that is required under the direction of a foreman to erect a wall of this nature. Curves may be followed or angles introduced without the necessity of special shapes or forms other than those used in straight way construction. The sections as employed weigh 26 lb. per lineal foot and about three lineal feet of the standard section are required per square foot of wall area. It is estimated that a retaining wall of this type ordinarily can be erected at about one-third of the expense of a solid wall serving the same purpose.

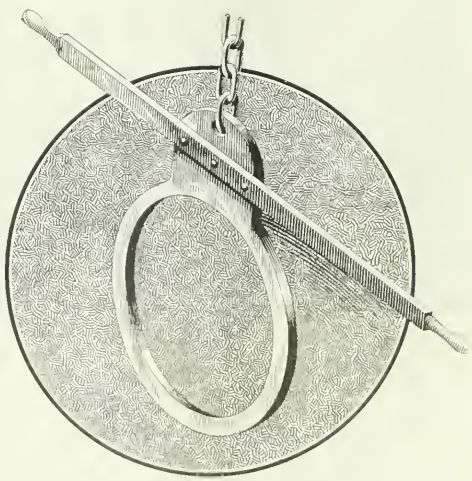
At many of our large coal operations, transportation conditions around the mines and tipples or breakers closely approach those common to trolley lines and railroads. At the tipples, for example, the empty and loaded sidings are at different levels for long stretches of parallel track which run so close together as to require retaining walls. In many cases the road bed of the loaded track at such points is secured by stone or concrete retaining walls. In some instances a reinforced-concrete cribbing could be used to equal advantage and the cost of construction reduced.

The illustrations and the description of the practice of the Youngstown & Cleveland R.R. offer suggestions to the managers and engineers of coal operations and coke plants. The reinforcing material used by the suburban trolley line was I-beams; it happened to be available at the point in question at reasonable rates. Around mines various reinforcing material is available from time to time — old T-rails, structural shapes and so on. This material can all be used in the form of concrete cribbing described. the details of the construction of the cribbing varying with the type of reinforcing material used.

Ingenious Form of Car-Door Lifter

By Ralph W. Mayer
California, Penn.

Many methods are used to raise the car door when dumping is performed by means of a crossover dump. The accompanying illustration shows a ring about 10 in. in diameter that engages the hook on the end of the car door and raises the door so that the coal may slide out of the car. Above the ring is a plate about 5 in. wide, with rounded corners. This is welded to the ring and forms an integral part of it. An iron bar



RING ENGAGES HOOK ON CAR DOOR AND LIFTS LATTER, PERMITTING COAL TO SLIDE OUT OF CAR

about 3 ft. long, with a handle on each end is riveted at its middle point to this plate. The ring may thus be easily guided to place from either side of the car. A chain fastened to the plate extends to the roof of the dumphouse where it is secured to a beam. This chain is placed in such a position, and is of such length, that the ring will catch the car-door hook when the car comes to rest on the dump. The bar handle is used to guide the ring over the hook and to remove it therefrom after the car has been dumped.

Mine Inspectors' Institute of America

By James T. Beard
Senior Associate Editor, *Coal Age*

THE tenth annual meeting of the Mine Inspectors' Institute of America was held July 8-11, 1919, at Indianapolis. In a spirit of loyalty to their respective governments and with a desire to do all in their power to win the war, the mine inspectors of the United States and Canada dispensed with the holding of their annual meetings and bent every energy to the work of producing coal.

It was thus, after an interval of three years, that the members of the Institute again assembled at the call of their secretary and took up the work of discussing ways and means of making mining operations safer and the lives of mine workers happier. Although the notices announcing the meeting were necessarily late in reaching the members, between forty and fifty inspectors responded and a most enjoyable and profitable meeting was the result.

Since the inspectors last met, June, 1916, at Joplin, Mo., there have been many changes in the mine-inspection forces, in this country and in Canada. The result was a large addition to the membership of the Institute, which was a noticeable feature of the gathering and gives much promise for the future.

It was in the state capitol building, at Indianapolis, that the first conference of mine inspectors was held, in 1908, and the Institute organized. On that account, it was fitting that the first session of this decennial meeting should be welcomed by the governor of Indiana, in the Hall of Representatives, in the Statehouse.

The opening session of the Institute was called to order promptly at 10 a.m., Tuesday, July 8, by Charles H. Nesbitt, chief mine inspector of Alabama and third vice president of the Institute.

Mr. Nesbitt then introduced Governor James P. Goodrich, who extended a cordial welcome to the members of the Institute and told, in a few well chosen words, how much he appreciated the efforts that mine inspectors in all the states were making to increase safety in mining and conserve the natural resources of the country. The governor assured the Institute that he would gladly render it and its members any assistance in his power that would enable them to prosecute their work.

The next speaker was Hon. William Green, who, as representing the International United Mine Workers Organization, felicitated the members of the Institute on the work done by them during the trying months of the war. Mr. Green referred briefly to the splendid record of the miners, whose loyalty could not be questioned when their labor in the mines raised the yearly production of coal in this country to over 600,000,000 tons. It was a most gratifying result when the cry was "Coal, coal, coal and more coal." In the face of this great demand, the faithful manner in which the mine inspectors had performed their duties had prevented any large mine disaster.

Mr. Green analyzed the situation as involving two chief considerations: (1) Conservation of human life in mining. (2) Conservation of coal as fuel. He urged that the broadest powers be conferred on mine inspectors to enable them to act promptly where the occasion may require and thereby save life and property—such action, however, to be subject to review by a court.

In closing, Mr. Green referred to the thousands of tons of coal that are now being wasted by improper methods of mining. He stated that every ton of coal left in the mine was a lost ton and a crime against future generations.

The chairman then called on H. M. Wilson, director of the Department of Inspection and Safety, The Associated Companies, Pittsburgh, Penn., who responded in behalf of the Institute, expressing the appreciation and thanks of the members for the kind and generous welcome accorded them.

The chairman then called on the following members, who, in turn, addressed the meeting: James T. Beard, senior associate editor of *Coal Age*, New York City;

MEMBERS AND GUESTS OF THE MINE INSPECTORS' INSTITUTE OF AMERICA IN

James W. Paul, engineer Federal Bureau of Mines, Pittsburgh, Penn.; John Dunlop, former district mine inspector, Peoria, Ill.; Cairy Littlejohn, chief mine inspector, Indianapolis, Indiana.

The chairman then read a telegram that had just been handed him. It was from President Graham and expressed regret of his inability to be present and wish for a profitable and enjoyable meeting. The session was then closed by adjournment, to meet, at 2 p.m., in the Palm Room of the Claypool Hotel.

The afternoon session was devoted to the appointment of committees and the reading and discussion of the president's annual address, which had been forwarded to and was read by the secretary. At five o'clock the meeting adjourned to observe a first-aid demonstration given on the lawn surrounding the Statehouse.

In the evening the Institute was entertained by the local committee of arrangements, in the banquet-hall of the Claypool Hotel and, after the feast, listened to speeches by Governor Goodrich, James Taylor (better known as "Uncle Jim"), Secretary Paul, and others.

Wednesday, July 9, was devoted to the business of the organization, the members and invited guests assembling in the Palm Room of the hotel. An interesting paper on "Compensation Insurance as an Aid to the

ATTENDANCE AT THE TENTH ANNUAL MEETING AT INDIANAPOLIS, JULY 8-11, 1919

State Mine Inspector of West Virginia" was read by Inspector J. G. Vaghan of that state and discussed by the members. In the afternoon, the members listened to an address on "Coöperation Between State and Insurance Inspectors," by H. M. Wilson, of the Associated Companies, and discussion of those present.

The reading of papers and discussions were interspersed by reports of the committees on membership and resolutions. Many new members were received and the Institute took favorable action on numerous important resolutions that will be published later in the *Proceedings*. The session was closed with the reading of a valuable paper on "A Method of Humidifying Coal Mines to Prevent Dust Explosions," by Secretary J. W. Paul.

Owing to the shortness of time and the unfinished program, it was found necessary to hold an evening session. At that time, the paper on the "History of the Mine Inspectors' Institute of the United States of America," by J. T. Beard, was called, but Mr. Beard deferred the reading of his paper, stating that business of greater importance awaited the action of the Institute and, as chairman of the Committee on Resolutions, asked for consideration of the resolution presented at an earlier session, regarding the use of permissible explosives in mines and urging state legislation regulating the handling and storage of all explosives in and about mines. This and other resolutions received favorable action by the Institute, after careful discussion and amendment. All the resolutions adopted by the Institute will appear later in the published *Proceedings*. At a later hour the session adjourned.

Thursday, July 10, the Institute members and their friends were taken by train to Terre Haute, and enjoyed a never-to-be-forgotten boat ride up the picturesque Wabash and inspection of what is known as the "Submarine Mine" at Tecumseh. A bountiful box luncheon had been provided by the committee of arrangements and music and dancing completed the pleasures of the occasion.

The following day, Friday, July 11, found the Institute party en route to Vincennes where they were met at the station by the mayor of the city and escorted to waiting automobiles. After a drive through that ancient and picturesque town, the party was driven to Bicknell and inspected the surface equipment at Mines Nos. 1 and 2 of the American Coal Mining Co. Mine No. 1 recently held the world hoisting record, while Mine No. 2 has one of the largest, most complete and up-to-date plants in the country, being electrically equipped throughout.

The party was dined by the company at Bicknell, and, returning by automobile to Vincennes, enjoyed a banquet in the evening, at the hotel. Following the banquet, there was music and dancing to a late hour, thus bringing to a close one of the most enjoyable and profitable meetings of the Institute. It was decided to hold the next annual meeting at Cleveland. All the officers of the Institute, by vote of the members present, were continued in office another year, owing to the interruption of their work caused by the war.

Use of the Dorr Thickener and Classifier in Coal Preparation

Methods and apparatus long employed in the wet concentration of ores may well be applied to the separation of fine coal from its wash water. Such a separation may be made practically complete, thus recovering not only the fine coal, but the water accompanying it, which is discharged in a clear state and ready for reuse.

By John Griffen
Scranton, Penn.

IN THE anthracite field wet methods of preparation have become almost universal. In many bituminous regions such methods are being steadily adopted. These methods produce their special and peculiar problems. Among these are the recovery of the fine coal, and the waste water, and the prevention of stream pollution. In many coal-mining districts the mine water carries excessive quantities of free acid and acid salts. Such waters are destructive to pipe lines, pumps and preparation equipment, as well as to vegetation when discharged into streams. Treatment of such water chemically is effective and economical provided the precipitated substance can be recovered from the water cheaply.

All these problems involve the presence of solid material mixed or suspended in large quantities of water and are simply problems of wet classification and dewatering.

These problems early faced those engaged in the wet treatment of such ores as copper, lead, zinc and tin. The introduction of Dorr thickeners and classifiers so successfully solved the difficulties that today these machines are used in practically every important wet metallurgical plant on this continent. The world over, plants handling more than 150,000 tons of material each 24 hours are so equipped. Their use in milling low-grade copper ores, where large tonnages must be handled cheaply and efficiently, pointed to their applicability to the quantity production methods employed in coal-preparation plants.

A brief description of the principles of construction and operation of the Dorr thickener and classifier will bring out their usefulness in solving certain problems in the wet preparation of coal. The Dorr continuous thickener is used for the collection and dewatering of fine solids mixed or suspended in a liquid. Its operation is entirely automatic and continuous. Power and attendance requirements are almost negligible. The thickener mechanism may be installed in any form of circular tank or basin up to 200 ft. in diameter.

The Dorr thickener mechanism is shown in Fig. 1 installed in a steel tank. The tank may be constructed either of steel, wood or concrete as the nature of the service and comparative cost may dictate. The feed enters the tank at the center from above. The solids settle to the bottom of the tank, while the liquid overflows at the periphery into a collecting trough. The thickener mechanism, suspended in the tank from the superstructure above, consists of a central vertical shaft with radial arms equipped with ploughs to bring the settled solids, by means of a slow rotation of the mechanism, to a discharge opening at the center of the bottom. The settled solids as a thick sludge can be discharged at this point by gravity or piped to a pump for delivery to any desired point.

The superstructure carrying the mechanism may be of steel or wood, and may be supported by the tank or

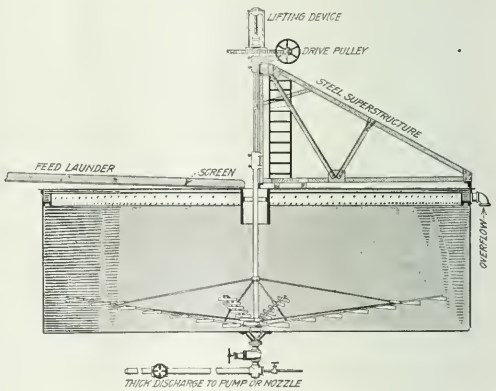


FIG. 1. MECHANISM INSTALLED IN STEEL TANK

independently. If convenient the superstructure may be incorporated with the roof trusses of the tank covering, should such be provided. Power is delivered to the mechanism by means of pulley and worm reduction gearing.

Arrangements are provided for quickly and easily raising the shaft and arms so that they will not become embedded in the settled solids should the power be shut off for any length of time. The shaft can be gradually lowered again while running.

The operation of the thickener may be so controlled as to deliver an overflow either entirely clear or containing a desired percentage of solids. The proportion of liquid in the sludge discharge can also be varied at will between wide limits. For a thickener of given size the natural settling rate of the solid matter in the material being handled and the rates of feed and underflow determine the amount of solids in the overflow.

The thickener may also be operated to separate the suspended solids into two sizes. Coarse particles settle

more rapidly than fine ones of the same specific gravity, so that it is possible, by suitable adjustment of operating conditions, to secure a reasonably clear-cut separation of the solids at a given fineness. When so used a thickener is termed a hydroseparator.

The Dorr classifier is used for obtaining a close separation of coarse particles from finer ones suspended in a liquid, for dewatering granular material or for counter-current washing of granular solids. As with the thickener, the operation of the classifier is automatic and continuous, and the power and attendance required are exceedingly slight.

In Fig. 2 is shown a standard duplex classifier with steel tank. Where solutions handled would attack the steel, wood tanks may be employed; if necessary the mechanism can be made acid-proof.

The Dorr classifier consists essentially of a settling box or tank in the form of an inclined trough open at the upper end and equipped with mechanically operated reciprocating rakes which remove the coarser material as fast as it settles onto the bottom of the tank, the liquid or liquid and fine solids overflowing at the closed end. The tank may be set at any desired slope, usually 2 to 2½ in. to the foot.

The rakes are carried by suitable hangers from bell cranks connected by rods to levers which terminate in rollers. These latter press against cams attached to the crank shaft, which is driven by belt through a countershaft and spur gears. The rakes are lifted and lowered at the opposite ends of the stroke by the action of these cams. The horizontal motion is produced by the cranks and transmitted by rods to the rakes. The motion imparted to these rakes is therefore a forward stroke along the bottom of the tank toward the upper discharge, a lift of the entire rake at the end of the stroke, a return in the elevated position, and a lowering to the initial position at the end of the stroke, thus completing the cycle of movement.

In the duplex classifier illustrated, the rakes are arranged to alternate in such a manner that the weight of the moving parts is largely counterbalanced and the power required is only that necessary to overcome friction and to advance the settled solids. The design is such that all parts subject to wear are well removed from exposure to the material treated.

The material to be treated is fed across the width of the tank, where the liquid produces a pool. The granular solids settle to the bottom and are advanced up the inclined bottom of the tank by the rakes. After emerging from the pool and while ascending the sloping bottom the solids have an opportunity to drain before being finally discharged from the end of the tank. Any fine and more slowly settling solids overflow the closed end with the liquid. The agitation near the bottom caused by the reciprocating motion of the rakes prevents the settling of the fine particles and at the same time is not sufficient to cause the overflow of the larger grains. By control of the slope of the tank bottom, the speed of the rakes and the dilution of the feed, the character and size of the two products can be definitely controlled. The machine will operate under greatly varying conditions and a close separation in size obtained at any point desired.

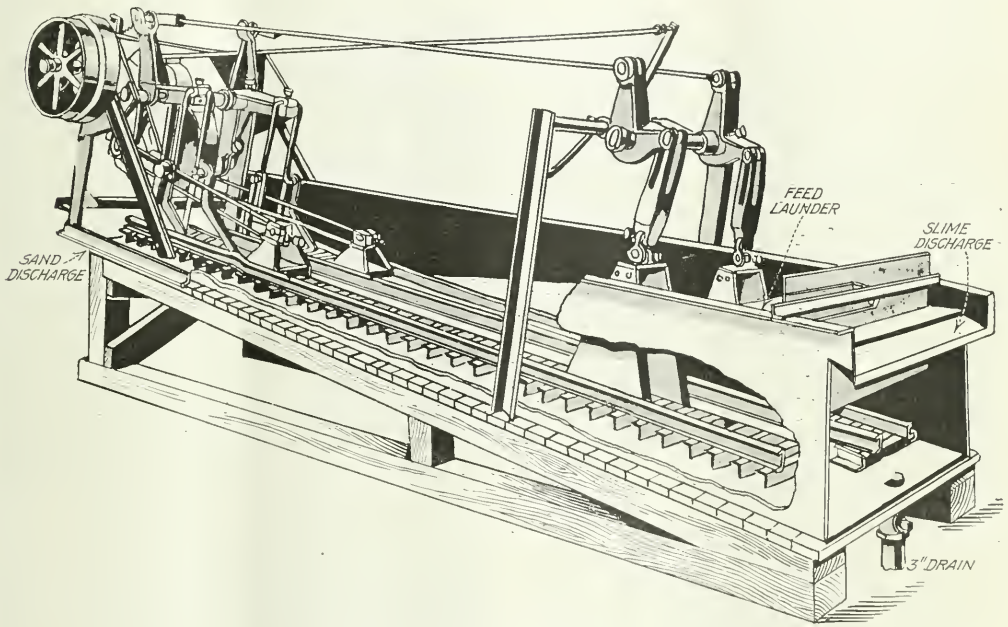


FIG. 2. STANDARD DUPLEX CLASSIFIER WITH STEEL TANK

In anthracite preparation a considerable tonnage of coal passes through the barley screen. This tonnage amounts to from 5 to 10 per cent. of the breaker output and will run as high as 80 per cent. of the output of washeries treating bank or river coal. Most of this tonnage is granular and slightly smaller than barley, and if freed from the fine slimes and water is suitable for mine fuel or salable for use in certain makes of stokers, or for briqueting. This slush consists of from

10 to 30 parts of water to one of solids. By delivering the breaker or washery slush to a Dorr hydroseparator to remove the excess water and most of the slimes, and then passing the hydroseparator underflow to a Dorr classifier for final sizing and dewatering, this granular coal can be recovered practically completely, free from slimes and of a definite size.

Because of the easy control of the two machines the size of the ultimate product can be varied to meet the customers' demands. With the same equipment the product can be made substantially all above 40 mesh, or 60 mesh or 100 mesh, as desired. Should the slush contain considerable granular slate, sand or pyrites these can be removed by placing concentrating tables, Robinson washers or other suitable concentrating devices between the hydroseparator and the classifier. With such a plant, properly designed, a coal product analyzing 15 per cent. ash or lower, if desired, can be cheaply obtained.

In soft-coal washing plants it is usually sufficient to deliver all the waste waters to a thickener large enough to settle practically all the solids. The thick sludge obtained can be mixed with the larger coal and shipped. The overflow water is left practically clear and can be again used in the washing plant.

In the anthracite field, the waste water from the plant outlined above for the recovery of the granular coal, may be clarified to any desired degree by the use of a further thickener of larger diameter.

The thick sludge from this thickener, consisting largely of fire clay and fine slate, in the proportion of about one ton of solids to one of water may be run to waste storage. Over 80 per cent. of the breaker water can thus be recovered in a substantially clear condition.

By the same system the waste waters direct from either anthracite or bituminous washeries can be clarified with the same result. This system offers a solution of the water problem where the clear water supply is insufficient or where water must be pumped from a distance or against a considerable head. This method offers great economy in water and expense as compared with the use of settling ponds, where frequently the losses by evaporation and seepage are excessive.

Where the water supply comes from streams contaminated by other operations, the water may be clarified by the use of Dorr equipment, thus eliminating wear on pumps and pipe lines and insuring well-washed market coal.

Many washing plants depend for their water supply upon corrosive mine water with a resultant high maintenance cost on pumps, pipe lines and washery machinery. By chemical treatment and use of a thickener to remove the precipitated solids, such water can be cheaply converted into a practically clear, noncorrosive liquid, well suited for washery use.

An installation of a thickener of this kind to clarify waste waters can be operated to prevent stream pollution. The thick sludge from the thickener can be stored in a comparatively small pond, which because of the thickness of the sludge and relatively small volume can be built and maintained at small cost.

In carrying a long bar of iron or a plank through a crowded shop, a man should bear in mind that this may be a means of injury to his fellow workmen. It is common practice to carry such material on the shoulders; a better method would be to carry it in the hands—it would be safer for the other employees.

Legal Department

Injuries in Illinois Mines—If defendant coal company permitted a miner to work in a mine room under a roof known by it to have been dangerous, it is liable to him for injuries resulting from a fall of the roof. By electing not to be bound by the provisions of the Illinois Workmen's Compensation Act, the employer lost any right to rely upon a defense that the injured man assumed the risk of the accident. (Illinois Supreme Court, Fromm vs. New Staunton Coal Co., 521 Northeastern Reporter, 594.)

Connecticut Workmen's Compensation Act Applied—Mere failure of an injured workman to consult a physician until two weeks after being injured does not amount to such "willful or serious misconduct" as debars his right to an award under the Connecticut Workmen's Compensation Act, although such failure if continued long enough might, in a proper case, be held to amount to such misconduct. (Connecticut Supreme Court of Errors, Rainey vs. Tunnel Coal Co., 105 Atlantic Reporter, 333.)

Injuries Resulting from Noxious Gases—An Iowa coal operator who has failed to comply with the statutory requirement for maintaining such ventilation throughout his mine as to render harmless and expel all noxious gases is liable for impairment of a miner's health resulting from the air in the mine having become charged with poisonous gases. "A wrongful injury which operates to destroy or undermine or impair the health of another is no less actionable than is a wrong from which the injured person sustains wounds or bruises or broken bones." (Iowa Supreme Court, Gay vs. Hocking Coal Co., 169 Northwestern Reporter, 360.)

Liability for Breaking Cable—If a steel cable used by defendant operator in moving cars on an incline and slope of a mine was of a quality usually utilized in careful mining operations, defendant is not to be held liable for injury to plaintiff, an employee who was struck by a car when the cable broke because of some latent defect in its manufacture or other hidden defect not discoverable by such ordinary careful inspection as would be expected under the circumstances. Such an accident is one of the ordinary risks incident to mining employment which employees are to be held to assume. (Kentucky Court of Appeals, Wright vs. Elkhorn Consolidation Coal and Coke Co., 206 Southwestern Reporter, 634.)

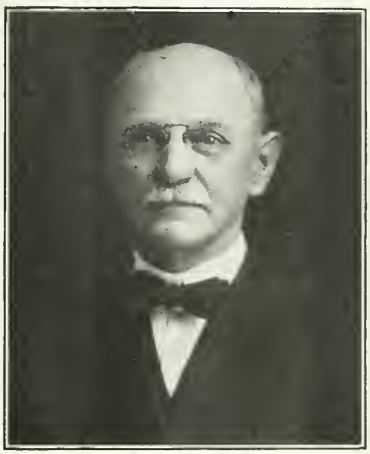
Indiana Safety Act—If defendant coal operator maintained in its mine unguarded cogwheels in the mechanism of pumps, and if it was practicable to have guarded such cogwheels, plaintiff is entitled to recover damages for injuries sustained in consequence while at work at the pumps, for this involved a violation of the Indiana Safety Act. An employer's duty under this act to safeguard dangerous machinery cannot be evaded by delegating performance of the duty to some employee—not even to the injured employee. An employee is not necessarily guilty of contributory negligence in remaining at work at a machine not safeguarded as required by law. (Indiana Appellate Court, Moore vs. Candalia Coal Co., 121 Northeastern Reporter, 685.)

Exclusive Sales Agency Contracts—A contract purporting to grant an exclusive local agency for the sale of coal for a longer period than a year is unenforceable unless evidenced by at least some memorandum of the agreement in writing, signed by the party to be charged under the agreement. And where there is a valid contract of this kind, the agent is not entitled, on breach of the agreement, to recover damages as for loss of profits or merchandise he might have sold from his store to employees who would have been employed to deliver coal under the agency contract. Such damages are too uncertain and speculative in their nature to be the subject of an award. (Kentucky Court of Appeals, Gregory vs. Harlan Home Coal Co., 206 Southwestern Reporter, 765.)

Who's Who
in Coal Mining

QUIN MORTON, of Charleston-on-the-Kanawha, a director of the National Coal Association and an active, successful coal man, has succeeded where Ponce de Leon failed. In and under the hills of West Virginia he discovered the secret of youth—a mixture of hard work, perseverance and keeping the spirit young—and best of all the elixir—West Virginia's pure mountain air.

Even as years go, Quin Morton is not old, for when a man reaches threescore he may still be in the prime of life. But the point is that no one would believe that Quin Morton was over forty. A glance at his photograph will substantiate this statement. What keeps him young may well be asked. The answer is, his grandchildren—fifteen of them—in whom he glories and by and with whom he drives dull care away. As for the youngsters themselves, they idolize him—for he is one of them. There may also be another reason for his defiance of nature and time, and that is his determination to be, look and feel younger than G. H. Caperton, also of the County of Kanawha.



QUIN MORTON

Almost 62 years have elapsed since Quin Morton breathed his first breath of Virginia air at Charlotte Court House. Upon the death of his parents, while he was still a child, he had to shift for himself. His "education" was limited to that obtained in a private school taught by an uncle He has received, however, a liberal education in the school of hard knocks and has in the course of an active life acquired a wide store of knowledge and experience.

He began to acquire a real knowledge of men, of business and of values when at the age of sixteen he came to West Virginia, locating in Greenbrier County, where he was a clerk in a store, weighing out sugar and cutting calico. At the age of twenty he became a school teacher (about the hardest work he ever had), and after about three years in that patience-trying occupation he embarked in the mercantile business at Ronceverte. He gave this up in 1883 to travel for a Baltimore shoe firm. He had dealt with heads, previously, but now for five years he dealt with soles. Finally, in 1888, he came in touch with the pockets of humanity, accepting the post of cashier of the Bank of Ronceverte, a post he held until 1895, when he resigned to take charge of the business of Rodes Morton & Co., closing out that business in 1896.

Quin Morton's career as a coal man really dates from 1896, when he became bookkeeper of the Turkey Knob Coal Co. at MacDonald, being promoted in time to superintendent. In that capacity he soon gained a knowledge of the operating phase of the coal business, as might have been expected of a man of his initiative and energy. By 1903 he had organized and had become president of the Morton Coal Co., of Paint Creek. In January, 1906, this company was sold to the Paint Creek Colliery Co., and Mr. Morton upon the consolidation became assistant to the general manager. He remained in that position until October, 1906, when he acquired an interest in the Imperial Coal Co., of Burnwell, becoming general manager. He organized the Christian Coal Co. in 1911 and was made general manager of that company, continuing as executive officer of the company until 1915, when the Imperial Coal Sales Co. was organized.

Since 1915 Mr. Morton has devoted a large part of his time to the affairs of the Imperial company, particularly to the sales department, and is today the general manager of the firm. However, the affairs of the Wood Coal Co., the Peytonia Mining Co. and several other concerns also claim a share of his attention, since he is a director in each of them.

Mr. Morton is not so thoroughly engrossed in his own affairs but what he has time to devote to other causes. He has in fact given his energies liberally to the advancement of the industry in general, as is illustrated by his service as president of the Kanawha Coal Operators' Association upon several occasions and also by the time he has devoted to the affairs of the West Virginia Splint and Gas Coal Association. He is perhaps best known nationally as a director of the National Coal Association, which is doing much valuable pioneering work in the coördination of the soft-coal producing interests to the end that a better relationship be created between operators and consumers.

Quin Morton is a man who derives intense enjoyment from the companionship of his fellowmen. He knows how to apply himself to the tasks in hand and yet he extracts all the enjoyment there is to be had from prosaic business. And when he plays he enters into recreation with his whole being. Men like him because he plays fair, because he is courteous and affable, and because they cannot help it.

Impurities in Raw Coal and Their Removal*

SYNOPSIS—*The impurities in coal, regardless of their nature or of their occurrence, may be in a measure decreased by suitable means. The means employed for this purpose are hand-picking, mechanical picking and washing. Each has its limitations, but a careful application of two or more may do much toward reducing the ash content of the original raw coal.*

THE impurities in raw coal may be conveniently divided into four classes:

1. *Intermixed Impurities.*—In this group is included the inorganic matter which normally yields the ash of the coal. Where the coal-forming material was accumulated under clear water the impurity will be confined to the mineral matter originally present in the original plants; but if the accumulation of the vegetable remains was accompanied by a sedimentary deposit of mineral matter, the resulting coal will contain an ingrained as well as an inherent ash. As the percentage of mineral matter in the material increases, the characteristics of the product change from coal to bone coal. An admixture of more than about 50 per cent. of shale with the coal is termed carbonaceous shale, while a more rapid deposit of clayey matter produces in the coal bed a layer of almost pure shale. To remove the ingrained and inherent impurities from the coal substance is impossible, but it is possible to effect the separation of coal from bone coal and carbonaceous shale.

2. *Infiltrated Impurities.*—The impurities most frequently met with infiltrations are calcite, gypsum and iron pyrites, which are deposited in the coal seam subsequent to its formation. They cannot always be separated from the coal. Calcite and gypsum are found in the cleavage and bedding planes of the coal and therefore occur in the form of thin plates. The effectual separation of these two minerals from the coal depends on the thickness of the layers and the tenacity with which they cling to the coal. Layers of calcite are usually detached easily from the coal, and owing to their brittle nature the layers are broken by the subsequent handling into small pieces. Hence when the raw coal is screened the calcite accompanies the slack, from which its separation presents considerable difficulty.

3. *Interbedded Impurities.*—This group includes impurities which may be easily separated from the coal, since they are to a large extent freed from their attachment during the process of mining. Where the impurity band is hard and exceeds 1 in. in thickness it should be removed from the coal at the working face; but if the band is comparatively friable or is thinner than 1 in., it is loaded with the coal and is brought to the surface to be dealt with there.

4. *Extraneous Impurities from the Roof and Floor.*—Occasionally in a bed of coal material from the roof and floor has been forced into fissures in the coal bed by the pressure of the superincumbent strata. This largely depends on the nature of the roof and floor, and if these are soft such intruding impurities are detached to a great extent from the coal, and this materially facilitates their subsequent removal.

The physical character of the floor and roof has a large influence on the quantity of dirt in the coal. Where the floor and roof are soft and friable a greater percentage of dirt is unavoidably mixed with the coal. Further impurities are mixed with it from the floor by hasty shoveling, especially when the floor has been disturbed by shotfiring. Extraneous matter from the floor may also owe its origin to undercutting in the top layer of the floor instead of in the lower layer of coal. Such impurities are naturally detached from the coal and may be separated from it fairly readily.

The object of removing the impurities from the raw coal is to produce a clearer product. Treated coal yields less ash than untreated coal and its calorific value will be increased in direct proportion to the resulting purity of the sample. In actual boiler practice, however, it is found that the increase in evaporation which is observed with treated fuel exceeds the expected value because the fireman can use the cleaner coal to greater advantage. Hence the more effectively the coal particles are separated from accompanying dirt the more valuable does the fuel become from a commercial and industrial point of view.

Methods of Separation

The chief methods employed for separating the impurities from coal particles are hand-picking, mechanical shale pickers and coal washers. Hand-picking is only applicable to lump coal from which all particles smaller than about 2½ to 3 in. in diameter have been removed. The process is one in which the human element plays an important part and which cannot be easily subjected to exact investigation under normal working conditions. It is therefore impossible to give any figures for the process.

A special feature is made at many collieries of picking out all coal particles which are intermixed with impurity bands. These pieces are crushed and then sent with the screened coal to the washing plant. This practice appears to be the only efficacious method of dealing with particles in which the impurity is incorporated with the texture of the raw material.

Mechanical shale pickers depend for their action on the different forms which the particles of shale and coal assume in the raw state. Coal is usually more or less cubical in shape, whereas shale takes the form of flat plates. Hence after the raw coal has been carefully sized by the usual screens it may be fed onto bar screens. The bars are of such a shape that the shale is tipped on edge and falls through the slits between the bars. On the other hand the cubes of coal travel to the end of the bar screen.

Other mechanical pickers take advantage of the fact that coal, especially anthracite, will slide at a more rapid rate down a chute than will shale. This action, which results from the coal possessing a smaller coefficient of friction than shale, is augmented by the regular shape of the coal which allows it to roll down the chute. Hence the coal leaves the chute at a greater velocity than the shale and will in consequence be carried to a more distant bin than the dirt.

The method of cleaning raw coal either by hand-picking or by means of mechanical shale pickers is only ap-

*From a paper presented by F. G. Drakeley, at the January, 1919, meeting of the Past and Present Mining Students' Association, held at the Wigan and District Mining and Technical College, Wigan, England.

plicable to lump coal. Raw coal of smaller diameter than 3 in. has to be dealt with at the washing plant.

The action of the washing process depends on the difference in the velocities with which identically shaped particles of various specific gravities settle in water. If pieces of coal, shale and pyrites of approximately the same shape are dropped into water, the pyrites having the greatest specific gravity falls most rapidly; then comes the shale; and finally the coal follows some distance behind the others. All coal washers utilize this principle in effecting the separation of the heavy dirt from the coal particles.

In a former paper on coal washing in the *Transactions* of the Institute of Mining Engineers, 1918, it was shown that the efficiency of the washing process rapidly increases as the average diameter of the raw coal particles increased up to about 1¼ in. After this the efficiency only rises slowly with the increase in size. From this it is concluded that the larger the size of the coal to be washed the more complete will be the separation of the dirt from the coal. Therefore every effort should be made to limit the breakage of the raw coal so as to preserve the large pieces. Any preventable reduction of the diameter of the particles to less than ¾ in. involves a considerable lowering of the attainable quality of the washed product.

The effective separation of the dirt particles from the coal particles is not the primary object of washing, from the colliery point of view. The main object is to reduce the percentage of ash yielded by the washed coal to a minimum. Hence although the separation is more perfect as the size of the raw coal increases, the coal particles themselves, owing to their non-homogeneous structure, deteriorate in quality. Consequently, as the average diameter of the raw coal particles increases beyond about 1 in. two opposing functions come into action. One is the more effective separation of the dirt particles, thus tending to reduce the ash yield; the other is the gradual decrease in quality of the coal particles themselves, which tends to increase the percentage of ash. The latter function eventually predominates and therefore a definite size is reached where the ash content is reduced to a minimum.

As the result of a large number of tests the conclusion has been reached that raw coal of an average diameter of 1¼ in. is most amenable to ash reduction by washing, but certainly every precaution should be taken to prevent breakage from reducing the diameter to less than this value.

J. Drummond Paton, of Manchester, suggested that probably the raw coal might be cracked up into what he termed natural fracture, whereby it might be possible to screen from the product coal of a definite dimension which would yield only the normal ash.

Although cases could not be given where such a process is in operation, the following table giving the ash contents and the corresponding sizes of samples obtained by screening raw coal may be of interest:

ASH CONTENTS AND SIZES OF SCREENED SAMPLES

Ash Content, per Cent.	Size, In.	Ash Content, per Cent.	Size, In.
16.01	2½—2½	10 03	1 — ¾
16.42	2½—2	15 41	¾— ½
11.97	2 —1¾	16 89	½— ¼
15 93	1¾—1½	16 67	¼—1/10
13.16	1½—1¼	20 35	1/10—0
8 75	1¼—1		

The tabulated results are merely tests on one large sample of raw coal, and before any definite conclusion can be reached a considerable number of experiments will be necessary, especially as a previous test on another coal completely failed to answer the problem.

However the results would appear to indicate that if the raw coal could be broken in such a manner as to give particles of a diameter equal to 1¼ to 1 in. the accompanying impurity would be broken to a different size. Hence by screening that particular size from the crushed product a sample would be directly obtained that would be comparatively free from impurity.

One of the most vexing questions, and one that needs close attention, is exactly what is to be regarded as legitimate refuse. Thus the foreman in charge of a washing plant might be content to allow dull coal to pass away in the dirt, and owing to the higher specific gravity of the dull coal the tendency would be for this to take place. Of course, a serious loss of good fuel is thereby incurred.

Bony Matter Should Be Removed From Coal

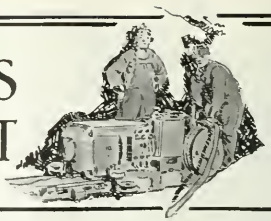
In other cases, particularly where a dirty raw coal is being washed, the tendency is for the light carbonaceous shale to be delivered with the true coal. The removal of bone from the coal that is required for coking is a matter of importance, and cases could be instanced where the refuse from the washer is material with a comparatively high carbon content. Indeed, at some collieries that type of refuse is burned under the boiler without any special arrangements being made concerning the draft or area of grate.

Perhaps it may be legitimate to overlook the discharge, as refuse, by the washing plant of particles of coal which are ingrained with iron pyrites, on the ground that if the pyrites were not removed by some means or other the percentage of sulphur in the washed coal might be so high as to render the fuel unfit for foundry or metallurgical purposes. Incidentally it should be observed that the appearance of pyrite in the coal is no indication of the sulphur in the coal.

One of the most difficult problems which is still awaiting a commercially practicable solution is the question of dealing with the coal dust. As a rule this dust is allowed to proceed with the small coal to the washing plant. There the dust forms a slime with the washing water. The washing water is led to a settling pond in which the slime settles. The slime is subsequently removed, but owing to the fact that no method which is economically applicable on a large scale has been devised for removing the high percentage of water from the slime, the disposal of it is a difficult matter. At some collieries it is consumed under boilers generating steam at a low pressure, but in many cases huge mounds of slime have been accumulated in the hope that further investigation and progress may render them profitably available. Frequently the accumulations assume such large proportions as to necessitate throwing the slime on the waste heap.

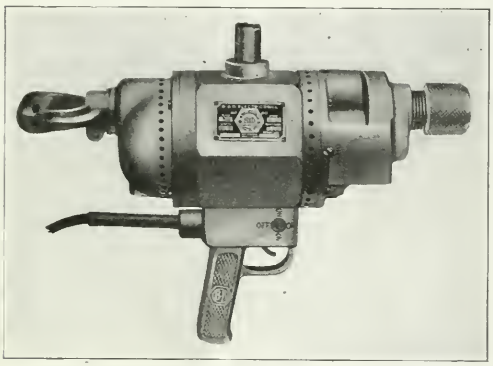
Although at the present time there is no sale for slime, it is certainly not a true waste product. Therefore it is of importance to prevent its production. In the washing plant the dirt in the raw coal often disintegrates so that the resulting slime, even if it could be dried, contains more impurity than the dry dust. Hence it would be an advantage to remove all the dry duct of smaller diameter than about 1/20 in. previous to delivering the coal into the washer. The recovered dust might be used in the manufacture of briquets or as a powdered fuel. However, before an efficient dust extractor and recoverer is evolved a considerable amount of research seems to be necessary.

NEW APPARATUS AND EQUIPMENT



New Electric Hand Drill

The Black & Decker Manufacturing Co., Baltimore, Md., has recently added a new size to its line of portable electric drills. This is a machine with a capacity of 0 to $\frac{9}{16}$-in. steel, and is provided with a No. 1 Morse taper socket. It will drill a $\frac{9}{16}$-in. hole through machine steel at a rate of $1\frac{1}{2}$ in. per minute without overloading the



NEW SIZE OF PORTABLE ELECTRIC DRILL

motor. In tests, pressure up to 500 lb. has been applied without stalling the drill.

This machine is similar in construction to the other sizes manufactured by the company. The housing is of magnalite, an aluminum alloy of great tensile strength. The gears are packed in grease in a separate grease-tight compartment like an automobile transmission, and the drill spindle runs in a long bronze bushing and against a ball thrust bearing. The motor is air cooled, and in testing these drills have run continuously for 14 weeks, day and night, including Sundays and holidays, stopping only to renew brushes. The weight is 21 lb., and the no-load speed 600 r.p.m.

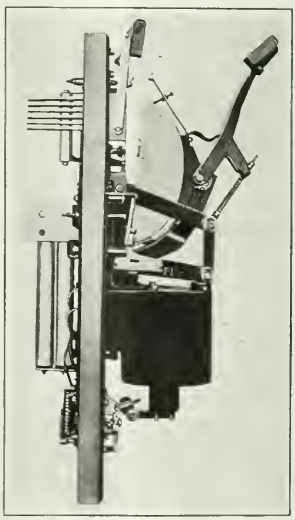
An interesting feature of this tool is the attachment of the Morse taper socket. This is in the form of a separable sleeve secured in the drill spindle by means of a large knurled nut. By unscrewing this nut the entire taper socket can easily be removed from the drill spindle.

The drill shank protrudes slightly beyond the end of the taper socket, and a little tap on the end of the protruding drill shank frees it. This makes the drill unusually compact, and gives it great strength and wearing qualities, as, otherwise, it would necessarily be at some distance from the bearing in order to leave room for the drift pin slot. This drill has the patented pistol grip and trigger switch which characterizes all Black & Decker drills. A view of the new drill is shown in the illustration.

New Reclosing Circuit Breaker

The accompanying photograph illustrates a new circuit breaker, type "LRL" of 3000 and 4000 amp. capacities, recently put on the market by the Automatic Reclosing Circuit Breaker Co. This breaker is an electromagnetically operated instrument, having the following characteristics: (a) The breaker is closed and held closed by means of an electromagnet; (b) it opens automatically in case of overload, short-circuit, or voltage failure; (c) it remains open a definite time interval regardless of cause of opening; (d) in case the breaker is opened by a short-circuit, it makes no attempt to reclose while the short-circuit exists, but closes instantly upon the removal of short-circuit or overload.

The main contact brush is of a laminated butt contact type. The studs are of laminated construction, the lower stud being slotted vertically and the upper stud horizontally. The main contact brush is protected from arcing by an auxiliary copper contact shunt and the final arc is formed on upper graphalloy contact tips. The upper arcing tip is supported on a pivoted support actuated by a strong compression spring so that the



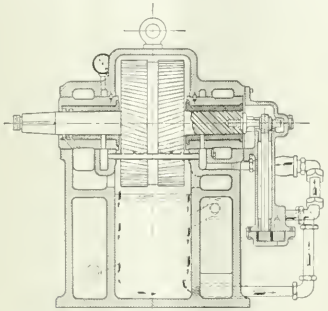
ELECTROMAGNETICALLY OPERATED CIRCUIT BREAKER

upper rear tip follows out at a considerable distance in opening, thereby insuring good contact of the arcing tips until brush and auxiliary contact are separated from their respective contacts. The upper rear arcing tip is also pivoted directly on a bracket so that it is free to align itself with the front contact in all positions. Provision is made for adjusting the tension of the main brush by an eccentric bushing in the brush support.

Turbine Reduction Gears

Terry reduction gears manufactured by the Terry Steam Turbine Co., of Hartford, Conn., are again on the market, not having been obtainable during the last year because of the concentration of this company almost entirely on turbines for the destroyers. Although made primarily for sale with Terry turbines, the gears alone are available whenever a high-grade reduction gear is desired.

In the design of these gears there are a number of features that are particularly interesting. The gears and pinions are of the stub-tooth, double helical type,



CROSS-SECTION OF THE REDUCING GEAR

generated to true form on a Fellows gear shaper. The accuracy of this method of tooth generation is such that no grinding or scraping process is necessary to insure perfect contact of tooth surfaces. Both gears and pinions are interchangeable.

A well-ribbed, double-walled, box-like structure, extending the full depth of the case, forms a rigid support for each pair of bearings. The space between the walls acts as a water jacket for cooling the oil. The ribs between the walls act both as stiffening members and water baffles. The central part of the case, directly under the gears, forms an oil reservoir which contains sufficient oil to supply not only the gears, but also the turbine if attached.

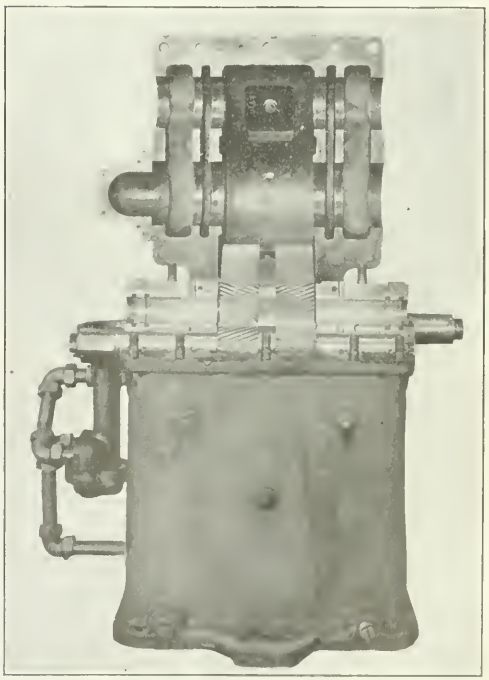
The case being a double-walled, rigid, box-like structure, accurate and maintained alignment of the gears is insured. The casing is bored with the aid of jigs, the dimensions and alignment of the boring being checked by accurate gages. This results in a tight and rigid fit of the bearings.

The bearings themselves are of ample size and are split horizontally to permit their replacement without removing the couplings. The bearing shell is of cast iron and is unusually heavy. This is to prevent warping or "pinching-in" from heating, which often occurs in thin shells of bronze or similar metal. The lining used is of highest grade tin-base babbitt on both gear and pinion bearings, accurately machined to close limits, thus requiring little scraping. Interchangeability makes it possible in case of excessive wear to easily and quickly replace a bearing and restore the original alignment.

The oiling system employed is of the forced-feed variety, the ring oiling system having been found unsatisfactory for turbine reduction gear bearings. The oil pump is located well below the oil level in the reservoir, so as to avoid suction lift, thereby preventing ruin of the gears arising from a possible failure of the pump to function. The oil is pumped from the reservoir through short, direct, brass piping to a self-cleaning strainer, thence through distributing passages to large, annular oil pockets around each bearing shell, and through the spray pipe from which the oil is sprayed, for lubrication of the gear teeth. The oil pressure gage is located in one of the above-mentioned annular oil pockets at the most distant point from the oil pump.

The pump and its bevel gear drive make a complete unit without stuffing boxes or exposed running parts. This unit is so constructed as to be easily accessible. The pump gears may be removed for inspection without disturbing the driving mechanism or oil piping. The bevel gears may also be inspected by removing a small cover. The effectiveness of this lubricating system has been proved by test, for, without any water cooling, the temperature of the oil after long runs has been found to be not excessive.

In spite of the cool operation of the gears, a water cooling system forms part of the standard equipment. The water cooling jacket is hydraulically tested, and when it is once found to be water-tight it is certain that it will always remain so. Because the cooling jackets are in the bearing ends of the case, heated oil



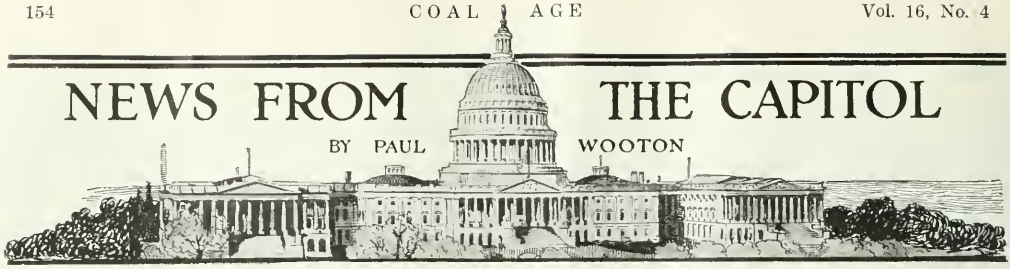
REDUCING GEAR WITH COVER RAISED

draining from the bearings and gears comes immediately into contact with the cooling surfaces before it has the opportunity to heat the oil in the reservoir.

These gears may be furnished for either direction of rotation, the only difference being the location of the oil spray piping above or below the contact point. Great reliability and quietness in operation are claimed for these machines by their maker.

NEWS FROM THE CAPITOL

BY PAUL WOOTON



Large Refund Will Be Made to Exporters of American Coal

Fully $1,500,000 will be returned to exporters of coal as a result of a decision announced, July 18, by the Commissioner of Internal Revenue. The decision amends Articles 13 and 15 of the tax regulations. These articles govern tax exemptions on amounts paid for transportation of commodities in the course of exportation. Commissioner Roper's opinion was accompanied by the following statement:

The constitutional provision that no tax shall be imposed on the exports from any state has been held by the Attorney General to include taxes on amounts paid for the transportation of property in the course of exportation.

Numerous cases have come to the attention of the bureau where amounts paid for the transportation of property were being exempted from tax when the shipments in the light of the law were not in fact in course of exportation. While the constitutional exemption excuses shippers sending goods into export from paying the transportation tax that all other shippers are required to pay, it does not require that a bounty be placed on export business or that it should escape from ordinary burdens that are imposed on property similarly situated in the United States.

The misunderstanding of the constitutional provision and the different interpretations placed on the term "in course of exportation" by the shippers and carriers, and the consequent unsettled conditions in circles engaged in export business, have made it necessary to promulgate rules adequately to protect the Government in the collection of its revenues and at the same time secure to shippers engaged in the export trade the exemption to which *bona fide* export shipments are entitled.

The new regulations were drawn after an exhaustive examination of the subject from a legal standpoint and after numerous hearings where representative men from the different industries were heard at great length. A practical arrangement is provided by means of temporary exemption certificates and certificates of exportation for determining when property is in the course of exportation and providing for exemption from tax on amounts paid for its transportation.

The practice of assembling commodities in pools and similar arrangements at export points from which such commodities might be sent either to a domestic point or to a foreign point was given extended consideration and provision made for the exemption from tax on amounts paid for the transportation of property through such pools into export when the essential character of such shipments and the continuity of their movement can be determined. The manner in which the property usually was disposed of in the pools heretofore would not permit of the exemption from tax of any of the amounts paid for the transportation of the property into the pools, because the property after it arrived in the pool was subject to any disposition which the owner might deem expedient. In fact, the property was ordinarily merely consigned to the pool and either sold before its further domestic or foreign destination was determined, or such destination was determined after it had arrived in the pool. The new regulations provide that amounts paid for the transportation of property on the inland movement to the pool may be exempted from tax if the shipper has disclosed the essential export character of the shipment at the point of origin by making the shipment against a verified statement of his foreign requirements. Such shipment would move under a temporary exemption certificate stating that the shipment is sent into the pool for the express purpose of being exported and referring to the foreign requirements certificate containing the foreign order against which the shipment is to apply. Upon the shipment from the pool into the export of a like quantity and grade of the property by the first available transportation the shipper would secure a permanent exemption by filing a certificate of exportation, which certificate would also refer to the particular foreign order against which the shipment is applied. In this manner the essential export character of the shipment and its disposition would be disclosed at the time such shipment originated; the property could not be held in the pool for sale; if it were, the final exemption could not be secured and the tax would be collected.

This regulation recognizes that the nature of the shipping papers does not determine the essential character of the shipment and American exporters will not be placed at a disadvantage by reason of shipments under bond from foreign countries which proceed to a point of export in the United States and are there held for sale or for any disposition that the owner may deem expedient. The transportation tax in such circumstances will be assessed and collected on bonded shipments to the extent of the amounts paid for transportation in the United States.

In all cases where shipments are sent into export and this regulation has not been complied with, the tax will be collected, but the person paying the charges for the freight may seek a refund.

Example of Change in Regulations

Amounts paid for the transportation of bunker coal in no case are exempt from tax. An example covering the application of the change in the regulations is as follows:

A coal-mining company has a contract to supply 10,000 tons of coal to a dealer in Italy. It also has a branch in the Argentine to which it proposes to ship 150,000 tons during the next six months. The contract with the Italian concern and the allotment to the Argentine branch are shown in the Foreign Requirements Certificate which has been filed with the collector at the place where the shipper has his principal place of business. The coal company is endeavoring to obtain a ship to either place, but before a ship is secured it ships 5000 tons of coal to the pool at an Atlantic port intending to export that amount of coal to either place by the first ship it can obtain, and Temporary Exemption Certificates as herein required have been filed covering this tonnage at the time it is shipped. After the arrival of the coal a ship is secured to take a cargo to Italy and it is loaded with 5000 tons of coal from the pool, no part of the coal making up the cargo, however, being a part of the shipment which entered the pool exempt from the tax pursuant to the Temporary Exemption Certificate covering the shipment of the 5000 tons, but the coal making up the cargo was of the same grade and kind as that shipped under the Temporary Exemption Certificate. The temporary exemption of this shipment from tax becomes permanent upon the filing of the Certificate of Exportation as provided in this regulation and the carrier in making up the monthly summary need not check the shipment by car number, but merely by quantity.

If the shipper had secured an 8000-ton vessel and loaded 6000 tons of coal in it for shipment to the Italian concern and there were only 5000 tons of coal in the pool from which exemption from tax had been secured by the filing of the Temporary Exemption Certificate in compliance with this regulation, the shipper would have to pay the transportation tax on the 1000 tons which had been taken from the pool and for which no Temporary Exemption Certificate had been filed.

Not Anxious for Another Investigation of Coal Industry

After listening to a number of witnesses the Rules Committee of the House of Representatives is not at all enthusiastic about another investigation of the coal industry. Hearings were opened by the committee on a resolution by Representative MacGregor, of New York, proposing an investigation of the anthracite situation. If anything is done in the matter it is evident that it will not be confined to the anthracite industry, but will be extended to the whole matter of coal production, marketing and distribution. The suggestion by George H. Cushing, the managing director of the American Wholesale Coal Association, that any investigation would carry with it the expectation on the part of consumers of lower prices, and would discourage buying, seemed to have weight with the committee, as did the testimony of various witnesses to the effect that present prices of coal are justified.

The committee had hard work getting at the real subject before it. A partisan quarrel developed as to the merit of the work done by Dr. Garfield as fuel administrator. One member of the committee suggested that Dr. Garfield should be hanged. Others defended his administration. The snapping back and forth between the Republicans and Democrats on the committee punctuated each session.

The committee is anxious to know if coal has increased in price more than other commodities and if the advance in wages to labor engaged in the coal industry is greater than that in other businesses. Facts and figures in that connection will be furnished from several sources.

In the course of Mr. Cushing's testimony he presented the following information in tabular form:

AMERICAN PRODUCTION

Grade	First Six Months, 1919	First Six Months, 1918	Loss	Loss Per Cent
Bituminous	220,361,000	294,837,000	74,476,000	24.9
Anthracite	40,204,000	50,812,000	10,608,000	19.8
Coke (Beehive)	262,510	578,965	336,455	28.0
Total	260,827,510	346,227,965	85,420,455	24.5

Anthracite facts:

Production of prepared sizes for first three months of this coal year behind 1918 by 960,000 gross tons.

Domestic coal takes { 60 per cent. of anthracite; 16 per cent. of bituminous

Steam coal takes { 40 per cent. of anthracite; 84 per cent. of bituminous

Anthracite supplies { 38.9 per cent. of domestic coal; 7.5 per cent. of steam coal

April costs—34 independent companies representing 60 collieries, 812,000 tons
Cost—exclusive of selling expense and capital charges, $5.31
Realization, $5.02. Loss, $0.29

Dr. Garfield, on Jan. 31 said anthracite prices should advance 50c. per ton. Companies held same price and added 10c. per month from May to September, or 50c. on prepared sizes. Individuals added 15c. on prepared sizes—after deducting 75c. in February—or 75c. Out of line on Sept. 1 by 50c. too low.

The hearing brought out that householders in the East and in the Middle West are fairly well stocked up for the winter, but in other sections domestic supplies are yet to be acquired. The alarming feature of the situation, is was declared, lies in the fact that there has been no storage of steaming coal. The railroads, public utilities and industries soon will begin buying heavily and will make it difficult for the domestic user to obtain his coal, it was stated.

The possibility of avoiding a coal investigation, which it is feared will delay buying, has been lessened by the introduction by Senator Frelinghuysen, of New Jersey, of the following resolution:

Whereas, for several years the price of coal to the consumer has from time to time been largely increased; and

Whereas, for a period this increase in price was attributed to existing war conditions; and

Whereas, in spite of the fact that, since the armistice was signed, Nov. 11, 1918, normal peace conditions have prevailed, the price of coal has continued to rise, without any apparent economic, or other proper reason therefor;

Therefore be it resolved, that the Committee on Interstate Commerce, or any subcommittee thereof, be instructed to make inquiry into the cause or causes which have brought about the enormous increase in the market price of coal, and to that end obtain full data regarding freight rates, wages, profits and other matters bearing upon the question under consideration, with a view to determining who, or what, may be responsible for such increase in price, whether due to economic causes, and therefore proper and right, or whether due to manipulation or profiteering on the part of miners, shippers or dealers in coal.

Be it further resolved, that the Committee on Interstate Commerce, or any subcommittee thereof, be authorized and directed to subpœna witnesses and compel their attendance, to send for persons and papers, and do such further acts as may be necessary to secure any and all information desired in the furtherance of said inquiry.

Be it further resolved, that the Committee on Interstate Commerce shall report its findings to the Senate, together with such recommendations as may be pertinent and advisable, with a view either to Congressional or executive action, in order to remedy existing conditions, or the punishment of any individual or corporation deemed guilty of unlawful acts.

And be it further resolved, that the sum of $10,000 be, and is hereby, appropriated for the purpose of said inquiry, the same to be paid out of the contingent fund of the Senate.

Cancellation of Fuel Agreement and New Bunker Rules and Regulations

The War Trade Board Section of the Department of State has announced that all agreements (W. T. B. Form X-201) entered into with the War Trade Board by persons, firms or corporations in the United States and its possessions and in foreign countries, in connection with the sale or delivery of coal, coke and primary or derivative oils, have been cancelled, effective July 14, 1919. Effective the same day also all existing bunker rules and regulations were cancelled.

General Bunker License Number Three has been issued through the Division of Customs of the Treasury Department, effective July 14, 1919, authorizing vessels of all flags to secure in the United States or its possessions, bunker fuel, port, sea, and ship's stores and supplies in any quantities desired, whenever said vessels are engaged or are about to engage in trade to any part of the world. No formalities whatsoever will be required under the terms of this General Bunker License.

Coal Age Index

The indexes to *Coal Age* are furnished free to all who ask for them. The index for the first half of 1919 will shortly be ready for distribution, and a copy can be had by addressing a postcard to the Subscription Department of *Coal Age*.

COAL AGE

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Where There Are No Forces There Can Be No Resultant

IN THE day-wage system the reward for intelligent and energetic industry is largely taken away from the working man. To use the vernacular, he gets his pay for the least amount of work that he "can slide by with." On the other hand, under the piece-work or tonnage system, pure and simple, all reward for efficiency exhibited by the employer is taken from him and given to the employee. The coal operator gets his work done for a given rate whether he helps or fails to help his employee to do a good day's work.

With payment by the ton, there is no encouragement offered the employer to give good service to the man who works for him. Neither the day-work nor the piece-work system acting alone functions perfectly, for it removes from one party or the other the natural reward of efficiency. There are two parties to production—capital and labor. If you would get service from both, both must find an adequate reward for the efficiency of the service rendered.

A coal-mine executive buying certain ancient and inefficient second-hand mining machines was asked why he did so. "Reason enough," he replied; "they are cheap, and I can get the electric-machine scale regardless of the efficiency of the machinery I buy. Why pay three times as much for a new up-to-date machine when all the benefit of the greater efficiency would go to the employee? After all, as everyone knows, the tonnage scale was made to suit the output per man-shift of the machines then in use and did not have the shortwall coal cutter in view at all."

In a sense the purchaser of the historic equipment was right, and we will get no efficiency till the operator is rewarded for any expenditure he may make in purchasing new mining devices to help the miner and loader. Often, all that results from introducing more efficient machinery is a strike and sabotage. The workman is too little versed in economics and engineering to see how the better machinery will help him, and he strikes against its introduction and in some cases he even destroys the machine. The enginery of advance is profit, and the piece-work system takes the profit from advancement and so makes advance impossible.

We hear the unreasonable demands of a few of the labor agitators and wonder that the more numerous reasonable working men do nothing to restrain such men, but instead strike readily with them at their behest. But that surprise is qualified by the thought that when good laws for the protection of life come up in legislative halls, how often do the large number of reasonable operators, in silence, let the unreasonable reactionaries in the industry oppose those remedial measures!

Shall Production Be Limited?

"THERE is a most pernicious doctrine being preached, that if a man does less work there is more for others. The very opposite is true. The more work one does, the more there is for others, for every industry affects every other."

The foregoing words were used by Sir Auckland Geddes, brother of Sir Eric Geddes, in the British House of Commons during a recent debate over the advisability of increasing the Government-fixed price of coal by six shillings, or about $1.50 per ton. In England the problem of labor is even more acute than it is in this country; so is the proposition of nationalizing the mines. In Great Britain the miners are obsessed with the belief that a large portion of the profits from their labor goes into the pockets of the mine owners and is there beyond the reach of the public and does the public no good. Were the mines nationalized and an equal profit on the sale of coal realized, this profit would not be entirely objectionable since it would enter the coffers of the commonwealth and be expended on enterprises intended for the public weal.

For the past four or five years the commercial, industrial and economic, as well as the political, world has been in a state of eruption. Demand, production, costs and prices have undergone such rapid changes as to be highly bewildering even to the expert, let alone the tyro. The cost of living has mounted by leaps and bounds, and wages have roughly been advanced in proportion thereto.

Broadly speaking, this process has been a closed cycle of multiplying error. The higher wages were raised the higher went the cost of living, because wages enter into and influence the cost of all commodities; the higher went the cost of living the higher went wages, because each individual's income must cover his expenditures. Of course all costs and wages were measured in dollars and cents or some other so-called standard of value.

Reverting to first principles, nobody cares a tinker's dam for a dollar or a franc or a pound as such. A certain weight of gold of a certain fineness has little meaning or utility to the ordinary human being. What interests him, and interests him deeply, is the exchange value, the purchasing power of the little disk of metal we call a dollar or the slip of paper that circulates in its stead. Thus, aside from acquired habits of thought, it matters nothing what the compensation for a day's work may be in dollars and cents, but it matters much what the purchasing power of these dollars and cents may be. Back in the early 90's a laborer could be hired for $1 a day; at that time a good pair of shoes could be bought for $2.50. Today, in the same locality, a laborer not one whit more proficient receives $4 a day while shoes, certainly not superior in stamina and wearing quality, now cost $10. Other examples of the advance in wages and the shrinkage in the purchasing power of the dollar might be mentioned almost without limit.

The eastern portion of the United States in particular is threatened with a shortage of coal. The miners are going to ask not only for an increase in wages but for a shorter day and possibly a shorter week. The miners must live, have a right to live, and should be able to live in at least the same manner to which they have been accustomed. And yet, if either or both these demands are granted the price of coal must be raised.

Now it takes coal not only to cook food but to haul trains, propel steamboats, drive mills and factories, smelt metal, weave cloth, grind flour and move street cars. In short, all modern civilization is so close an interweaving of various industries that what affects one affects all.

This being the case, what means can be invoked to decrease the cost of living? While there may be others, the greatest and most fundamental remedy is increased unit production. So far as the coal mines are concerned, this may be accomplished either by the more general use of machinery and mechanical devices (in certain instances) or through the exercise of either greater effort or a higher degree of skill by the manual worker.

For years, four-fifths of the human race has been prostituting its productive energies to the arts of destruction. Today the entire world is short of goods; its warehouses are empty, its shelves are bare. Is it logical to suppose that the pressing needs of humanity, and thus the best interests of the individual, can be most advantagecusly served through a limitation of useful production?

Civilized man must work either with brain or muscle or both in order to exist; other things being equal, the more he accomplishes the better he lives. The idea that any man or any set of men can permanently benefit through a decrease, curtailment or limitation of useful production is socially iniquitous, for the simple reason that it is fundamentally and economically wrong.

What is the proper pay for a man who, like the miner of Great Britain, produces only 0.89 ton per day? Surely it is questionable whether such a low-producing unit is entitled to a living wage.

Sidewalks a Mining Town Necessity

NO MATTER how arid any climate may be, sidewalks are a much needed convenience. Even in dry weather they make it possible to go from the house to the store, to the school or to the office without wading through the dust, while in wet weather no argument is needed for urging their introduction. In wintry weather the snow serves, like rain, to make roads muddy and sidewalks requisite.

No one can expect a prosperous looking town where there are no sidewalks. The office, the amusement hall, the store and the houses cannot be clean so long as there are no sidewalks provided. All that can be said about gardens and lawns fails to equal what can be said about sidewalks, for while the former improve the appearance of the towns, sidewalks improve the appearance not of the town only but of the interior of the dwellings and of the inhabitants themselves.

People will not dress well if they have to wade in mud or dust, and if they do so dress the dirtiness or dustiness of their apparel inevitably makes their clothing appear out of place and anything but becoming. Consequently where there are no sidewalks everything appears bedraggled. There can be no social life for there can be no cleanliness.

The absence of sidewalks increases the work of everyone without any compensating advantage. Where sidewalks are not built weeds grow, and then, even if the walks are clean, travel is dirty for the weeds are sure to be covered with a thick layer of dust which is disturbed by every passer-by.

The frequently noticeable difference between the apparel of inhabitants of cities and the clothing of people in the country is almost wholly a reflection of the condition of the sidewalks and crossings. What is within the bounds of frugality in a city is improvident in a village, not because fine clothing is not as appropriate in one as it is in the other, but because what is kept intact in the city is speedily destroyed on the muddy and dusty country roads or village streets.

Let no one say that wages are high in America, for in doing so he disguises a cardinal fact. Let him rather say that unit production is high. Wherever that is true unit satisfaction is high accordingly.

Pumping Problems East and West

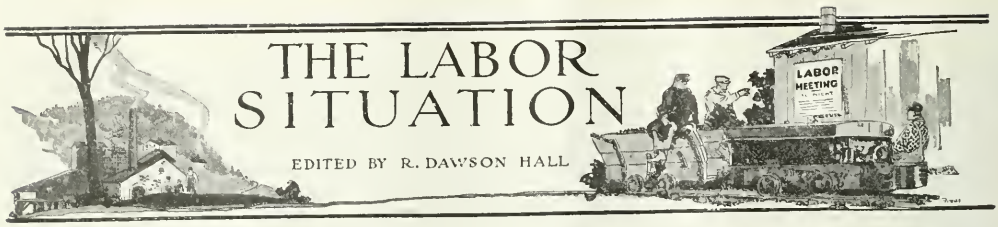
QUITE different are the pumping problems of the Eastern to those of the Western bituminous mines. If the Western mines were as wet as the Eastern the cost of keeping them dewatered would be immense, because Western coal measures, for the most part, dip as they enter the hill and often reach immense depths. Similar difficulties have been met in anthracite mines and in metal mines, but not without increasing the costs of mining considerably.

Fortunately, or unfortunately, many Western coal mines are quite dry. Some, so far, have had no water pumped or drained from them, what little water enters them being spent for evaporation. Yet these mines have a pumping problem, because water must be pumped *into* them from nearby surface points for the purpose of sprinkling the deadly coal dust that gathers in them.

In some workings all trips are sprinkled, both on entering and leaving the mines, the roadways also being generously moistened by water and steam. Some mines are pumping water from their profoundest depths for use in sprinkler lines. Some even leave water in storage underground during the wet winter season and pump it out in the dry summer to use, perhaps with other water, for sprinkling purposes. There are some mines, however, that are quite wet, for the West is not all equally arid. The amount of water which enters as a result of the caving of workings to the surface and to water-laden strata frequently affords no small problem.

Often the water to be used for sprinkling has to be forced up the slopes of a high hill against considerable head. At other mines, as at Black Hawk, Utah, the risk of fire has made necessary the installation of a heavy pumping outfit at the foot of the hill with high-pressure pipe for delivering water, if needed, in large volume at the mine mouth. The coals of the West, while they contain combined moisture, are dry to the touch. Being quite resinous—streaks and even masses of resin can often be found in them—they burn readily, and a prudent manager will provide himself with means to flood such fires out before they get too great a headway.

Thus it happens that the problem of pumping is as apparent in Western mines as in Eastern, though the difficulties surrounding the solution are at times somewhat different. At some mines the work of the pump is to deliver water to the mine instead of from it. At others it is both to remove and deliver water. In any event the pump is needed, but the type of pump will vary with the kind of duty demanded of it.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Of leading importance in the news of the week is the action of the mine workers in Great Britain. Unfortunately the miners of the United States are only too anxious to follow British precedents, good or bad, and probably they will emulate the unfortunate example of the British mine workers in demanding that their pay be provided out of the taxes instead of by increased prices as soon as their demanded increases in wage lift the cost of coal so high as to thoroughly incense the American public.

It will be remembered that the British mine workers have been continually asking more and performing less. It is true that the men in the British mines are probably not the equal of those who worked in the underground before the war. But there is no question that the efficiency of the mine workers has declined even since the war ended, and concurrently the mine workers have been seeking more pay and shorter hours.

The Fine Art of Backing Down Gracefully

In face of a nation-wide strike the mine worker was promised an inquiry into the justice of his demands with the covert understanding that he would get at least a large part of what he demanded. A Royal Commission sounds like a portentous machine for grinding out the life of the workingman. It is nothing of the sort. It is rather a camouflage to cover an ignominious surrender. The workmen know that it is the "protective coloration" by which ministers of the people —speciously termed "Ministers of the Crown" and "His Majesty's Ministers"—disguise an ignominious retreat.

The Royal Commission reported as desired. Wages were to be raised; profits were to be curtailed; and as wages were to increase far more than profits declined, the Ministry decided that prices should be boosted six shillings per ton. The public was filled with indignation. Here again was the "endless spiral"—higher prices demanding higher wages; higher wages demanding higher prices and so on *ad infinitum*. Wage earner was clearly seen as the enemy of wage earner. If the miner gets more, it must be from those workers who buy the materials excavated, transported or manufactured by the use of coal.

More for Mining Makes Everything Cost More

The Federation of British Industries declared, and no one could question the statement, that the cost of machinery would be increased from 3 to 10 per cent.; textiles would cost from 3 to 4 per cent. more than before; chemicals, gas and electricity would rise in price 10 per cent. more; the building trades would face an increase in the price of steel of $6 per ton, while bricks would cost 5 per cent. more and glass from 5 to 10 per cent. The steel manufacturers placed the increase in the cost of steel at 2 pounds sterling, or $10 per ton.

The mine workers wanted the increase proposed, but did not want prices to rise as a result. Consequently, they insisted that the taxpayer (who, by the way, was groaning under a burden of $300,000,000 a year, to pay for improvident operation of the railroads, and of $250,000,000, which was annually paid to reduce the price of wheat) should pay also $233,000,000 to keep down the price of coal.

The Government offered to keep the old price in operation for six months, if only the mine workers would agree not to strike. It undertook, as proposed by the mine workers' leaders, to form a committee of inquiry more compliant doubtless than the spineless Sankey board. But the mine workers' conference at Keswick overwhelmingly decided against the proposal. The burden must fall on the taxpayer and nationalization of the coal industry must proceed at once. The mine workers would not permit the introduction of labor-saving machinery so long as the mines were privately owned.

At last the makeshift ministry of Great Britain plucked up heart enough to declare that the taxpayer could not be made to bear burdens such as this in addition to all the others resulting from the war. On July 18 Andrew Bonar Law declared that, beginning Monday, July 21, the increase of six shillings ($1.50) per ton would have to come into effect. Then he added, canny Scot, that the Government's action did not preclude the possibility of further negotiations on the subject. Where Great Britain will land, if she make the concession, no one knows. If the coal concession is added to those made earlier she will lose nearly $800,000,000 each year on her plan of keeping down prices. The loss represents an amount of money that would have run the United States Federal Government before the war. The burden would be the last strain that would break the taxpayer's back, and if industry is to be conducted without gain where will be the profits for the payment of taxes?

As a result of the decision of the Government to make the public pay the whole cost of mining the coal that it uses, the miners went on strike over large sections of the mining field. The Yorkshire mines closed down, the union withdrawing even the pumpmen. On July 21 Premier Lloyd George announced that three mines were flooded and several others were filling with water and the Government was sending men from the fleet to pump out the mines.

Strike To Make Taxpayers Pay Bill

On July 21 the South Wales mines were hampered by the abstention from work of large numbers of the surface men who were striking for the shorter hours granted the miners and who sought extra pay for week ends. The mine workers in the Mansfield District, of Nottingham, were also striking. Their strike was on the main issue—whether the price of coal should be increased or the mines should be run at a loss at the expense of the taxpayer.

The news of unrest from all over the United States—of which space forbids the recital of any more than a part—shows that the labor relations here, while better than in Great Britain, are by no means satisfactory. At Parsons in the northern anthracite field 1500 men employed at the Ridge Colliery of the Hudson Coal Co. struck because 100 of the employees failed to pay their union dues. Only July 12 the men were instructed by the union mine workers to complete their payments. They were informed that if they failed to do so by July 17 a strike would be called. Payment not being made the miners fulfilled their threat.

A number of boys at the Evans Colliery, at Beaver Meadows, in the Hazelton anthracite field, were put on a 6-hour shift, while the outside men and company hands were allowed to work 8 hours. So on July 17 the boys went on strike and tied up the whole operation.

At the Locust Spring Colliery of the Philadelphia & Reading Coal and Iron Co. the miners during the war were asked to load their own coal, owing to the shortage of laborers. The United Mine Workers of America conceded that this be done. Now the war is over the men refuse to fill their own cars, the union declaring that such action is in violation of the contract.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Surveying Without Instruments

Letter No. 2—Regarding the suggestion of T. Edwin Smith, in his article on this subject, *Coal Age*, Mar. 27, p. 562, that a mine survey can be made by the use of a steel tape only, when no instrument is available, let me say with emphasis, In that case, the survey should never be made until an instrument is secured and the work can be performed by a reliable and properly qualified surveyor or engineer.

No matter what care may be exercised, in attempting to make a survey with a steel tape and connecting the surface lines with the underground work in a mine, no guarantee can be given in regard to the accuracy of such a survey. It would certainly be bad practice for mine officials to base the continuation of their operations underground on the supposed accuracy of such a survey.

The sources of error in tape measurements are well known, and no reliable mine surveyor or engineer will claim that a survey made by that means is accurate, or can be depended on in extending the mine workings or locating a boundary line underground. A slight error made at the commencement of the survey of a large mine would seriously affect the result at the working face. For this reason the idea of surveying a mine with a steel tape only ought never to be entertained.

An Accurate Map a Necessary Guide in the Development of a Mine

Serious losses of life and property have resulted from incomplete and imperfect mine surveys; and the first consideration in the survey of a mine should be to prevent possible mistakes and insure the accuracy of the results. The plan of a reliable survey enables a mine foreman to lay out the work under ground systematically. Reference to an accurate mine map shows the proximity of the working face to boundary lines and points of danger. Such maps are necessary to insure safe and efficient mining.

The map of a mine is always the guide in its development, and it is both annoying and expensive when calculations based on the mine map prove to be incorrect, because of a mistake or error in the survey. An accurate mine map is a most important factor in preventing undue loss of coal, which is bound to result when the entries and rooms in a mine are badly arranged. The correct location of property lines is of the utmost importance in order to prevent trespassing on neighboring properties, which has often proved an expensive mistake in mining practice. Troubles from creeps or squeezes are avoided by a proper arrangement of the openings and the development underground; and this can only be accomplished by a careful study and calculations based on an accurate mine map.

For work of a temporary character, a survey made with a steel tape may often suffice; but all permanent roadways and important parts of a mine should be surveyed with the utmost care, by employing a modern instrument for that purpose. A good mine surveyor or engineer will carefully check the adjustment of his instruments before attempting to make a survey.

These remarks are not intended to underrate any ability on the part of the ingenious surveyor to perform certain work without an instrument; but rather to show the necessity of making all mine surveys with instruments of precision, and thus reduce the possibility of making errors that could be avoided by the use of proper instruments. Moreover, state mining laws require accurate mine maps and, to comply with these requirements and in the interest of safe and efficient mining, acurate surveys must be made in every case.

Ladysmith, B. C., Can. WILLIAM WESNEDGE.

Barometer vs. Outflow of Gas

Letter No. 5—Referring to the question regarding the effect of change in the reading of the barometer on the outflow of gas in mines, it is interesting to note that the use of this instrument, in mining practice, has gradually come to be regarded as essential.

Of the two types of barometers in use, the standard mercurial barometer is almost universally employed in Europe, while the aneroid barometer is quite frequently found in use, at mines in this country. However, both of these types depend solely on the changes in atmospheric pressure which are determined by the weight of the atmosphere acting on the instrument.

The term "barometric pressure" has the same meaning as atmospheric pressure, but is expressed in inches of mercury instead of pounds per square inch, 1 in. of the mercury column of the barometer corresponding to 0.49 lb. per sq.in. of atmospheric pressure. The effect of barometric changes on the gases, pent up in the waste areas of a mine, can only be understood by a thorough familiarity with the laws of the expansion of gases due to changes in pressure and temperature.

Laws Controlling Expansion of Gases

Boyle's law relates to the effect of pressure on the volume of gas or air, while Charles' law, sometimes called Gay-Lussac's law, concerns the effect of temperature on the volume of gas or air. The former of these two laws makes the volume of air or gas vary inversely as the pressure it supports, while the latter makes the volume vary directly as the absolute temperature. The rate of expansion is the same for all air and gases.

Bearing these rules in mind, it is evident that, during the period of a falling barometer—the period when mine officials are warned to exercise extra precaution—the gob gas confined in the waste areas of the mine will expand and flow out onto the airways, owing to

the decrease in atmospheric pressure indicated by the fall of the barometer. At the same time, the air in the live workings of the mine is expanded in the same proportion, and this, in a measure, resists the expansion of the pent up gases.

Allow me to suggest, here, that the increased percentage of gas in the workings is not due solely to the fall of barometer. The effect produced on the ventilating fan by the barometric fall is such as to cause a slight decrease in the efficiency of the fan and a similar decrease in the quantity of air circulated. The ultimate result is to augment the effect in the mine by slightly increasing the percentage of gas in the workings.

Drop in Outside Temperature may Counteract Effect of Fall of Barometer

Again, let us assume that the fall of barometer is accompanied with a considerable drop in the temperature of the atmosphere. The former acts, as before, to expand the air and gases in the mine. But, if the drop in the temperature of the outside air is considerable, say from 40 or 50 deg. to zero, the effect will be to increase the density of the air revolved in the fan, which increases its efficiency as a ventilator. The effect of the change in temperature on the surface does not materially alter the temperature of the air in the mine workings, owing to the intake air being rapidly heated in passing into the mine.

In this case, the combined effect of the drop of outside temperature and the fall of barometer is such that the one partially or wholly counteracts the other. The claim of some authorities that the fall of the barometer precedes its effect in the mine is thus seen to depend on many conditions, which make such a rule pure assumption.

Someone has suggested that, in order to maintain a constant mine pressure when the fan is blowing air into the mine and the barometer is falling, it would be necessary to increase the speed of the fan, thereby increasing the ventilating pressure but maintaining the total pressure on the mine air constant. In other words, the increase of pressure due to the fan takes the place of the decrease of barometric pressure, keeping the absolute or total pressure constant.

When the fan is exhausting air from the mine, the same reasoning would make it necessary to slow down the fan to maintain a constant absolute pressure in the mine. This, however, would cause a decrease in the quantity of air in circulation and increase the percentage of gas in the workings.

Lowest Recorded Barometric Pressure

The lowest barometric pressure ever recorded in the United States occurred at noon, Thursday, Mar. 25, 1909, when the pressure of the atmosphere, at sea level, was 28.48 in. of mercury, which was 1.44 in. below the normal reading. The average fluctuation of the barometer is much greater in this country than in England. Here it is not uncommon to experience a variation of 1 in. in a period of 48 hours. While the average range in this country may be taken as varying from $\frac{1}{2}$ to $\frac{3}{4}$ in., that in England is said to vary from $\frac{1}{4}$ to $\frac{1}{2}$ in. The maximum range of barometer in this country may be assumed as not exceeding 2 in., which amount is rare in occurrence.

Speaking of the two types of barometer, my preference has always been for the aneroid compensated for temperature. It is my experience that the aneroid adjusts itself more promptly to atmospheric changes than is possible in the mercurial barometer where the movement of the mercury column is very sluggish. Also, the aneroid is small, compact and portable.

The instrument consists of a metallic box or vacuum chamber, which is supported against the atmosphere by the tension of a spring. The movement of the flexible disk forming the wall of this chamber is communicated to a needle whose reading is registered on a dial that is graduated to read very small changes in atmospheric changes. The construction of the mercurial barometer is well known and need not be repeated here.

Wheeling, W. Va. R. Z. Virgin.

Letter No. 6—The relation of barometric pressure to the outflow of gas in mine workings is a subject worthy of discussion and, already, some interesting and important points have been brought forward for the purpose of showing to what extent barometric readings can be taken as a guide to safety in coal mining.

As is well known, the barometer is one of the instruments used in mining practice to warn mine officials of changes taking place in atmospheric pressure, and which affect the volume of air and gases in the mine, and call for extra precautions to be taken in order to maintain a safe condition of the mine air and prevent danger.

Importance of Barometric Readings Recognized by Requirements of Mining Laws

No doubt should exist in any one's mind regarding the efficacy of the barometer when used for this purpose. Not only do mining authorities advocate its use, but its importance is emphasized by the requirements of our state mining laws, which call for a barometer and thermometer to be placed at the entrance of all mines generating gas. This requirement of the law is as important as that calling for a water gage to be placed in the fanhouse, or underground between the intake and return airways, to show what ventilating pressure is produced.

The fact is well known that an increase or decrease of atmospheric pressure causes a corresponding compression or expansion of the volume of air and gas contained in the mine. According to Boyle's or Mariotte's law, the volume of air or gas varies inversely as the pressure it supports. However, aside from this knowledge of the law of contraction and expansion of gases, further information is required to determine the practical effect of barometric changes in mines.

It is incorrect to assume that a high barometer or a low barometer is indicative of safe or unsafe conditions in the mine atmosphere. What is important to ascertain is whether the barometer is rising or falling; and the mercurial barometer does not afford this information, which is only given by a recording barometer or "barograph."

The barograph is a particular form of the aneroid barometer and is provided with a needle that moves up and down over a revolving chart. The result is that a pressure curve is drawn on the chart by the needle and shows at a glance whether the barometer is rising or falling; or, in other words, whether the atmospheric pressure is increasing or decreasing and at what rate, since the chart is revolved by clockwork, at a uniform rate. The pressure curve drawn by the needle on the

chart shows the rise or fall of the barometer in fractions of an inch, each hour of the day or night.

It is my belief that changes in the mine atmosphere always take place from one to six hours before any indication of such change can be observed in the mercurial barometer. This appears to be due to the fact that air or gas is more sensitive to changes of atmospheric pressure than the mercury column of the barometer.

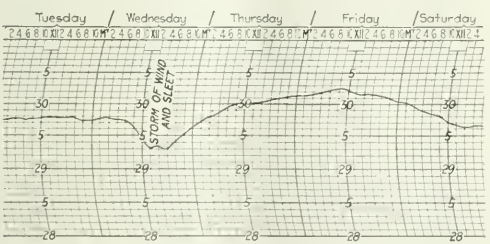
Rapidity of Fall Determines Danger in Mine

The result is that the gases confined in abandoned portions of the mine expand immediately with any decrease of atmospheric pressure. Whether a fall of pressure will produce a dangerous condition of the mine air, however, will depend on the rapidity of the fall and the volume of the space where the gases have accumulated, together with the percentage of gas present in such areas and the volume of air in circulation in the mine.

A considerable fall of atmospheric pressure distributed over a sufficient length of time will seldom produce a serious condition in the mine, provided the circulation is adequate. Ordinarily, in such a case, the actual quantity of gas expanded into the mine workings is so diluted by the volume of air in circulation that the increase in the percentage of gas in the air current is scarcely appreciable.

On the other hand, a lesser fall occurring at a more rapid rate may prove more serious while it lasts. The rate of fall of barometric pressure governs the rate of expansion of the gas-laden air in the mine, and this may prove more than what the ventilating current can handle safely. Since it is impossible to foresee the swiftness of atmospheric changes, the wise plan is to be constantly prepared for such occurrences, by maintaining adequate mine ventilation.

The accompanying figure is a portion of a chart taken from a barograph, and illustrates the manner in



BAROGRAPH CHART SHOWING RAPID FALL AND RISE

which this instrument shows whether the barometer is falling or rising, at any given hour of the day, which is important for the mine foreman to know. It will be observed that this chart shows a very rapid fall of nearly one-half inch of mercury column, occurring in five hours, from 9 a. m. to 2 p. m., Wednesday, followed four hours later by a rapid rise.

This was a very rapid fall of barometric pressure caused by a wind and sleet storm. Such a sudden fall of barometric pressure, if accompanied by an equally sudden rise in temperature, would, to my mind, present the greatest danger, as I believe the rise in temperature will diminish the circulation of air in the mine, owing to the decreased density of the air and a corresponding decrease in the efficiency of the ventilator producing the circulation.

My conclusion is that if the requirements of the state mining laws regarding ventilation are duly observed and strictly carried out there need be no uneasiness felt in regard to barometric readings, so far as they affect safety in coal mining. Our mining laws require that every mine, when worked, shall be thoroughly ventilated and furnished with an adequate supply of pure air, to dilute and render harmless the noxious gases generated in the mine, and make the mine workings safe and healthy at all times.

Ladysmith, B. C., Can. William Wesnedge

A. C. vs. D. C. Current in Mines

Letter No. 4—Having worked in mines and assisted in the installation of both a.c. and d.c. current machinery, I was much interested in reading the letters that have appeared in *Coal Age*, in regard to which of these two kinds of electricity is the most dangerous in mining work. There is hardly a doubt but that there will be some difference of opinion regarding this question. However, if I was asked to give a direct answer I would say that the use of a.c. current installed in a mine is no more dangerous to the employees than d.c. current of the same voltage.

In my opinion, a.c. current also has a greater range of usefulness in mining work than d.c. current. The former can be used directly for hoisting and pumping and, by rectifying, it can be employed to charge storage batteries for use in mine locomotives or for signal bells and lights, by stepping down the current to a suitably low voltage. In the same manner, it can be transformed for the operation of coal-mining machines. In each of these instances, it is my belief that it is safer for use than d.c. current when the necessary precautions are taken in the installation.

When a.c. current is installed in a mine the cable conductors must be properly insulated and covered with a waterproof covering. Also, all controlling apparatus must be placed where it will be safe from interference or meddling and cause no harm or in any way prove a menace to the safety of the mine. The installation should be in charge of a competent electrician, familiar with mining conditions.

Advantages of Alternating Current in Mines

My experience is that a.c. current possesses the advantage of being more flexible when used for the transmission of power into the workings. This current transmitted at high voltage permits of the use of a much smaller wire, which reduces the cost of installation over long distances very materially. It is, of course, necessary to install transformers to step the voltage, up when necessary, or down to what is required for operating the machine or for lighting or signalling. In this manner, it is possible to get any desired voltage, which makes this kind of current adapted to a wide variety of uses in the mine.

In reference to the relative safety of a.c. and d.c. currents, it is true that the general belief is that there is more danger in the use of the former, owing to the generally supposed higher voltage of the current. One often hears the remark made that contact with a live wire charged with a.c. current "will hold a man fast" so that he cannot get away, while d.c. current "will

knock a man down or throw him to one side." I have known many men to be shocked by contact with a.c. conductors and have had the same experience myself. In none of these instances, however, did the current hold the man to the wire.

Judging from experience and observation I will say that much depends on the position of the person when shocked by a live wire. For example, if he is standing or sitting in a rigid position, at the moment of contact with the wire, he is apt to have much difficulty in freeing himself; if, indeed, that is at all possible, owing to the rigidity of the muscles due to the effect of the current on them. On the other hand, if one comes in contact with a live wire when in a position that he will naturally fall when losing control of his muscles, it is clear that his contact with the wire would be at once broken by the fall.

Fear of Danger Makes Men Cautious

Speaking of d.c. current "knocking a man down," I would ask why there are so many killed by d.c. current of 400 or 500 volts. It appears to me that the belief in the greater danger of the a.c. current is based solely on its generally higher voltage. This fact, however, makes it more carefully guarded by signboards and guardboards. Also, a.c. conductors are more heavily insulated, and greater care is used in the installation of the system. Moreover, the fear of the consequences makes a man more careful not to come in contact with a wire charged with a.c. current But, I want to say that it does not pay to be careless when working around live wires whether these are charged with a.c. or d.c. current.

In regard to the relative advantages of these two kinds of electricity, I have found that a.c. current machinery gives less trouble with sparking of brushes on the commutators, which is so common in the use of d.c. current. Alternating-current machinery is more compact and, to my mind, simpler in operation, requires less attention and causes less trouble with armatures burning out, than where d.c. current is used.

On the other hand d.c. current gives better satisfaction, in charging storage batteries for use in mine locomotives, signalling, lighting, etc. The use of storage-battery locomotives greatly lessens the danger from the presence of trolley wires in the mine workings.

In the cutting of coal with machines, machine runners will generally prefer machines operated by d.c. current, which saves dragging their cables from junction block to junction block when changing from place to place. However, the use of a.c. cutting machines requires practically the same amount of work and are, to my mind, the safest for use. ELECTRICIAN

Johnstown, Penn.

Letter No. 5—Referring to the discussion of this subject, allow me to offer a few comments regarding these two types of electricity in mining work, both with respect to their relative usefulness and safety in practice. In respect to the use of electric machinery in mining work, I believe this discussion will be practically limited to the operation of mining machines or coal cutters.

Any one having had much experience with electric motors will agree that an a.c. motor is best adapted to the constant speed required in pumping. The a.c. locomotive has not been developed to the stage where it is a factor in this discussion, although I understand that the single-phase, a.c. locomotive is in use.

In my experience, I recall a well-known make of heavy mining machine, using a General Electric motor and the same type of feed-and-cutter gearing on both a.c. and d.c. machines. The d.c. machine proved much more flexible on the road, owing to the ease of control by the various steps of cutting out resistance. Very little trouble is experienced by overheating the resistance in modern machines.

Comparing Results in Operating Coal Cutters..

The two-speed control of a.c. machines is hard on the truck chains, and especially hard on the friction for moving the machine on the road. But I have known of d.c. machines that have run two years and never had the lining of the truck friction renewed and will probably not require this for two years to come. In these machines the speed is controlled altogether by the motor controller, and the friction is only used as a brake and to drive the truck.

When the d.c. machine is sumping and the operator standing over it in danger of a kickout, he is much better protected than when using an a.c. machine, because he has the controller but partly open, until the machine has cut a foot or two under the coal and is in no danger of jumping sideways.

When the sumping cut has been made and the machine has started across the face, if the disks have become dull the a.c. operator must back farther away from the cutting place, in order to free his bits from the coal. This requires more floor space and consumes time. If he should endeavor to change the bits close to the coal, the new bits coming around will catch and, the torque of the a.c. motor being low on the first or starting button, the cutter chain will hang up and must be thrown out, sometimes, and the machine started back, again losing much time.

New bits always catch in the top and bottom of the cut. If the operator tries to loosen them by reversing the motor and running it back and forth, he is apt to burn the controller considerably and gain nothing. The a.c. machine may cut off many bit clutches, owing to the speeding of the motor and throwing the bits into engagement to free the chains.

No Commutator Trouble with D.-C. Machine

It will be claimed by men who advocate the use of a.c. current that they avoid all commutator and motor trouble by the use of that current. However, I know of d.c. machines that have run steadily for two years and never had a brush renewed or a commutator turned down. The latter shows no appreciable wear and has a good color, never sparking. I fail to see how a.c. motors could give less trouble than the d.c. motors operating in this field.

Controllers on both a.c. and d.c. machines give some trouble; but this is minimized by the use of blowout coils on the d.c. machines, which are also equipped with a dynamic brake that stops the armature immediately, by a short circuit through a part of the resistance. Again, a much better power control is provided in d.c. machines.

The three-wire cable required by the three-phase system of a.c. machines means 50 per cent. more feeder line; and the renewal of this heavy cable compared with the 2-wire conductor of the d.c. machines is a big item

of expense, to say nothing of the extra weight of the three-wire cable that must be dragged about the mine.

Regarding the relative danger of these two kinds of electricity, the limit of 275 volts required by the mining law of this state is hardly sufficient to kill a man, unless he is held fast on the wire a considerable length of time. The d.c. current generally knocks him away, and his only hurt is a severe shock. On the other hand, the 275-volt, "effective heating value," of the a.c. current is but 70.5 per cent. of the peak value of the alternating waves in the a.c. system, which subjects a man in contact with an a.c. wire to $275 \div 0.705 = 390$ volts. It is no wonder that this high voltage paralyzes the muscles and holds the man fast, while the current finds a better path through his body.

Fatality Greater in Small Mines Where A.-C. Current is Purchased

The greater fatality of the a.c. current is demonstrated in this state where the small mines purchase their current from central stations, while the larger mines use their own d.c. current. The result is that hardly a man has been killed by electricity in the large mines, as compared with 5 or 6 such fatalities in the smaller mines, in the last few years. Where it is necessary to step down a high voltage there is always the chance of a transformer breaking down, and the high pressure being transmitted to the machine feeders, although this seldom happens now owing to the care taken to avoid overload.

In a large mine requiring the operation of locomotives, pumps, fans and cutting machines, the installation of a rotary-converter set would prove a good investment, while a smaller mine operating coal cutters only would use a transformer to step down the high voltage for use in the mine. In this district the average depth of the coal being about 200 ft., the more general practice is to carry the a.c. current over the surface to a point directly above the center of distribution in the mine. Here a hole is drilled to reach the workings. A transformer is located on the surface at this point, and a low voltage carried down the drillhole into the mine. This avoids the danger and expense of installing a high-tension cable underground. R. R. T.

Danville, Ill.

Safety in Mine Timbering

Letter No. 3—I read with much interest the letter of an Indiana mine inspector, *Coal Age*, June 26, p. 1175. Considering the importance of proper and safe timbering methods, and the large percentage of accidents that are due to falls of coal and rock in mines, letters and publicity relative to safety in timbering must always be of the highest interest to everyone concerned in the mining of coal.

Statistics show that as high as 60 and 70 per cent. of all mine accidents, particularly fatal ones, result from falls of coal and rock, which is chiefly due to improper methods of timbering, or no timbering at all. It is shown further that nearly all of these accidents occur in the working places. It is true that many accidents occur from other causes, such as coming in contact with high-voltage electric wires, being caught and crushed by moving trips, firing shots, etc., and we may not cease our vigilance in trying to prevent these; yet it must be remembered that the number of accidents due to bad timbering are alarming and unnecessary.

Today, more than ever before, every effort should be made to minimize mine accidents. A letter that intelligently handles the safety-first idea in mine timbering should receive earnest attention. New ideas should be broadly advertised and old and unsafe practices condemned. The consideration and prevention of accidents from falls of rock and coal should be taught by the "Safety-First" slogan, today, tomorrow and always.

Iron Rails as Crossbars to Support Roof

The suggestion regarding the use of discarded iron rails as roof supports is good, economical and practical, provided there is sufficient headroom and the bottom of the rails are placed against the roof. There should be a cut made in the rib, on each side of the roadway, from the pavement to the roof, so as to set a good post at each end of the rail, clear of the track and avoid the danger of derailed cars knocking the timbers out of place. The arrangement would give, besides, a more firm support for the rails than when holes are picked into the coal next to the roof. It is important that the man in charge of the work shall have some idea of the strength of materials, in order that he may not try to attempt to support too wide a space with rails of insufficient strength.

Referring again to the fact of the larger number of accidents occurring at the working face, I believe that the most of these happen because miners wait too long before securing the roof in their places with timber. But, while that is true, it is important not to neglect the haulage and travelingways, or any other place where danger may lurk. Reducing the accident record of a mine is a matter that is largely in the hands of the mine officials. Where accidents at the working face are minimized, it will also be noticed that accidents along the haulages and other places are minimized.

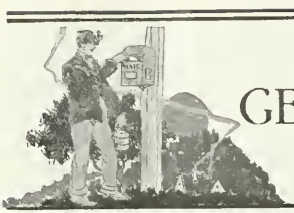
Insist on Men Taking Care of Themselves

Of course, accidents will happen in spite of the most careful vigilance, and under apparently the best of conditions and which cannot be attributed particularly to anybody's fault. But, where the foreman and other mine officials properly perform their duties to the men in their charge and insist on these men protecting themselves and their families, it will be noticed that mine accidents are very nearly a negligible and unavoidable factor.

The foreman or superintendent of a mine will not fear being known as "a crank" on timbering where the results accomplished are satisfactory. I have known foremen and inspectors to halt a man loading a car of coal under a dangerous roof condition, and make him set a post before loading another shovelful of coal, thereby probably saving the man's life or at least preventing a serious accident.

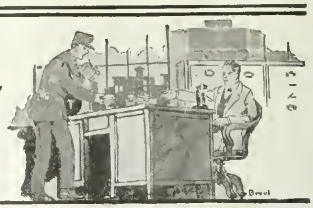
While a foreman may cause the production of the mine to fall short a car or two of coal, it is safe to say that he will regain the loss in a day or so, and that he will not have to remind the man of a similar danger when he visits his place in the future. Too much publicity cannot be given the safety-in-timbering idea, and the subject should continue to be as new and fresh in years to come as it is today. We can only minimize the accident records of the country by constantly reminding mine workers of the dangers to which they are daily exposed at the working face.

Thomas, W. Va. W. H. Noone.



INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Preservation of Mine Timber

How to prolong the life of timber is a question of the greatest importance in this locality at the present time, owing to the growing scarcity of timber suitable for mining purposes. When one considers the rapid decay of timber in the mine, necessitating a large yearly consumption in order to keep the mine roads and airways open and the working places in safe condition, the need of adopting means for preserving mine timber is clearly evident.

This being the case, allow me to ask for any information that *Coal Age* and its readers can give regarding the preservation of timber in mine workings and on the roads, travelingways and air-courses of the mine. In the experience of readers, what means have been found most effective for lengthening the life of mine timber? Can *Coal Age* refer me to any literature on the subject that goes into detail regarding the method of treating timber to prolong its life, the equipment necessary for such treatment and the method to be pursued? Any information forthcoming along this line will be greatly appreciated and will doubtless prove of benefit to all.

——, Ky. T. L.

The question of protecting and preserving mine timber is an important one and has been carefully studied for several years not only by the Forest Service of the Department of Agriculture, but by mine operators, builders and contractors, who are large consumers of timber. In mining operations, it is important to protect the timber not only from decay, but from destruction by insects and by fire, as well as providing against the destructive effects of excessive roof pressure.

The preservation of timber depends very largely, first, on its being cut in the winter season when the sap has drained from the wood; and, second, on the later seasoning of the wood by air-drying. Green timber is very subject to decay in mines.

Numerous bulletins have been published by the Forest Service Branch of the U. S. Department of Agriculture, among which may be mentioned Bulletin 41, "Seasoning of Timber"; Bulletin 107, "The Preservation of Mine Timbers"; Circular 111, "Prolong the Life of Mine Timbers." These bulletins state the causes of the destruction of mine timber and describe in detail the necessary treatment to prolong its life. The destructive effects of the different causes are estimated approximately as follows: Decay, 45 per cent.; crush or squeeze, 35 per cent.; insects, 10 per cent.; waste, 10 per cent.

Peeling the bark of the timber is recommended as a means of prolonging its life, by lessening the inroads of insects and fungous growth. Good ventilation is necessary to preserve the life of mine timber. Coating the timber on shaft bottoms and main haulage roads with "gunite," a mixture of sand, cement and water, applied with a cement gun, has been found to afford effective protection against fire and insects.

Work of Gathering Locomotives

Practically all of the articles and letters published in *Coal Age*, concerning the use of gathering locomotives in mines, have failed to give important facts that mine superintendents and others are anxious to learn regarding the actual results obtained in the use of this type of locomotive. For example, it would be interesting to know the number of mine cars hauled, their weight when loaded, kind of equipment, grade and condition of track, length of haul, and other like data.

It would be interesting to see a discussion started in *Coal Age* that would bring out the results obtained in practice. It can be readily assumed that there are many readers of the paper who have had practical experience in the use of electric mine locomotives for gathering coal and would be willing to give the results they obtained. It is not sufficient to state, as many do, the tonnage per mile of haul; but, to make the information of practical benefit to others, sketches should be given showing the plan and grade of roads, and the distribution of the work. The method of handling the loads and empties, in gathering the cars to make up a trip, should be described and the number of working places served by each locomotive given.

Allow me to suggest that a discussion of this kind would give much valuable information to operators contemplating the installation of this class of locomotive and would indirectly benefit many operators of mines already so equipped, by reason of the friendly criticism that the discussion would naturally evoke.

Drakesboro, Ky. MINE ENGINEER.

Coal Age is glad to receive the suggestion of this correspondent and to present it for the consideration of readers who are interested in the proposition of the economical gathering of cars in mines. It is a subject that has been treated, as stated, in numerous articles that have appeared from time to time, besides being discussed in this department. However, the discussion has dwelt more particularly on the relative advantages obtained by use of plain and roller-bearing cars.

As remarked by our correspondent, little has been said in reference to the actual results obtained on gathering hauls and giving the data required to form an intelligent judgment of the proposition. It is probable, also, that some of the readers of *Coal Age*, who have developed a more efficient system of accounting, will be able to give comparative costs per ton-mile of haul. There should be no reluctance in presenting information of this kind, as the benefit to be derived is largely mutual, since the most efficient installation can generally be modified and improved by comparison with others, operating under varying conditions.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Miscellaneous Questions

(Answered by Request)

[Below are given several questions taken from mining examinations and sent us by candidates who ask for their solution. As will be seen one or two of these questions are incapable of solution on any practical basis and all of them are problems that should never be asked in a mining examination.—Editor.]

Ques.—Show, by example, the comparison between fan and furnace ventilation. Assume two shafts 500 ft. deep; temperature of the downcast, 60 deg.; upcast, 200 deg. F.; barometer, 30 inches.

Ans.—No intelligent answer can be given to this question. While it is possible to calculate the motive column produced by the given temperatures in these two shafts, each 500 ft. deep, assuming a level surface and seam, and from that result to find the unit pressure or water gage producing the circulation in the mine, it would not be possible to establish any basis for comparing this pressure with that produced by a fan, the dimensions and speed of which are not given or the size and length of the mine airways, which determine the resisting power of the mine and establish the ventilating pressure for any given size and speed of fan. The question is unworthy of further comment.

Ques.—Give the size of two airways whose perimeters are equal; the area of one being one and one-half times larger than that of the other.

Ans.—We should be glad to receive a practical solution of this question.

Ques.—The workings of a mine are ventilated with two splits of air. Split A is 1000 ft. long and is passing 20,000 cu.ft. of air per min., while Split B is 200 ft. long and passing 14,142.12 cu.ft. per min., the pressure in each split being 5 lb. per sq.ft. Now, in order to make each of these airways pass the same quantity of air, what should be the area of the regulator opening, the power remaining constant?

Ans.—The question is a difficult one and should never be asked in examination. The fact of the power remaining constant is immaterial, unless it is desired to find the quantity of air in circulation after placing the regulator.

The size of the airways or dimensions of the cross-section are not given; but it is observed that the ratio of the perimeter to the cube of the sectional area is the same in each split, its value being $o/a^3 = 5 \div (0.00000002 \times 1000 \times 20{,}000^2) = 0.000625$, as calculated from Split A. Split B, 2000 ft. long and passing 14,142.12 cu.ft. per min., will give the same value, $o/a^3 = 0.000625$.

The placing of the regulator in the shorter split and arranging the opening so that each split will pass the same quantity of air will have the effect, the power remaining unchanged, to increase the unit pressure in both splits and decrease the total circulation of air in the two splits. Then, since the quantity passing in each split and the unit pressure for each split is the same, it is possible to find the area of opening in the regulator that will make the sum of the pressure due to the regulator and the natural pressure in that split, equal to the natural pressure in the open split.

Without showing the development of the formula, which is complicated, and indicating the respective lengths, perimeters and areas of the two splits by l_1, o_1, a_1; and l_2, o_2, a_2, we have

$$\frac{l_2 o_2}{a_2^3} = \frac{l_1 o_1}{a_1^3} + \frac{37.3}{A^2}$$

Then, substituting the value $o/a^3 = 0.000625$ and solving with respect to A, we have, for the area of opening in the regulator,

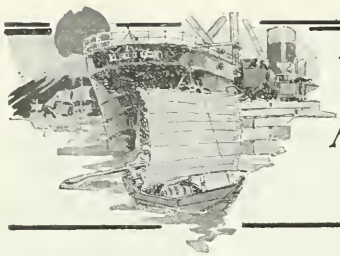
$$A = \sqrt{\frac{37.3}{0.000625(l_2 - l_1)}} = \sqrt{\frac{37.3}{0.625}} = 6.14 \; sq.ft.$$

Ques.—Take a pound of ice at zero (Fahr.) and gradually convert it into a pound of steam at 212 deg. F. Show the amount of heat absorbed in the various stages in passing from ice at zero to steam at 212 deg. F.

Ans.—Taking the specific heat of ice as 0.463, the heat absorbed per pound when its temperature rises from zero to 32 deg. F., is $32 \times 0.463 = 14.8$ B.t.u. Any further addition of heat causes the ice to melt. The change of a solid into liquid is always accompanied with absorption of heat, which becomes latent in the liquid. There is no change in temperature. The heat absorbed when ice melts is called the "latent heat or fusion" and is 144 B.t.u.

The next stage, caused by the further addition of heat, raises the temperature of the water from 32 deg. to 212 deg. F. This rise in temperature is accompanied with an absorption of sensible heat and is approximately $212 - 32 = 180$ B.t.u. Again, the further addition of heat to the water at 212 deg. F. converts the water into steam. The change of a liquid into a vapor is always accompanied with an absorption of heat, which becomes latent in the vapor, and is called the "latent heat of vaporization." There is no change in temperature, but the amount of heat absorbed per pound of water vaporized is 970.4 B.t.u.

[NOTE—The foregoing question assumes a knowledge of data that the average candidate in examination will not be able to recall and should not be required to retain in his memory. The problem is one that intelligent mining men should be able to solve when the necessary data are at hand; but if such a question is asked in examination, the candidate should be permitted the free use of a textbook such as would be available for his use in his daily practice.]



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Alarming Shortage of Coal in Europe

Shortage of Fuel Prevalent with Probability of a Still More Serious Deficiency Unless United States Exports More Coal—Labor Unrest Responsible for Lowered Production

It has usually been thought that with the coming of peace, despite the appalling destruction of French collieries, the difficulty of Europe supplying itself with coal would pass away. The destroyed mines of France produced 20 million metric tons (of 2205 lb.) in 1913 and at least two-thirds of the destruction by the Germans was systematic and wanton, without military necessity. But even this enormous loss of coal-producing capacity represented only 3 per cent. of the total production of Europe—in 1913, 730 million metric tons—so has a relatively small effect on European coal supplies as a whole; there are other greater factors in the deficiency of production. George S. Rice, chief mining engineer of the Bureau of Mines, Department of the Interior, who has just returned from an extended mining investigation in France, Belgium, Great Britain, the Rhine Valley and the Saar districts, reports to Director Van H. Manning that the shortage of fuel that prevailed during the war continues and there is probability of a still more serious deficiency unless the United States can come to the rescue by an extensive program of exporting.

Mr. Rice finds that while there was virtually no destruction of the Belgian coal mines, of which the Germans evidently expected to retain possession, that Silesian, Polish and the Bohemian mining districts have been, and still are, affected by the military fighting and undoubtedly their coal production will suffer; but most important of all effects on production in Europe is that of the general unrest of labor and changes in labor conditions which have brought about serious lessening of coal production. The cost of production is from 75 to 150 per cent. greater than in 1913, in the various countries, owing to tremendous increases in labor and material. In most countries the wages of miners have more than doubled. The miners are demanding and undoubtedly will receive betterment of living conditions which the miners claimed were very bad in many mining towns. These factors go to make increasing cost of fuel, which in turn will make increasing cost of transportation and manufacturing and cause readjustments in commercial competition between different countries.

In Serious Straits for Coal Supplies

Perhaps the most serious changes, because of the magnitude of the British coal industry, are those taking place in Great Britain, which in 1913 produced 287 million long tons (2240 lb.). Great Britain has always been the largest coal-exporting nation of the world. In 1913 it exported 77 million long tons.

The seriousness of the conditions are strikingly set forth in the statement reported in the *Times* (London) of June 5, 1919, as follows: "Sir Auckland Geddes called attention in the House of Commons yesterday to the serious position of the nation's coal supplies. The output in the year beginning July 16 next, when the miners' working day is to be shortened will be about 70 million tons less than that of 1913, and the deficiency on working about £46,600,000. This will mean an increase of 4s 6d ($1.06) per ton to the consumer, or a burden on the taxpayer."

In the statement "deficiency on working £46,600,000," refers to the total additional cost of the year's production due to the shortening of hours of labor and increase in wages which under the Coal Control Act would be borne by the Government or else by the consumer through a raise in the price of coal.

This situation results from the so-called Sankey award, which was a report of a Parliamentary Committee called "The Coal Industry Commission," headed by Justice Sankey. The findings of this committee, the Government announced, would be put into effect by the Government. The chief feature of the Sankey report, which became effective July 16, 1919, is the reduction in the hours of labor underground from eight to seven hours and "subject to the economic position of the industry at the end of 1921, the hours of labor underground to be reduced to six." These times are exclusive of the average time of lowering and raising the workman, but include the time he will take in traveling to and from his working place. The mine owners contend that with the seven-hour working day there would be less than six hours' effective work.

Sir Richard Redmayne, chief inspector of mines, testified that, in his opinion, the effect of the reduction of one hour would decrease the production about 10 per cent., and on this basis estimated the output for 1919 would be 230 million tons (of 2240 lb.) and for the year 1920, 217 million tons, or a reduction of 70 million tons from the output of 1913.

British Exports in 1913

The total British exports in 1913 were 77 million tons. If the restrictions in the consumption of coal are removed on the basis of internal consumption of 1913, this would leave but 7 million tons for export. As France, Italy, Sweden, Norway and Spain have largely been dependent on Great Britain for fuel, it can be realized that the situation is a serious one apart from England's loss of practically its only raw product export.

The Sankey report calls for an increase of wages for adults of 2 shillings (46c) per shift. The report expresses the hope that through economies in production, including the most extensive use of machinery underground, the cost to the consumer will not be increased. Nevertheless, the general opinion of mine owners, manufacturers and others is that the price of coal on the markets must rise when the Sankey report becomes effective.

The Commission proposes continuation of the Coal Mines Control Agreement Act of 1918, which determines minimum wages, maximum profits and market prices of coal for internal consumption and shipments to Allies.

The Cardiff price quotations f.o.b. on May 29, for the best steam (Admiralty) coal were: for the Allied nations, 40s. ($9.20); Spain and South America, 50s. ($11.50); and other countries, 75s ($17.25), for ordinary coal, 37s. ($8.51), 45s. ($10.35), and 70s. ($16.10), respectively. For coke-oven coke, the prices were respectively 54.6 ($12.54), 65s. ($14.95) and 65s. ($14.95). These figures are about double pre-war figures; for example the prices for Welsh coal Jan. 1, 1914, f.o.b. Cardiff were: Best steam, 21s. ($5.72); bituminous coal, 15s. 9d. ($3.90); coke, 28s. ($8.05).

One of the features on which much evidence was brought out by the Commission was the reduction in the output per underground man per shift. The output in 1913 was one ton per shift and in 1915, 1.02; but since that time it has shown a steady decrease, and for the first 20 weeks in 1919 dropped to 0.89 ton per shift, while the absenteeism had been 10.7 in 1913, 8.9 in 1917, and has now risen to 13 per cent. The owners are also seriously disturbed by the proposal of the Commission to restrict their maximum profits to one shilling twopence (25c.) per ton, which in many cases would represent a reduction of 40 to 50 per cent. from pre-war figures and would correspondingly affect mining shares marketed.

Since the Sankey report the Commission has been hearing evidence on the proposed nationalization of the industry, which is favored by the miners, but the owners and manufacturing interests bitterly oppose this plan on the ground that the Government agencies could not conduct the business economically.

Coal Situation In France

The consumption in France before the war was 62 million metric tons (of 2005 lb.), and the production 41 million tons. She imported 18,693,000 tons of coal, 3,010,000 tons of coke and 1,086,000 tons of briquets. Exports were 1,742,000 tons of coal, coke and briquets, the total fuel imports exceeding the exports to the amount of 21 million tons.

The destroyed mines in the Nord-Pas de Calais field produced 20 million tons, so that if the consumption of France within the pre-war boundaries were the same now as it was then, there would be a dificit of 41 million tons. It is, of course, probable that the consumption within this territory will not be as large for some years as so many manufactories in the North of France were destroyed, including steel works which produced in 1913, 3,336,000 tons of iron. On the other hand, during the war, to provide essential materials, it was necessary to make extensions and erect new plants in central and southern France. Many of these plants manufacturing essentials will continue to operate and will require coal.

The taking over by France of its former provinces of Alsace and Lorraine, and its occupation of the Saar district, has materially altered the fuel needs. The Saar in 1913 produced 17,500,000 tons, but the labor situation has lowered the production to the rate of about 12 million tons. Doubtless this output will be increased, but a large proportion of the coal is absorbed locally in the industries of Alsace and southern Germany, so that the loss of the coal in the Nord-Pas de Calais district will not be made good.

By forcing the production during the war in the St. Etienne and other small fields of France by concentration of miners in these fields, temporarily, the production was increased according to published statements attributed to M. Locheur, who has been in charge of the internal affairs of France. Estimates of coal production for the coming year were 28 million tons to 38 million tons, but owing to the shortness of hours and labor unrest the production may fall below 20 million tons, which was the output of the undestroyed mines before the war.

It is estimated by the French engineers and from the observations made by Mr. Rice, which are probably correct, that it will take from two to five years to restore the broken shaft linings, which pass through the water-bearing strata, fissured chalks and marls overlying the coal measures and to unwater the mines and rebuild the surface plants, and it will take ten years to completely restore the production rate of these mines. A single instance may be cited—the Courrieres mines, in which the engineers estimate there were 20 million cubic meters of water. This water drained in through the destroyed shaft linings and in addition was ditched in from surface ponds by the Germans.

In 1913 France imported from Great Britain 12,776,000 tons of coal.

Coal Situation in Belgium

Contrary to the general impression, the coal mines of Belgium were not destroyed by the Germans. The misapprehension

doubtless arises because the Germans did destroy industrial plants, especially iron and steel, in the vicinity of the coal basins. This destruction was so extensive that it was stated by the King of Belgium in March that there were 950,000 men out of employment. Evidently Germany expected until the last few months of the war to retain Belgium. It may or may not have been their intention when they knew that they would lose Belgium to destroy coal mines wantonly as they did in France. President Wilson's notification advising the Germans that punishment would be visited on them if there were destruction of a non-military character may have saved the Belgian mines, so some of the owners stated to Mr. Rice.

During the war Belgian mines were operated by the owners' representatives under military control of shipments. The following table shows the decrease in the number of workers and the production in the course of the war. It is interesting to note the reduction in the yearly output per man below that of 1913.

Year	Number of Workers	Production (Metric Tons)	Yearly Output per Man
1913	145,337	22,841,590	157
1914	129,157	16,714,050	130
1915	123,806	14,177,500	114
1916	126,092	16,862,870	134
1917	111,695	14,919,700	133
1918	110,110	13,821,930	125

Since the retreat of the Germany army and the armistice, the labor conditions in Belgium have been unsettled and there is a shortage of miners. Some have not returned from the army; doubtless many were killed and wounded in the war; others, driven away by the first advance of the Germans, have engaged in new occupations. The miners have also been unsettled, with the result that they have not worked with their former efficiency. It was thought that the men in idleness in the industrial belt would seek work in the mines, but they do not wish that kind of work and are not forced to take it so long as the Belgian Government provides them with food. On the other hand, the mine owners have not apparently made much effort to hire men who have not been miners previously, as they consider that inexperienced men or men without early training become miners under the difficult underground conditions in Belgium.

The outlook for immediate improvement in production is not hopeful, although there will be some increase. The deficiency in the output from pre-war conditions amounts to 9 million tons. In 1913 Belgium consumed 4 million tons more than it produced, the deficit being met by imports from Germany and Great Britain. Therefore, the total deficiency on a 1913 basis of consumption in Belgium is about 13 million tons.

Coal Situation in Italy

Of the great allied nations, Italy is in the worst situation as regards fuel. In 1913 it produced but 773,000 tons of coal and imported in that year from Great Britain 10 million tons of coal, coke and briquets. During the war its output of low grade anthracite and lignite was increased to a couple of million tons, but at high cost, to take care of the shortage of import coal.

Coal Situation in Neutral Countries of Europe

Spain produced before the war a little over 4 million tons of coal yearly and is said to have increased its output materially during the war. In 1913 it imported from Great Britain 3,649,000 tons. Its natural resources are limited, and it must continue to import a large proportion of coal for its consumption.

Holland produced 2,065,000 tons in 1913 but imported about 12 million tons, of which 2,018,000 tons came from Great Britain, the balance chiefly coming from Germany. Norway, Sweden and Denmark produce a negligible quantity of coal, as is also the case in Switzerland, which was supplied from Germany. The former countries imported from Great Britain in 1913 as follows:

	Metric Tons
Norway	2,298,000
Sweden	4,563,000
Denmark	3,034,000
Total	9,895,000

German Coal Situation

The former German Empire was a close second in coal output to Great Britain, producing in 1913 Bituminous coal, 190,109,000 tons; lignite (brown coal), 87,233,600 tons. The largest part of the production was from the Westphalia or Ruhr field in 1913—114,487,000 metric tons—which Germany retains under the peace terms. Upper Silesia, which has been detached from Germany, produced 49 million tons of bituminous coal, and the Saar basin about 17 million tons. The new German Republic will have approximately a yearly production, based on pre-war capacities, of about 124 million tons of bituminous coal and about 90 million tons of brown lignite.

Westphalia produced the bulk of the coke of the former German Empire, and this was vital for obtaining the great outputs of blast-furnace iron and steel in the plants of the Rhine valley. There was also sufficient surplus coal and coke to send large amounts to Belgium, Holland and France. But in March, 1919, the German coal owners in a conference with the allies at Cologne, which Mr. Rice attended, declared that owing to the labor unrest and weakened condition from lack of food they had no coal to export over that already going to the "occupied" zones in the Rhine valley. Undoubtedly, the recovery of production in the Westphalian fields will be rapid—perhaps more rapid than that in any other country. Although labor has shown some unrest, it is probable that the miner, because of habit and traditions, will be more ready to settle down with some improvement in wages.

The Ruhr field is capable of more expansion in output than perhaps any other European coal field, but several years at least must pass before production can be larger than it was before the war. The brown lignite field near Cologne can easily increase its output. The beds are very thick, attaining in one place a thickness of lignite free from shale partings of over 300 ft. It is very poor fuel as mined, containing 60 per cent. moisture, but when dried it can be briquetted without binder. The briquets stand weathering. The output of this field has increased during the war from 20 million tons to 27 million tons of coal, including 6 million tons of briquets.

The Ruhr field will be called upon to supply Holland and France with large amounts of bituminous coal and coke, and it is probable that exports to France will be compelled by the necessity of obtaining minnette ore from France for the Ruhr iron furnaces. The German Empire in 1913 used 47 million tons of iron ore; of this only 7,472,000 was produced in Germany proper, including Silesia, which has its own blast furnaces. Former German Lorraine supplied 21 million tons; Luxemburg supplied 7 million tons of minnette ore, and 3,311,000 tons of minnette ore were imported from French Lorraine; the remainder was imported from Spain, Sweden and other countries. Then Germany used about 25 million tons of minnette ore from present French territory. Consequently, Germany will serve its own interest by supplying coal to France to the limit of her capacity.

Political and industrial conditions in Russia, Austria and Poland are still so complicated that discussion of future supplies of fuel is not justifiable. The most important coal field is that of Upper Silesia, which is now largely included in Poland, the southern margin formerly belonging to Austria being in controversy; the eastern part, formerly in Russian Poland, is now included in Polish territory so that Poland is in a strategic position as regards coal supply. Russia has other important fields, but has not supplied enough coal for its own consumption. Great Britain formerly furnishing 6,000,000 tons annually to northern Russia.

Foreign Coal Trade Opportunities

A South African electrical power company wishes to purchase the best grades of anthracite coal. Quotations should be given f.o.b. American port or c.i.f. South African port. Reference. Further details may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its branches, by referring to File No. 29,899.

The manager of an import house in England desires to become the representative of an American coal-exporting company interested in export trade. Refer to File No. 29,923.

A mechanical engineer, graduate of an American university, will be in America to secure commission or consignment contracts for sale in Belgium of coal. Refer to File No. 29,945.

Summary of Situation

Western and southern Europe is badly in need of coal. The deficiencies in the several countries were supplied by Great Britain, which now faces a loss of its export business through reduction in its coal production. On a pre-war basis of consumption the following tabular statement gives the deficiency in the various countries in Western and northern Europe which must be met by imports:

	Long Tons
France	20,000,000
Spain	3,650,000
Italy	9,650,000
Holland (other than supplies from Germany)	2,010,000
Sweden	4,560,000
Portugal	1,360,000
Norway	2,300,000
Mediterranean countries (other than Italy)	3,500,000
Denmark	3,030,000
Total	50,060,000

In 1913 Great Britain supplied 31,000,000 tons to North Europe, 32,000,000 tons to France and South Europe; that is, 63,000,000 tons to the above named countries and others in Europe, in addition to which about 9,000,000 tons was sent to South America and 5,000,000 tons to other parts of the world.

If the statements made before the Parliamentary Commission are correct, from the most favorable point of view, as estimated by Sir Richard Redmayne, conditioned on maintaining of war-time restrictions on domestic consumption, Great Britain will be able to supply only 23,000,000 tons of coal for export during the coming year, dating from July 16. If, on the other hand, the domestic consumption was on a pre-war basis, there would be but 7 million tons available. But, on the basis of Sir Redmaye's figures, if all the coal were shipped to western and southern Europe, there would be a deficiency of over 25,000,000 tons without considering the 14,000,000 tons that Great Britain, in 1913, supplied for other parts of the world. There is thus a total deficit of approximately 40,000,000 tons which, if it is to be supplied at all, can be supplied by America only, on the assumption that Westphalia and Belgium are unable to materially increase production for several years. At best there is evidently a large amount of coal that the United States could and should supply to relieve the situation in Europe and in South America, now that there is likely to be enough shipping flying the American flag to take care of the business.

Coal Mining Industry of Belgium During War Period

The region about Charleroi, in southern Belgium, is one of the most important industrial regions of the country, the chief interests being those connected with coal mining; coke, iron, and steel plants; glass factories; and quarries. Coal mining in the Charleroi district continued throughout the war with production diminish d all the way from 10 to 50 per cent. Many miners left this region during the war to live in western Belgium, as it was possible in the latter section to engage in agriculture to some extent and thus obtain better food. Those remaining in the Charleroi district had almost no bread during many months of 1916 and 1917, and they ate beet root (betteraves) as a substitute. In the third district (arrondissement) of the Charleroi section, the average monthly production of coal in 1913 was 299,580 metric tons during 552,459 working days for 22,365 workmen, 16,587 being in the mines and 5778 on the surface. The production of coal, in metric tons, for the last three months of the year 1918 was as follows: October, 181,805 tons; November, 39,174 tons; and December, 150,280 tons.

There are 39 coal mines in the vicinity of Charleroi. The Houilleres Unies du Bassin de Charleroi à Gilly, whose condition represents in general that of all coal mines at Charleroi, is now employing about 2800 men at its 12 shafts. In 1913 this company had a force of some 5600 men. The present production is practically one-half of the normal amount.

The mines of Belgium in general formed an exception among Belgian industries during the war. They continued their activity throughout the war, with a gradual decrease from year to year of from 8 to 9 per cent. in production. The following table shows in detail Belgium's war-time production of coal in metric tons of 2,204.6 lb. and the number of workmen employed during the war:

Districts Production	1913	1914	1915	1916	1917	1918*
			Metric Tons			
Couchant de Mons	4,406,550	3,578,810	3,310,200	3,705,540	3,869,680	3,281,721
Centre	3,458,640	2,701,550	2,573,430	3,212,860	2,785,400	2,559,615
Charleroi	8,148,020	5,764,410	5,875,690	5,223,970	4,671,240	4,493,628
Namur	829,900	534,180	410,660	497,150	427,870	374,440
Liege	5,998,480	4,135,070	4,007,520	4,223,350	3,155,510	3,112,530
Total	22,841,590	16,714,020	14,177,500	16,862,870	14,909,700	13,821,934
Workmen			Number			
Couchant de Mons	32,287	30,974	28,096	28,077	30,610	29,074
Centre	21,876	21,061	40,445	38,427	32,265	32,691
Charleroi	47,963	43,153	22,667	23,233	20,644	20,269
Namur	4,779	3,841	3,045	3,252	3,168	2,953
Liege	38,432	30,128	29,553	32,803	25,008	25,125
Total	145,337	129,157	123,806	126,092	111,695	110,112

* Provisional figures.

Coal Situation in Germany

In a rather pessimistic review of the present position of the German coal industry, the *Frankfurter Zeitung* bewails the fact that while the output in the year 1915 totalled 146,867,563 tons, Germany is now to lose her coalfields in Upper Silesia, while the Saar and Aix-la-Chapelle regions will remain outside her sphere of control. In the same year, 1915, the output in Upper Silesia was 38,106,787 tons, in the Saar region 10,345,417 tons, and in the Aix-la-Chapelle coalfield 2,251,260, or a total of 50,703,464 tons, that is, 34 per cent. of the total German output. She is therefore left with an output of 96,164,099, but even this figure requires considerable modifications. The conditions of production have greatly changed since 1915. The average daily dispatch of trucks in Rhenish Westphalia in peace time (1913) was 32,000; in February, 1919, after an improvement in conditions it was only 16,000.

Germany's remaining coal output may, therefore, reasonably be placed at not more than 50,000,000 tons. Of this quantity she is for a period of ten years to be compelled to deliver 21,600,000 tons to France, 6,000,000 tons to Italy, 8,000,000 tons to Belgium, 1,500,000 tons to Luxemburg, or a total of 37,100,000 tons, leaving for her own necessities 22,900,000 tons of her own coal. The total export in 1911 was 31,145,076 tons out of a total output of 158,777,500 tons. Thus, with an output only one-third as large, she is to export 20 per cent. more.

This does not complete the chapter of her difficulties, for 75 per cent. of her coal output is to be delivered at prices fixed exclusively by the victors. Three-fourths of her coal output instead of helping to rescue her from her economic distress will thus be excluded from contributing to her profits.—*Iron and Coal Trade Review.*

Yorkshire Coal Trade

The following review of the coal trade in Yorkshire appeared in *The Yorkshire Post*, under date of June 3, 1919: "In the coal trade circles in Yorkshire, the outlook in the export trade continues to be the main item of interest. A week ago there was a hint as to expected concessions, based on the knowledge that the Coal Controller was reviewing the situation in this department. Since then the South Yorkshire Supplies Committee has issued an intimation that colleries in their area may resume export on a limited scale as from June 2, conditional on all inland demands being met. The aggregate amount allowed per month is only some 25,000 long tons of large coal and 8000 tons of slack, and this quantity has been apportioned in varying amounts to South Yorkshire collieries. It is not anticipated that the condition as to home requirements will nullify the concession for as compared with the total monthly output from South Yorkshire pits the allocation of 33,000 tons for export is as a drop in the ocean.

"The details of the controller's decision as affecting the southern portion of the county were posted on the Yorkshire Coal Exchange in Leeds this afternoon, and there were numerous inquiries as to the position in West Yorkshire. Although there was no definite information on the point, colleries in West Yorkshire may expect to hear something in the course of a day or so. Coal for export from this area is to be available to the extent of 15,000 tons of large descriptions and 8000 tons of smalls per month, and collieries are now being allocated their due share.

"The same condition as to home supplies obtains, but here again no difficulty is anticipated of collieries being unable to take full advantage of the concession. Meanwhile, there is a steady inquiry for all descriptions of fuel, and although the continued spell of warm weather has produced a summer business in the house coal trade, merchants find that they are able to dispose of all supplies that come to hand. The question of reserve stocks is becoming increasingly important, and merchants are being urged to do their utmost in the matter. Their position, however, is by no means an enviable one, for the greatest difficulty is the persistency with which output is kept at a low level by the miners. Until this improves it is impossible to say how the accumulation of stocks can proceed in a satisfactory manner. The view is expressed that the situation must inevitably react upon the export trade."

Under date of July 4 *The Colliery Guardian* reviews the market situation in England as follows: "The recent spell of cold weather has considerably checked the possibilities of landing any considerable amount of stock coal at the various London depots. Supplies are coming forward in better tonnage, but are inadequate to the demand. The coal market at Cardiff fluctuates considerably as the result of labor and other difficulties, causing a decrease in production. The Newcastle coal market is very dull. Local ship owners complain of the diversion of coal vessels for the Spanish ore trade, while the Tyne tonnage market is extremely congested. There is a fairly good supply of coal for home purposes in Yorkshire, and the requirements may be met so far as summer buyers are concerned, but there is little over for the greater consumption of winter."

Reduction in Rates on Coal to South American Ports

The shipping Board has announced that effective Tuesday, July 15, 1919, a reduction of $2.50 per ton was made in the present rates on coal to South American ports. The following is the new schedule:

To	Per Ton	Daily Discharge, Tons	Per Ton	Daily Discharge, Tons
Rio de Janeiro, Brazil			$17.00	1,000
Santos, Brazil	$18.50	600	17.00	1,000
Rio Grande do Sul	19.50	500		
Bahia and Pernambuco, Brazil	16.00	500		
Montevideo, Uruguay	17.00	750	16.00	1,000
Buenos Aires, Argentina	17.00	750	16.00	1,000
La Plata, Argentina	17.00	750	16.00	1,000
Rosario	19.00	750		
Bahia Blanca	17.50	1,000		
Punta Arenas	32.50	500		
West Coast of South America:				
Coal	14.00	750		
Coke	21.00	525		

All of the foregoing is subject to 15 tons guaranteed daily loading except coke for West Coast 800 tons guaranteed daily loading.

Miscellaneous Notes

Coal is found in various parts of Siberia, and the rise in the price of wood has led to the exploitation of the mid-Siberian fields. Rich coal beds exist on the Island of Sakhalin and along the Pacific coast. Deposits of iron ore are found near coal fields in the mountainous districts, but are waiting proper transportation facilities for their profitable exploitation.

The regulations heretofore in force governing shipments of coal and coke to Scandinavia and Holland have been rescinded and W. T. B. R. 735, issued May 14, 1919, has been revoked. Accordingly, coal and coke may now be exported freely without individual license under the terms of Special Export License R C-77, as amended, effective July 14, 1919, to all the countries therein mentioned.

Exporters of coal see increased demand for coals now that prices for English fuel have been advanced six shillings per ton, but they cannot see where it is to be obtained unless there is a big increase in production, and that seems impossible under present labor conditions. Then again it must be remembered that domestic consumption will increase, with a larger tonnage being demanded by the steel and other industries.

A special cable dispatch to the Philadelphia *Ledger* states that about 150,000 tons of American coal have been discharged during the first half of July at Rotterdam alone, being carried along the Rhine in barges. American coal is being sold at European ports at $30 to $33 a ton. There is virtually a fuel famine all over Europe, and owing to unavoidable and other causes, it is estimated that English exports will for some time to come amount to only about 50 per cent. of the total sold abroad in 1913-14.

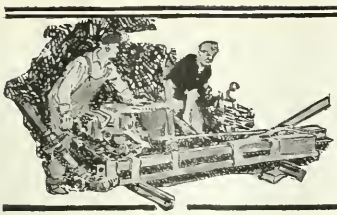
Exports of Coal and Coke During May, 1919

(Compiled by Bureau of Foreign and Domestic Commerce)

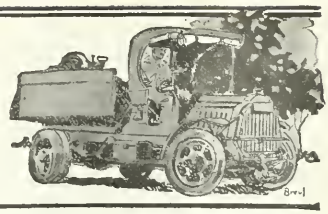
Districts:	Anthracite Tons	Bituminous, Tons	Coke, Tons
Maine and New Hampshire	133		
Vermont	1,163	860	79
Massachusetts	142		
St. Lawrence	124,515	139,084	492
Rochester	75,461	25,894	
Buffalo	187,598	179,866	9,668
New York	3,601	540	626
Philadelphia	820	18,552	
Maryland		74,410	4,619
Virginia		217,397	
South Carolina		12,942	
Georgia		3,780	
Florida		6,374	
New Orleans		983	50
San Antonio	99	575	2,350
El Paso		4,429	2,405
Arizona	94	1,525	8,606
Southern California	2	74	
Washington		25	29
Hawaii		5	
Dakota	494	2,289	64
Duluth and Superior	210	420	26
Michigan	77	89,971	3,946
Ohio	4,481	649,617	339
Total	398,890	1,429,612	33,299
Countries			
France			405
Italy		35,908	
Netherlands		4,272	
Norway		6,300	
Spain		50	
Sweden		22,792	1,611
Switzerland		6,989	
Bermuda	820	2,062	
British Honduras		2	
Canada	396,580	1,088,026	14,643
Costa Rica		1,717	
Guatemala		47	3
Honduras		1,637	
Nicaragua		347	
Mexico	195	6,810	13,501
Newfoundland and Labrador	325		
Barbados	23	3,020	
Jamaica		2,491	
Trinidad and Tobago		1,594	
Other British West Indies		3,039	
Cuba		90,112	
Danish West Indies		295	
French West Indies			7
Dominican Republic	589	1,475	20
Argentina		22,589	
Brazil	352	109,868	4
Chile		4,931	3,048
Colombia	1		
British Guiana	5		
Peru		4,862	27
Uruguay		8,362	
Venezuela		10	30
Other British Oceania		5	
Total	398,890	1,429,612	33,299

BUNKER COAL

Districts:	Tons
Maryland	45,296
New York	298,991
Philadelphia	38,198
Virginia	141,275



COAL AND COKE NEWS



Harrisburg, Penn.

Action by Governor William C. Sproul upon the Smith Bill, establishing a bureau of rehabilitation for persons injured in industry is expected this month and steps to begin the survey required by the provisions of the bill will be taken immediately by the State Department of Labor. The new bureau will be under that department and the idea is to supplement first the information gained in the last two years relative to the character and number of injuries in various industries, including coal mines and, second, the experience of the State Workmen's Compensation Board, by new surveys which will include the periods of greatest activity during the war. The benefit of the bill is limited to persons residing in this state and injured in Pennsylvania industries, and provides for special training to fit men for various occupations where their disabilities would unfit them for work.

The recent enforcement of the statute prohibiting the employment of boys under 16 years of age in anthracite breakers, is proving a boon to old men. As several hundred boys have been laid off, there is a marked shortage of slate pickers, jig operators, chute tenders and oilers. To fill the places made vacant by the boys, under the legal age, the companies have found it necessary to take on men well advanced in years. The aged men are now able to earn from $12 to $16 per week, greater compensation than received six years ago for mining coal.

Charleston, W. Va.

Ground lost during the week of the Fourth had been to some extent regained by July 12 though not to as great an extent as would have been the case had miners shown a little more celerity in returning to duty after their holiday. The second week of the month was about half over before there was anything like a full complement of miners in any mine and while production was in excess of that for the previous week it was still short of the final week of June. If the mines in the central southern section of the state did not reach the maximum production it was more because of labor shortage than due to any lack of cars, for empties furnished to the mines were entirely sufficient for all loading purposes. In addition to labor shortage an embargo still in force on July 17 on shipments from the high volatile fields to tidewater was instrumental in retarding a large production; the embargo, however, did not interfere with the shipments of smokeless coal to tidewater.

What was giving smokeless producers more concern than anything else was the navy requisitioning order which threatens, if carried out to the letter, to cause a shortage of smokeless coal in the markets. At the present time it is impossible to secure West Virginia smokeless coal in all markets, because of the heavy shipment of such coal to tidewater ports for export in an effort to make up for the deficit brought about in June by the Norfolk & Western tieup. Furthermore, during the week New River was showing further advances in price and was quoted at $6.00 a ton at tidewater. It is estimated that the amount of coal produced in this section the latter part of the week brought the output up to about 70 per cent. in the Kanawha and New River fields.

There was a much increased demand for steam coal during the week, but little of such coal was being sold under contract, producers being unwilling to tie themselves up in contracts and buyers postponing definite action in the hope that they might be able to secure better prices later on in the season. With an improved demand for mine-run, slack is not so sluggish as it was, that condition being due in part to renewed activities at cement plants in the east. The second week of July also brought a better demand for byproduct coal as well as for splint lump for domestic purposes. Despite the fact that prices for mine-run have advanced, a large number of producers are still slow about resuming operations, especially those whose mines have no screening equipment.

There were three reasons for an even greater call for New River smokeless during the first half of July than in previous weeks. In the first place there was a shortage of smokeless delivered at tidewater; then the holiday of the first week of July had shortened the supply mined and shipped, and finally there was an even more pronounced demand from foreign buyers. Lack of agreement as to the new wage scale is tending to create a spirit of indifference in the field which of course is having its effect on production. There have been further advances in New River smokeless and the price of that coal at tidewater now is $6.00 a ton. A small proportion of the total production of the field is going to western markets.

There was a gradual improvement in the labor situation in the Kanawha district during the week ended July 12, although a shortage of miners following the July Fourth holiday apparently extended over into the following week. By speeding up operations during the latter part of the week it was found possible to get out a tonnage equal to about 70 per cent. of capacity or some 140,000 tons. The run of empties throughout the week was entirely satisfactory. Increased demand for coals which have been rather inactive was also in evidence, more especially steam coal, it being apparent that indsutrial consumers were beginning to realize the necessity of arranging for a supply of fuel for present and future needs. Nevertheless large buyers are somewhat backward about contracting for a future supply. Producers apparently are content to rest on their oars and await developments before entering into contracts, believing that prices will reach a much higher level. There is a better market both in the East and in the West for mine-run and slack steam coal, though eastern markets are consuming much the larger quantity of such coal. Sales of domestic splint lump are also heavier. Gas and byproducts are also in more regular demand just at present. Production in the district would have been somewhat heavier but for the tidewater embargo already referred to.

Fairmont, W. Va.

All conditions in the Fairmont and other fields in northern West Virginia were conducive to heavy mining, loading and shipment of coal from such fields throughout the week ending July 12, up until the last day or two of the week when shipments slumped somewhat. In fact during the first three days of the week more coal was mined and shipped at least from some parts of northern West Virginia than at any time during 1919. During this time loading out of the Fairmont field was over 1100 cars a day. This was made possible not only by a sustained supply of cars and reasonably prompt placements, but also to an enlarged market for northern West Virginia coal, especially among the larger industrial concerns of the East, steam, mine-run and slack benefiting by the increased demand. While that kind of coal was also moving to western markets in somewhat larger quantities than during earlier weeks, yet the volume was far from being as large as eastern shipments, the western market being somewhat more sporadic. Increasing shipments to Curtis Bay reflected a somewhat heavier export business than had been obtained in earlier weeks, although such business has been steadily growing during the last month or two. The early part of the second week of July also brought further orders for Lake shipment so that shipments to Lake ports increased in volume though still far below what used to be considered normal. There is not much prospect of an extensive development of Lake business, however, until there is heavier consumption at upper Lake docks and until there is some adjustment of present rates. The car supply on the last day of the week was somewhat short, but it was believed that by the following Monday there would be an ample supply on hand. A few mines found it necessary to shut down because of such a shortage. With an enlarged market for coal however, the number of idle mines had been much reduced.

Williamson, W. Va.

Ground lost during the week of July 5, when production in the Pocahontas field dropped to 237,000 tons, was completely regained during the following week when production reached 342,000 tons—another high level. This gain of 105,000 tons was attributable to longer working hours and an increased number of miners at work, the number of hours worked having been increased from 3147 to 4248. Production rapidly increasing, production losses were cut down until they were almost negligible; amounting in all to only 37,651 tons or about half the loss of the previous week. There was a slight increase in the car shortage loss while, on the other hand, there was a material reduction in the labor shortage loss from 46,000 to 16,000 tons. Mine disability losses were doubled, but those from other causes were wiped out altogether. It is simply a question of mining, loading, and transporting Pocahontas coal now since the market is more than sufficient to absorb the entire output. Coke production showed a gain during the week, being 7690 tons—still far below normal.

Serious interruption to coal transportation was one of the consequenes of a heavy storm in southern West Virginia which washed out numerous stretches of track on the Virginian Ry., particularly between Mullens and Maben, in one place 2500 ft. of track being washed away. The numerous washouts made it, of course, impossible to operate coal trains between Deepwater (the junction point with the Chesapeake & Ohio and the Virginian) and Mullens. On the main line of the Virginian Ry. several days elapsed before trains could be operated and, consequently, the mines along the line were unable to load and ship their customary tonnage of coal.

Hinton, W. Va.

An important meeting was held at White Sulphur Springs on July 12 at which time the order of Secretary Daniels commandeering smokeless fuel was debated at great length by the smokeless operators of West Virginia. Almost unanimous opposition to such commandeering was expressed but no definite stand was taken, as a body, beyond requesting those representing West Virginia in the Senate and House at Washington to arrange if possible for an interview between the Secretary of the Navy and the smokeless producers. If such a conference is held, these operators will seek to have the commandeering order rescinded; failing in that they will at least endeavor to have the amount of coal to be requisitioned cut down. However, smokeless producers do not appear to be sanguine of inducing naval authorities to abandon their intention of requisitioning coal at $2.75 a ton which is much below current quotations. Districts represented at the meetings were the New River, Pocahontas, Tug River and Winding Gulf. Col. T. E. Houston presided at the meeting.

Logan, W. Va.

A gain of 78,000 tons was made by the mines of the Logan field during the week ended July 12 over the previous week, production reaching the new high level for the year—248,000 tons—the production for the previous week having been 170,000 tons. The output for the week of the twelfth was only 5000 tons below that of the corresponding period for 1918 when

production reached 253,000 tons. Though it was still found next to impossible to secure all the miners needed, the large output was made possible through the number of hours worked—5056 as against 3461 for the week ended July 12. Logan district is now producing up to 85 per cent. of capacity. Transportation facilities were better than at any time this year, as shown by the fact that there was only about one per cent. car shortage loss running to 2972 tons, as compared to a loss of 10,000 tons for the preceding week. That labor conditions in the district had undergone marked improvement in the course of a week was shown by the reduction in the labor shortage loss from 33,000 tons to 14,000 tons, or from 14 to 5 per cent.

Tidewater ports were still closed to gas coal by an embargo applying to coal mined in the Logan district as well as other districts supplied by the Chesapeake & Ohio Ry. during the week ended July 12 and also throughout the week ended July 19.

In coal loading for June the Logan district had a higher average of performance than any other field supplied by the Chesapeake & Ohio Ry., the performance being 91.4 per cent. of allotment, Kentucky ranking next with 90.4 per cent. The percentages of other fields were as follows: New River 82, Kanawha 89, Coal River 85.

The prospects are that unless there is some unforeseen change in conditions, that July will eclipse June in production in the Logan field.

The best coal loading record for the year 1918 has been shattered by the Chesapeake & Ohio during the week ended July 12. In 1918 coal loading was accelerated to an unprecedented degree by war demands, but the week ended July 12 beat even these records on the Chesapeake & Ohio.

Muskogee, Okla.

Texas, Arkansas and Oklahoma coal operators are much concerned over the competition of cheap Mexican crude oil as fuel, and are seeking means for eliminating this competition. Their business is threatened, they assert, and that unless protection is afforded, many of them must face bankruptcy.

This question was slated for discussion at the recent meeting of the Oklahoma Coal Producers' Association at Muskogee, Okla.; but after the convention assembled it was disclosed that the subject had not been submitted in the call sent out by the secretary, as required under the by-laws, and the subject could not be officially considered. It was discussed informally by the operators who attended the meeting, but action was deferred and it was decided to call another meeting to assemble at McAlester, Okla., on July 28. At that meeting, under the call already sent out, the question of affiliation with the National Coal Operators' Association, and a resolution recommending a tariff on Mexican crude oil will be acted upon.

Coal operators declare that Mexican crude oil is delivered at the border for 65c. a barrel, which is less than the freight charges from this section to the border on a quarter of a ton of coal, the equivalent of a barrel of crude oil in heat units. By affiliation with the National association it is hoped to line up the membership of this organization in favor of the proposed tariff for protection of the coal operators. Mexican fuel is now robbing the coal operators of a large trade territory in the Southwest.

PENNSYLVANIA

Anthracite

Shenandoah—Several hundred boys less than 16 years of age were discharged in the early part of July in four collieries in the lower anthracite region in accordance with the law which became effective July 1. The law is said to be unpopular among officials and employees alike. In the case of the former it means the companies must dispense with some desirable help, while in the latter, it works a hardship in many instances. In a number of cases boys were discharged who were the sole support of dependents.

Shamokin — Complying with legislation recently enacted prohibiting the employment of boys under 16 years of age about the mines, the Philadelphia & Reading Coal and Iron Co. and the Susquehanna Collieries Co., on July 7, discharged between 300 and 400 youths.

Bernice—The Connell Anthracite Mining Co., operating at this place, has provided a new recreation park for its employees and their families. The company developed a section of mountain land fitting up a dance pavilion, kitchen dining room and recreation features. The park is lighted with electricity, a place is provided in which to park cars and it is generally made a real pleasure resort.

Scranton—There is a persistent report to the effect that the Leggetts Creek colliery of the Hudson Coal Co. was purchased by a syndicate of Boston and Cleveland capitalists on July 15. The syndicate is headed by J. P. Burton, of Cleveland, Ohio, president of the Treverton Colliery Co. S. Hartwell, president of the H. N. Hartwell Sons, wholesale and retail dealers of anthracite and bituminous coal in New England is also interested. The third member of the syndicate is Philip Salonstall, banker, of New York and Boston. It is said to be the plan of the new owners of the colliery to begin remodeling the breaker at once so that it will be capable of handling between 2500 and 3000 tons of coal a day. It is estimated that the amount of minable coal on this property is 13,000,000 tons. The Leggetts Creek colliery has been in litigation for a number of years, and recently a verdict was rendered in favor of the landowners, which provided that the company would have to forfeit the lease.

Bituminous

Sharon—The Diamond No. 3 mine owned by the Westerman-Filer Co., of this place, was sold recently to the Scotch Hill Coal Co., of Pittsburgh. This mine has been in operation for the past 11 years and has a capacity of 600 to 800 tons a day.

Midland — The Crucible Steel Co., of Pittsburgh, is constructing a byproduct plant at this place which will have a capacity for carbonizing nearly 2000 tons of coal per day, producing more than 1300 tons of coke daily. The completion of this plant will mean another outlet for Monongahela River coal which will be supplied from mines at Crucible in the sixth pool.

Uniontown—There seems to be somewhat of a slump in the coke business in the Connellsville region during the week ended July 19. Several plants are carrying a large number of unconsigned loads and some are having to resort to off days. This may be due to the fact that some furnaces are stocked up and holding off for better prices. The Republic coke plant of the Republic Iron and Steel Co. was handicapped early in the week by its tracks being flooded by heavy rains.

Chambersville—The Seneca Coal Mining Co., of Buffalo, N. Y., operating the Seneca No. 1 mine here, has purchased the operation of the Shannon Coal Company whose mine is directly opposite the Seneca No. 1 tipple. The output of the Shannon mine has been loaded over the Seneca tipple for the past several months, but with the new property the Seneca company plans for a much larger tonnage. The Shannon mine is being equipped with electric mining machines and haulage locomotives. A larger bridge now spans the creek so as to accommodate the large electric locomotives and the increased tonnage. The plan is to double the present loading of the Seneca tipple.

Washington—H. A. Davis, of Pittsburgh, president and treasurer of the Canonsburg Gas Coal Co., announced on July 12 the organization of the Washington Gas Coal Co. This new company was promoted by the Canonsburg company in conjunction with practically every industry in the Washington district with a capitalization of $500,000. The company has paid $250,000 for about 600 acres of coal land north of this place for immediate development. The new mine is to be developed by a 280-ft. shaft and a slope 1000 ft. long; it is to be electrically equipped. The unique feature of this plant is to be the transportation of the product of the mine to local industries without railroad haulage, by means of trucks direct from mine to consumer. The officers of this company are: H. A. Davis, president; J. H. Hillman, Jr., of Pittsburgh, vice president; and R. G. Lutton, of Washington, secretary. Mr. Hillman is chairman of the board of the Hillman Coal and Coke Co., the Hecla Coal and Coke Co. and the Thompson Connellsville Coke Co.; he is also interested in other coal and coke operations.

WEST VIRGINIA

Moundsville — Preliminary construction work on the plant of the Woodale Coal Co., recently organized with a capital of $400,000, is being pushed. A shaft will be sunk at the mouth of Fish Creek in Marshall County. The company will build 50 houses at once for the accommodation of those opening up the mine.

Logan—Construction work on the new plant of the Brush Creek Coal Mining Co. located at Costa, W. Va., having been completed, the company has begun the mining and shipment of coal from its two mines, at the rate of two cars a day. The president of the company, H. C. Jones, of Logan, is also in charge of coal sales.

Kimball—Six men are said to have been killed in a gas explosion at the mine of the Houston Collieries Co. here on July 18. From 100 to 200 men were in the mine at the time but the six men killed were the only ones seriously affected by the explosion. The cause of the accident is a mystery. This mine is a few miles east of Welch and the development is by shaft on the Pocahontas seam.

Wheeling—Crews engaged in fighting the fire in the Beach Bottom mine of the Richland Block Coal Co., near this city, succeeded in finally gaining control over the flames. Heavy damage resulted to the mine. The chief of the Department of Mines of West Virginia, W. J. Heatherman, supervised the final effort made to put out the fire. Temporary repairs were started as soon as the fire was extinguished and little delay will be experienced in resuming coal shipments.

Fairmont—Several companies in northern West Virginia whose coke plants have not been utilized for some time have fired up their ovens again and are beginning to ship coke to market. Among the companies who are producing coke again is the Jamison Coal and Coke Co., the operation of its No. 9 plant at Barracksville having been resumed. While so far coke shipments have been exceedingly light, a larger demand is confidently expected.

Glen White—Five hundred veterans of the war, just back from France, and 5000 of Raleigh County citizens were present at the dedication of a bronze memorial tablet inlaid in a stone monument erected by the employees of the E. E. White Coal Co., at this place, in honor of their fellow workers of the company's Glen White and Stotesbury operations who offered their lives for the defense of their country. The unveiling of this memorial was the feature of this Fourth of July program that included speeches, music, athletic sports and a monster family basket picnic. In the evening there was dancing in the white and colored amusement halls.

KENTUCKY

Middlesboro—The tipple of the Lower Lignite Coal and Mining Co., of this place, burned down recently. The fire is supposed to be of incendiary origin and the loss is stated to be $5000. Several loaded gondolas were also destroyed.

OHIO

Martins Ferry—The Lorain Coal and Dock Co., has closed a deal with the McComas estate, whereby the company gains possession of the Brockuner Estate at Wheeling Creek; $100,000 is said to have been paid for 400 acres of coal land.

Toledo—More activity has developed at the Toledo docks of the principal coal carrying roads. During the week ended July 12 the Toledo & Ohio Central docks loaded 74,262 tons as compared with 37,783 tons the previous week, making a total of 584,204 tons for the season. During the same week the Hocking Valley docks loaded 211,006 tons as compared with 146,840 tons the previous week, making a total of 2,050,430 tons for the season.

Columbus—The organization of the Great Lakes and Ohio River Waterways Association, which has for its object the connecting of the Ohio River with Lake Erie by barge canal was completed at a meeting held here recently. The association is striving to show the many advantages of the so-called central route which runs through Columbus and joins the two waterways at Portsmouth and Port Clinton. Henry A. Williams, president of the Columbus Chamber of Commerce, is president of the organization, and J. T. Daniels is secretary. The Columbus Chamber of Commerce is lined up strongly behind the project. The sum of $250,000 has been appropriated by Congress for a survey.

MARYLAND

Cumberland—The Cumberland division of the Baltimore & Ohio R.R. is now handling coal at the rate of about 2000 cars a day and has been almost continuously since July 7. Loads from the northern West Virginia division are the heaviest, having averaged in excess of 1100 cars a day; the Connellsville and Somerset fields contributing about 600 cars a day; while loads from the Georges Creek region have been averaging approximately 400 cars a

day. The prospects are that the tonnage of coal handled will increase as the season progresses unless a car shortage should intervene.

OKLAHOMA

Alderson—The Rock Island Coal Mining Co. has resumed the operation of its mine at this place, in which an explosion killed fifteen men a short time ago. The State Mine Inspector of Oklahoma issued orders prohibiting the mine from being opened for operation for a period of ten days. During this time he searched diligently for gas which might have caused the explosion, but was unable to find any. The cause of this explosion remains a mystery; tests on the day before the explosion failed to show any gas whatsoever and immediately after the rescue work, tests made failed to show the presence of gas. Yet the condition of the men's bodies showed that death had been caused by a slow combustion that had exhausted the oxygen supply, as no bruises of any kind were disclosed.

INDIANA

Terre Haute—Coal production in Indiana for 1919 has fallen far below that of 1918, according to figures published by the Indiana Bituminous Coal Operators' Association. These figures disclosed the fact that during the first six months of the present year the production from the coal mines in the state has been less by more than 5,000,000 tons than the tonnage of the first six months of 1918. The production to the first half of the present year was a little over 9,000,000 tons. The June production figures were 1,355,551 tons as against 1,307,325 tons in May.

ILLINOIS

Belleville — The new National Coal and Mining Co. has elected the following officers: President, A. L. Wright; vice president, August Herl; secretary, John H. Wright; treasurer, Anderson Wright; board of directors, B. O. Schull, Ernest G. Fey, William Kunze, Victor Geolat; trustees of compensation fund, August Herl, Charles Pointon and Theodore Kunze.

Carlinville—The Sinclair Coal Co., of Texas, which some time ago closed a deal for over 12,000 acres of coal rights southwest of this place began payment on this property recently. The company plans to enter the coal field here at once. Carlinville is in the center of one of the prominent coal fields of Illinois and the city is experiencing a most rapid and substantial growth. The Standard Oil Co. has large interests in this section which are developing on an extensive scale.

Hartland—The increased demand for coal following a period of inactivity has enabled at least three companies operating in this section to resume operation. These companies are the Mill Creek Coal Co., the Mid-Lothian-Jewell Coal Co. and the Federal Coal Co.

The French Colliery Co. is preparing to develop the tract of 430 acres of coal land which it purchased not long ago from the Hartland Collieries Co. near here, and expects in a comparatively short time to have a mine in operation.

Duquoin—The coal industry in this section of the country at the present time, is facing a serious car shortage which has been gradually growing worse until now many of the large mines are losing from 2 to 3 days per week. Many tons of coal have remained in the ground in the last three weeks, because several of the large mines around Duquoin have been forced to remain idle whereas they would have worked had they been able to secure cars to load. It is unusually early for a car shortage to start at this time of year but the railroads say that part of the cause is due to so much unbilled coal which is standing on sidetracks in many mining centers.

UTAH

Echo City—A partly developed coal mine about 3½ miles south of this place and near the Union Pacific Coalville line was opened up by J. H. Dowdell. It is now the intention of G. P. A. Welsenborne, an eastern manufacturer, to become interested in this property, with Mr. Dowdell, to incorporate under the name of the Lux Coal and Mining Co., push further development and have the mine in full operation within a short time. The present holdings of this company comprise some 80 acres but it is expected to double this territory.

COLORADO

Grand Junction—The Midwest Coal Co., with general offices at Palisade, has about completed the suspension bridge across Grand River. The bridge extends from the mines to the loading track, a distance of 400 ft. It has a double roadbed and is supported by flat steel cables. It is one of the larger and more extensive improvements of the company this season.

Denver—Preparatory steps are being taken to contribute to the success of the National first-aid mine-rescue tournament to be conducted by the Bureau of Mines, in Pittsburgh, on September 30 and October 1. In this connection announcement was made recently that Bureau of Mines rescue car No. 11, which arrived here during the convention of the Rocky Mountain Coal Mining Institute, had been assigned to the Utah and southern field indefinitely. Work in first-aid and mine-rescue training will begin at once beginning in the Cottonwoods district. Other mining camps of the state will be visited by the car later. The staff of the car consists of Richard V. Ageton, engineer in charge; K. T. Sparks, foreman miner; Donald W. Cook, first-aid miner, and J. P. Allen, clerk.

MONTANA

Melstone—A coal mine is to be opened in the Carpenter Creek field south of here in the near future according to C. B. Foncannon of Aberdeen, S. D., who has extensive land holdings in that field. Two workable seams of coal underly the Foncannon holdings, both of which outcrop on the north side. One of the beds is seven feet thick at the outcropping and increases to a thickness of eight feet. The physical features of the property are such as to make the driving of a slope practical and comparatively inexpensive.

Personals

T. E. Houston, heavily interested in a number of mines in the Pocahontas and Thacker coal fields of West Virginia, is stated to have insured his life for $1,750,000. The announcement comes from Mr. Houston's sales office in Cincinnati, Ohio, and is to the effect that of the amount of the insurance, $500,000 is for the protection of his family and estate; the remaining $1,250,000 is for the benefit of the corporations, of which Mr. Houston is the head.

F. M. Chase, vice president of the Lehigh Valley Coal Co., with headquarters at Wilkes-Barre, Penn., gave his customary annual dinner and reception to the staff of his organization at his home "Breezytop," on July 11. An added feature on this occasion was the fact that Mr. Chase is rounding out his fortieth year of service with the Lehigh Valley company. As showing how he had seen this company develop, Mr. Chase pointed to the fact that when he began as an office boy in 1879, the Lehigh Valley company operated only five collieries, producing in that year 675,000 tons; while during 1918, it operated 39 collieries and 21 breakers and the production was 9,309,000 tons.

Delos W. Cooke, former Fuel Administrator for New York, now associate director of the Cunard Line, had conferred upon him by the French Government the title of Chevalier of the Legion of Honor. This is in recognition of Mr. Cooke's services to France as Executive Control of the Traffic of the Allies, having charge of the movement of supplies during the war and representing them on the Exports Control Committee at Washington. In addition to this Mr. Cooke had charge of the transportation arrangements for the American Red Cross at Washington on the staff of H. P. Davison, Chairman of the War Council. Previous to becoming Fuel Administrator Mr. Cooke was a vice president of the Erie railroad.

Coming Meetings

The Bureau of Mines on Sept. 30 and Oct. 1 will hold a national first-aid and mine-rescue contest at Pittsburgh, Penn.

New York Coal Merchants' Association will hold its annual meeting Sept 11-13 at Alexandria Bay, N. Y. Executive secretary, G. W. F. Woodside, Albany, N. Y.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

The National Commissary Managers' Association will hold its annual meeting August 5-7 at the Sinton Hotel, Cincinnati, Ohio. Secretary, D. J. Elchoff, Manhattan Building, Chicago, Ill.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting July 23 and 24 at Reading, Penn. Secretary, W. M. Berolet, Reading, Penn.

National Exposition of Chemical Industries will hold its fifth annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

The National Safety Council will hold its annual meeting Oct. 1 to 4 at Cleveland, Ohio. Secretary, S. J. Williams, Chicago, Ill.

Oklahoma Coal Operators' Association will hold its next meeting July 25 at McAlester, Oklahoma. Secretary, F. F. La Grave, McAlester, Oklahoma.

Obituary

Dr. C. H. Austin, surgeon for the Sunnyside Coal Co., at Strong, Colo., who went on a fishing trip with two Mexicans recently, was shot twice and beaten with a gun; he died in a hospital at Pueblo, as a result of his injuries.

Oscar Otto died on June 30 as a result of injuries received in an automobile accident. He was general superintendent of the South Philadelphia machine works of the Westinghouse Electric and Manufacturing Co.

Albert H. Tracy, Jr., president of the Retail Coal Association, of Buffalo, died on July 17 at the age of 52 years. He had been in the coal business most of his active life and on the retirement of his father from the superintendency of the Delaware & Hudson Co.'s Lake docks, the two formed the Tracy Coal & Wood Co, which is still in successful operation. He was a widower without children.

Industrial News

Washington, D. C.—Recent movement of coal through the Panama Canal was as follows: steamship Claremont, Baltimore to Callao; steamship Cowboy, Newport News to Coquimbo; steamship Pensacola, Norfolk to San Francisco; steamship Borgland, Norfolk to San Francisco.

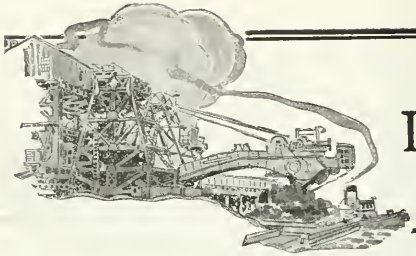
Troy, N. Y.—W. J. Rainey, 52 Vanderbilt Avenue, New York, is understood to be considering plans for the construction of a large new byproduct coke plant here, estimated to cost in excess of $5,000,000. It is said that the contract for the installation of the ovens will be handled by the Koppers Co., Pittsburgh, Penn.

Washington, D. C.—The War Trade Board section of the Department of State announced July 16 that all agreements (W. T.B. Form X-201) entered into with the War Trade Board by persons, firms, or corporations in the United States and its possessions and in foreign countries, in connection with the sale or delivery of coal, coke, and primary or derivative oils, are canceled, effective July 14, 1919.

Ward, W. Va.—Handling and loading of coal from its various mines will be consolidated by the Kelly's Creek Colliery Co., of this place, having perfected arrangements for loading the products of the various mines on Kelly's Creek over one tipple. In all, it is said, $250,000 will be expended in improvements during the summer. The general manager of the company is J. J. Smarr.

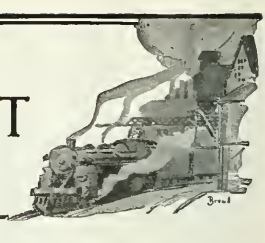
Logan, W. Va.—There will be further development of coal lands in Logan County following the organization of the Mabel Coal Co., of Mallory, which has a total authorized capital of $150,000. It is not only the purpose of the company to produce coal but also to deal in coal lands. Active in the organization of the new company were Bruce McDonald, W. C. Turley, E. L. Hoggett, of Logan; J. W. Thornbury and F. M. Burgess of Man, W. Va.

Huntington, W. Va.—Mining operations will be started in the Guyandotte district of Cabell County by the Lake and Export Coal Corporation as soon as the plant can be constructed. The company also has in mind handling coal land, particularly in Kentucky and Ohio. The new concern has a capital of $150,000. The company was organized by the following Huntington business men: C. L. Wells, E. L. Williams, A. Corn, Percy Williams and John S. Marcum.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Bituminous Market Conditions Firmer, with Quality Grades Short of Supply—Labor Scarce and Unruly—Coal Carrying Equipment in Poor Condition—Anthracite Market Strong in Both Domestic and Steam

THOUGH conditions in the soft-coal market are distinctly better than they have been, no pronounced upward tendency in prices is discernible. However, it is difficult to procure the better grades of bituminous. Operators continue to urge dealers and consumers to lay in their stocks while the opportunity affords, as a fuel shortage late in the fall and during the winter can scarcely be avoided. New contracts for future requirements are not being entered into by the operators, who are contenting themselves with clearing up old orders and preparing for the demand, at higher prices, that is sure to come.

Mine labor is not only scarce, but what is more aggravating is the fact that workers in many of the fields producing the good grades of soft coal refuse to put in more than four days a week. The output of bituminous coal for the week ended July 12 is estimated at 10,169,000 net tons, making a total for the calendar year to date of 230,522,000 net tons, or approximately 77,600,000 net tons less than in the corresponding period of 1918.

The daily rate of production averages 1,695,000 net tons, which is about commensurate with the present rate of consumption. It is doubtful whether any increase in the daily output of soft coal can be made.

Another deterring factor to full-time operation in the bituminous mines is the shortage of coal-carrying equipment. Thousands of cars have been taken off the rails for repairs, thousands of others have been scrapped; and it is apparent that in some districts the number of disabled cars will have a pronounced effect upon mining. Some operators report that they were without cars for two successive days during the week under review.

The marine workers' strike is having a serious effect on coastwise coal shipments, and developments the next week or two will be awaited with much interest and some anxiety. The export market is very firm, and, as is to be expected, Pocahontas and New River coals receive the preference. Quotations for these grades run from $6 to $6.25 per gross ton f.o.b. Norfolk and Newport News.

All the domestic sizes of anthracite continue to be in urgent request. Mines are operating as near full time as possible, though production, as in the bituminous region, is interfered with by a shortage of labor and the refusal of the miners to work steadily.

Steam sizes of anthracite are not causing so much trouble as might be expected, as shippers are not oversupplied owing to the closing down of many washeries. Prices are being adhered to generally, although the full schedule figures are being shaded.

The estimated production of anthracite in the week ended July 12 was 1,874,000 net tons, bringing the total production for the calendar year to date to 47,078,000 net tons, or 10,870,000 net tons less than last year.

WEEKLY COAL PRODUCTION

The production of bituminous coal in the week ended July 12 is estimated at 10,619,000 net tons, an average per day of 1,695,000 tons, compared with an average of 1,492,000 tons for the five working days in the previous week, and compared with 2,214,000 tons in the week ended July 13, 1918. The production for the calendar year to date is 230,522,000 tons, or approximately 77,600,000 tons less than in the corresponding period last year. The average daily production, considering only working days, has been about 500,000 tons less this year than last year.

The estimated production of anthracite in the week ended July 12 was 1,874,000 net tons, compared with 2,136,000 tons in the corresponding week last year, and the average daily production in the week ended July 12 was 312,000 tons, compared with 282,000 tons in the previous week and 356,000 tons in the corresponding week last year. The production of anthracite to date is estimated at 42,078,000 tons, or 10,870,000 tons less than in the corresponding period last year.

Returns from the operators for the week ended July 5 record a further improvement in market conditions, the loss of time on account of "no market" averaging 24.3 per cent. of full time in the week, compared with 72.5 per cent. in the week ended June 28, and more than 32 per cent. in the first half of June. Market conditions in Illinois and Indiana were better, and the Hazard, Kentucky and Westmoreland (Pennsylvania) districts recorded notable improvements. Less than 4 per cent. of the full-time operation was lost because of "no market" in western Pennsylvania, less than 1 per cent. in the Westmoreland and neighboring fields, and central Pennsylvania showed an improvement. Car supply was better in the week ended July 5 than in the previous week in all districts except Illinois, Indiana, southern Ohio and central Pennsylvania, while losses due to shortage of labor increased in every district save southern Ohio and Alabama.

The production of beehive coke in the week ended July 12 is estimated at 325,648 net tons, compared with 680,000 tons in the week ended July 13, 1918, and with 264,328 tons in the five-day week of July 5, 1919. The production of beehive coke to date is estimated at 10,197,481 net tons, as against 16,412,818 tons in the corresponding period of last year.

Bituminous coal dumped at lower Lake Erie ports in the week ended July 5 was 923,939 net tons, compared with 994,901 tons in the week ended June 28, and 861,093 tons in the first week of July, 1918. The total lake coal dumped from Jan. 1, to July 5, 1919, was 10,053,441 tons, compared with 8,560,516 tons in the corresponding period, last year.

BUSINESS OPINIONS

Dry Goods Economist—Inquiry among large distributors revealed the opinion that stocks of many lines of goods in the hands of retailers are much depleted, and that replacements must be made as soon as possible in order that when the fall openings occur in September it will be possible for retailers to show reasonably fair assortments of goods.

The Iron Age—All the week's iron and steel trade developments are favorable, with indications of sustained if not cumulative activity throughout the summer. In the Pittsburgh district operations are on a larger scale, the Carnegie Steel Co. having 75 to 80 per cent. of ingot capacity active, while a large independent interest there is above 80 per cent. A broadening inquiry from all parts of the globe marks the export market. Buyers are slow to accept the belief here in the stability of prices, but the volume of contracting is sufficiently large to indicate there is no summer-time dullness in foreign trade. Tin plate is now reckoned in export activity. A Pittsburgh mill has booked fully 20,000 boxes for Japan and much more is under negotiation.

Marshall Field & Co.—Current wholesale distributions of dry goods was considerably in excess of the large figures of the same week last year. The total of orders from road salesmen for both immediate and future delivery was also greater for the comparative period. Business in the house for this time of year has been brisk, more merchants coming into market than during the corresponding period of 1918. Retail trade continues excellent. Collections are good.

American Wool and Cotton Reporter—The condition of the Boston wool market is strong and advancing. In the West wools are pretty largely bought up. Fine wools are high but are becoming exhausted. Medium wools are expected to be called for more before long and in fact they are more in demand even now. It is expected that by another month there will be a good-sized boom in the lower grades of wool. In cotton the situation is causing an increasing amount of interest. It is only a question of time when cotton will be needed in much larger quantities by foreign manufacturing concerns.

Atlantic Seaboard

BOSTON

Market firmer and prices advancing, but as yet no pronounced upward swing. Shipments light due to labor conditions. Short-

age of cars already a factor. Only scattered buying. Railroads try to increase deliveries. Coastwise trade almost at standstill because of marine strike. Hampton Roads coals rapidly being absorbed for export. Shortage of bituminous at Philadelphia piers opens way for anthracite sizes, but supply limited. Pea and buckwheat in better request.

Bituminous—While the market is distinctly firmer there has as yet been no pronounced upward swing in prices on the coals shipped all-rail. It is much more difficult, however, to buy the better grades. Of Navy standard coal from Pennsylvania there is practically no tonnage available. Shippers who are under obligation to furnish coal to the Navy Department are, many of them, in straits to furnish their quota and there is some buying on their part to cover in the grades that would be acceptable. Advances of 25c. have been rumored the past few days, but these are as yet unconfirmed.

Now that orders are in hand for full-time production it is apparant that nothing like full time can be expected from mine-workers. Four days is now the average for the thicker seam operations, and shippers are finding that where the men are pressed to work five and six days the daily output is diminished and doubts are expressed whether in most of the regions any great increase can be relied upon. This is the chief reason for faith in higher prices, for while demands have thus far kept in step with output it is realized that any change that makes for less output will restore a bull market.

The threatening shortage of cars is another strong factor. It has been said that upward of 50,000 coal cars have been shopped, and certainly it is apparent that in some districts, especially along the line of the B. & O., that the number of disabled cars will have a pronounced effect upon mining. The past week there were operations without cars for two successive days, the first time this year, and when that occurs in July it is ominous. It is rumored also that the central authorities have in view an order to return cars to regions where they are owned, and should this be carried out there is no question about the depressing effect it would have upon production in Pennsylvania. The Tidewater Coal Exchange is once more coming into prominence because of the changing conditions. Within a few days, for the first time in perhaps 10 months, receipts at certain of the piers have been less per day than the daily dumping, and this of course cannot continue indefinitely.

And yet in face of these conditions there is no buying response from New England, certainly not in any volume. There is scattered inquiry for coal, but buyers are still in position to be discriminating as to grade and price and few if any current sales will stand more than one commission. Purchases made now are not for current use, and what anxiety there is among steam-users is for consumption next fall and winter, in anticipation of more difficult conditions. Offerings of coal are still being turned down quite as often as possible orders, and so far as New England is concerned we have yet to see an active market.

The strike of marine-workers has been effective on practically every steamer carrying coal coastwise, and on most of the tugs, both coastwise and harbor. Several of the barge lines have been affected through having no power to tow them. The offer of the Shipping Board was not accepted by the unions, and at recent conferences no headway seems to have been made.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.35@2.80	$2.80@3.40
F.o.b. Philadelphia, gross tons	4.49@5.00	5.00@5.70
F.o.b. New York, gross tons	4.85@5.35	5.35@6.10
Alongside Boston (water coal), gross tons	6.35@7.05	6.85@7.50

Georges Creek is still quoted at $3.70 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $6.00@6.25 per gross ton f.o.b. Norfolk and Newport News, Va., in response to export demand. There are practically no spot sales for coastwise shipment.

The Hampton Roads situation shows more activity than do the coals all-rail or from the other ports. The export market is very firm, and certainly there is no dearth of inquiry; $6.25 is now a regular figure f.o.b. vessel, while many of the agencies have contracts in New England that net them $4.69. This difference measures the premium that is being offered to get spot cargoes afloat for oversea shipment. Slow loading has also been a feature, and no coal is being sold in this market from Norfolk or Newport News without an understanding as to steamer demurrage. It is natural that Pocahontas and New River should have the call in foreign markets, and should this demand develop along the lines now expected there would be great difficulty in New England getting anything like even the modest quota that was relied upon early this season.

Anthracite—Egg, stove and chestnut are still in extremely short supply at all the loading piers. For several days there has been an effort to increase the Tidewater movement by diverting from all-rail territory, but actual shipments are far behind the wants of retail dealers in New England. The shortage of bituminous at the Philadelphia piers because of light output during the holidays has for the time being opened the way for better anthracite loading. Barges that would have loaded bituminous in regular course have been allowed to load anthracite for that reason, although the shippers have been hard put to it to furnish cargoes. Pea and buckwheat have both been loaded in the effort to use the barges available.

All-rail movement of domestic sizes shows no appreciable improvement. Companies who have been the largest distributors have been forced to curtail shipments, especially to new trade, and there is increasing anxiety over the outlook. Prices of "independent" coal have been quoted within a day or two at $1.35@1.75 in excess of the regular company circular.

NEW YORK

Domestic sizes of anthracite scarcer, with stove and egg in heavy demand. Production is fair with little chance for improvement. The line trade buying heavily. High premiums for quick shipments reported as offered. Steam coals easier. High grades of bituminous scarcer. Quotations for nearly all grades show strength over last week. Shipping strike hits bunkering trade. Increasing call for exports.

Anthracite—Every one of the domestic coals continues to be in heavy demand, with the majority of the loading docks practically bare of those sizes. This is particularly true of the docks on the west side of the North River, and it is also said that these docks are also short of the steam coals. There are large tonnages of steam-coals at the lower docks, but scarcely any of the larger sizes. That the market is not oversupplied with the steam coals is due to the closing down of many washeries.

There has been no increase in the receipts, which continue to be far too small to meet the requirements of the trade. Both the larger companies and independent operators are endeavoring to make an equitable distribution of their products. There have been heavy shipments to Canada, where the demand is heavy. Dealers from New England are also in the market for heavy deliveries, and the local offices are daily urged to take care of their needs. Reports from the surrounding territory are along a similar trend. Coal is short and consumers are anxious to fill their bins before the situation becomes more serious.

Stocks of the anthracite steam sizes are kept reduced by the action of the sellers in inducing retail dealers to include in their orders small tonnages of those sizes. This does not, however, obviate the necessity of the larger companies storing considerable of these coals. Most producers are sold well ahead and are not anxious to receive additional orders unless the standing order has been reduced by shipments. The local trade in some instances is said to be willing to pay premiums ranging from 50 to 75c. for quick shipments of egg and stove, while line dealers are said to have offered as high as $1 for similar deliveries.

The steam coals are not causing so much trouble as might be expected. Shippers are not oversupplied and prices are not being cut recklessly, although they are not being kept up at full circular.

Current quotations, white ash, per gross ton at the mines and f.o.b. at tidewater at the lower ports, according to company schedule, are as follows:

	Mine	Tidewater
Broken	$5.95	$7.80
Egg	6.15	8.00
Stove	6.40	8.25
Chestnut	6.50	8.35
Pea	5.10	6.85
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The increasing demand has been reflected in the high grades of coal, which are becoming scarcer for the spot buyer. There is not an oversupply of the medium grade coals to be had here. The shipping strike has injured the bunker business but not seriously enough to warrant embargoes being ordered. Many foreign vessels leave this harbor daily, and shippers so far have been able to keep their stocks of bunker fuel within reason. A continuation of the strike a few days longer will have a serious effect upon conditions and may result in considerable loss to those exporters of coal who have contracts abroad.

Conditions here show a substantial improvement. Demand is on the increase and the market seems to be on the mend. The better grades of coal are hard to get, but contract coals are moving steadily. There has been a good call for the other grades and shippers report a heavy tonnage moving. Indications point to a brisk fall market, which may put the producers on their mettle to meet.

The fueling of New England is taking much attention, it being understood that there is comparatively little coal in storage. The shipments of New River and Pocahontas coals from the Southern ports are not up to normal figures and it is probable that while there is a good tonnage of central Pennsylvania coals now going into those states by rail that the operators will be asked to increase their shipments.

There has been a demand for more coal to be sent to foreign countries. Dealers have received many new inquiries but the matter of transportation is to be contended with. There has been much delay loading because of the strike, and shippers returning from Baltimore say there is considerable congestion there. Hardly any trouble is experienced in loading foreign bottoms, because the strike has not yet been extended to include the members of the British Seamen's Union. Similar conditions exist at Hampton Roads. Vessels coming to this harbor from foreign countries report much delay in coaling boats on the other side because of labor troubles, and in some instances the coaling has been done by American soldiers who are anxious to return to this country.

Locally the situation is not as active as it was a week ago. The strike has caused a slowing down in loading vessels and bunker fuels are piling up. Buying along the line is strong and quotations for coal at the mines are stronger. Shippers are receiving inquiries regarding long time deliveries, but there are very few who will take orders extending over September.

Quotations for the various pool coals here are in most cases higher than last week. They range about as follows: Pools 1 and 71, $5.50 to $5.75; Pool No. 9, $5.50 to $5.75; Pool No. 10, $5.25 to $5.50; Pool No. 11, $5 to $5.25, and Pool No. 18, $4.35 to $4.50.

There have been increases in mine prices on nearly all grades during the past week, as the accompanying table shows:

	Spot
South Fork (Best)	$2.95@3.25
Cambria (Best)	2.95@3.10
Cambria (Ordinary)	2.45@2.60
Clearfield (Best)	2.95@3.10
Clearfield (Ordinary)	2.45@2.60
Reynoldsville	2.50@2.75
Quemahoning	2.85@3.00
Somerset (Best)	2.85@3.00
Somerset (Poor)	2.35@2.60
Western Maryland	2.35@2.60
Fairmont	1.90@2.25
Latrobe	2.20@2.35
Greensburg	2.35@2.50
Westmoreland ¾ in.	2.75@2.90
Westmoreland run-of-mine	2.50@2.60

PHILADELPHIA

Anthracite shipments short. Dealers going along quietly. Consumers' interest lessens. Very little stove here, as well as egg. Chestnut freer, and pea easy. No domestic buckwheat demand. Interest in August prices. Coal well prepared as to quality. Buckwheat only steam size wanted. Bituminous firmer. Some stocking. Tide business good. Some prices move up.

Anthracite—The dealers in this market are in the peculiar situation of being short of their requirements, but are growing unconcerned. They all have many orders to fill and are going quietly about the work and, unlike most summers, they are actually making a profit above expenses.

The larger companies make no secret of the fact that other territories are being cared for in greater volume than the local dealers and with the tonnage which has been going to those territories, which has also been materially added to by heavy

individual shipments at increased prices, it is believed that this city's turn will soon come. New England is receiving particularly heavy consignments.

With the sizes stove continues to be the one in smallest supply and judged by receipts recently it can be almost said there is none to be had. Most dealers' stove coal bins are bare. This is also true of egg, but a much less quantity of this is needed to fill requirements. Chestnut grows more plentiful and some dealers at times actually hint they have enough, but do not go so far as to cancel or hold orders, as they feel it might injure their standing later in the season. Even if they did hold orders no shipper would find difficulty in placing the tonnage, as many other dealers are storing all they can get.

Pea is plentiful and no one is short of this size, while most dealers actually have a good surplus of it. The position of pea in the market at this time is aptly illustrated by the advertising of the biggest producing company, which offers it for immediate delivery. It is known that the companies are being compelled to store some of this size. The Individuals are having no trouble in moving their pea, as their customers simply feel obliged to take their proportion to get the wanted sizes.

One good feature of the trade is the careful preparation. Coal mined in the summer is always good and the present is no exception. The one complaint that is universal is as to the sizing. Pea is the chief offender and there is not the least hope that the operators will increase the size by eliminating more of the buckwheat. The objection to too much pea in chestnut continues, and it is really these factors that have put such a strain on stove coal these days.

In the steam trade buckwheat remains the only size that is able to muster any strength. While big tonnages are being absorbed by the trade, the call is not nearly equal to the production. Rice and barley are also extremely plentiful. The steam trade situation is clearly reflected in the vast piles of the above sizes in the storage yard at Abrams, just outside of the city, which is about three-fourths full, an unusual condition for this time of the year, but caused by the full working time at the collieries in the endeavor to get out domestic sizes.

Bituminous—There is something of a firmer feeling in bituminous lately. This has been shown particularly in the good grades, which are scarce. Customers with contracts have been asking generally for increased shipments, as this class of trade is beginning to store coal. The exception to this rule is found in that railroads and these concerns appear to have little interest in getting more than current requirements. The shippers are anxious to fill them now so that they will be in better shape to look after their other trade in the months to come. Due to heavy shipments of Pool 9 coal to New England, it has been particularly difficult to get high-grade coals on spot shipment lately.

There is an active bunkering trade at the piers and an increasing amount of foreign business offering. Particularly strong inquiries have lately come from Italy, prompted no doubt by the fact that the English Government has increased the price of British coal. There have been a few departures for Italy, but until that country is in a position to furnish its own bottoms it can hardly happen that it will get much tonnage, even though the local shippers would like to take advantage of the opportunity.

Because of the increasing demand for good coals the price tendency during the week has been slightly upward, as is shown in the appended list of prices, which are quoted f.o.b. mine:

Georges Creek Big Vein	$3.00 @ $3.10
South Fork Miller Vein	3.00 @ 3.10
Clearfield (ordinary)	2.70 @ 2.80
Somerset (ordinary)	2.60 @ 2.70
Fairmont lump	2.50 @ 2.60
Fairmont mine-run	2.35 @ 2.50
Fairmont slack	1.90 @ 2.05
Fairmont lump (ordinary)	2.25 @ 2.35
Fairmont mine-run (ordinary)	2.00 @ 2.15
Fairmont slack (ordinary)	1.65 @ 1.75

BALTIMORE

Shipping strike interrupts but fails to halt big export business. Local market very brisk and prices on increase. Hard coal retailers need more fuel than is coming through.

Bituminous—In the midst of the largest export movement that has come to the trade since 1915, when a little less 2,000,000 tons was sent to foreign ports from Baltimore, the trade here was hit by the shipping strike. More than half the vessels ready for the piers were tied up by reason of being under American registry. The foreign ships were not held up, except through delays incident to getting American vessels away from the loading points to make way for the other carriers. The export loading here would have gone far in excess of 200,000 tons for July had not the strike intervened, and even now will probably run close to that mark, as the first two weeks saw a total of 123,641 tons placed in vessels cleared for foreign ports, of which amount 107,720 tons was cargo coal and 14,921 tons bunker fuel.

The local market, too, is active and the demand is growing steadily. Just before the shipping strike the congestion of export ships was so great at the Curtis Bay pier of the B. & O. that the Canton pier of the Pennsylvania, held during the war for local and harbor trade only, was ordered open for exports. The local demand on the pier has been so heavy the past week, however, and so continues, that little of the export coal is noted at the point. The reopening of the Locust Point pier of the B. & O. for local trade or the Port Covington pier of the Western Maryland, closed for the war, or both, seems a matter of the near future.

In the growing demand for industrial coal here the prices are stiffening materially. Best coals are almost out of the market, while good grades are readily commanding from $2.50 to $3 mine basis to the trade. Coals that had remained idle at terminals for weeks because they were of a grade that did not attract purchasers are now finding ready sale. The poorer coals are bringing foom $2 to 2.40 to the trade. One fly in the ointment has been an embargo against coal shipments to the Curtis Bay pier, placed when the shipping strike came, and it was found that some 2,800 loaded coal cars were at the pier en route there from the sidings at Brunswick.

Anthracite—The retail trade here could use much more coal than is coming through, especially of stove and egg sizes. Many dealers are still delivering on their spring orders, as they found it impossible to get all the coal they wanted from either Company or Independent mines. At present the Independents in many cases are asking premiums running up to 60c. per ton, as well as the regular monthly advance schedule, and the trade believes that these mines will be back to their war-time schedule of 75 cents premium by the fall.

Lake Markets

PITTSBURGH

Demand slightly improved. Predictions of shortage late in year are well founded. Excellent export trade. Slack prices higher.

There has been a further improvement in demand for coal and production is running at between 60 and 75 per cent. of full-time capacity. Men on payrolls are not putting in full time, but are doing somewhat better than 75 per cent.

Coal operators continue to urge consumers to lay in stocks now while there is an opportunity, stating that at best a shortage late in the fall and during the winter can scarcely be avoided. This advice has been given for a long time, but apparently coal consumers have not got rid of their early suspicions that the talk was based on nothing but a desire to bolster the market. Such a view is absolutely erroneous, as anyone can observe by noting that predictions of a shortage, with fancy prices, are men just as much by the most conservative and fairest minded operators as by those who are habitually radical in their talk.

Fancy prices for coal later in the year would not be for the good of the coal industry at all. They would be obtained only on a limited tonnage, while through influences that need not be referred to at length the rest of production would in all probability be greatly enhanced, thus causing reduced profits or actual loss upon the large tonnage of coal the operators are under contract, at flat prices, to deliver before they fill any prompt orders. The coal operators fear an insufficiency of transportation facilities even more than a shortage of labor. They have been observing of late a much larger proportion than formerly of bad order cars among the cars furnished to mines, some being in such condition that they cannot be used, and it is considered almost inconceivable that the railroads will be able to furnish full service next winter.

Demand for coal for export has improved, and for both Pittsburgh district and Connellsville coal prices well above the domestic market are being secured without difficulty. As sailing dates must be met precisely, only the large operators with efficient organizations can participate in the business.

The domestic market is somewhat stronger all around, but on mine-run and prepared sizes is hardly quotable at higher levels. Slack, however, is easily quotable 20c. higher on steam and 10c. higher on gas, prices being as follows: Steam slack, $1.50 @ $1.70; gas slack, $1.80 @ $2; steam mine-run, $2.25 @ $2.50; gas mine-run, $2.35 @ $2.50; 3-in. gas, $2.60 @ $2.75, per net ton at mine, Pittsburgh district.

TORONTO

Little anthracite coming forward; yards empty; deliveries hampered by strike of teamsters; strikes and labor unrest limit industrial demand; manufacturers not stocking up.

Market conditions are about the same as prevailed last year at this season, the dealers having orders in hand for domestic coal which they do not expect to overtake till fall. Little anthracite is coming forward and the yards are empty. Deliveries by many of the dealers are further hampered by a strike of the teamsters and a number of the yards have been closed. The prevalence of strikes in the metal trades and other industries, and the general uncertainty of the labor situation, continue to limit the demand for bituminous, which remains light. Manufacturers are not stocking up to any extent, notwithstanding the prospect of a considerable advance in prices.

Quotations for short tons are as follows:

Retail:	
Anthracite, egg, stove, nut and grate	$11 50
Pea	10 00
Bituminous steam	7 50
Slack	6 50
Domestic lump	10.00
Cannel	11.50
Wholesale f.o.b. cars at destination:	
Three-quarter lump	5.90
Slack	4.55

BUFFALO

Fair bituminous trade. No boom in sight. Shippers not agreed as to the outlook. Prospect of slow improvement. Anthracite rushing up the lakes.

Bituminous—The demand increases slowly. There is no boom and the effort to spring one on the part of Pittsburgh shippers has about subsided. Some members of the trade are saying that it was illjudged and overdone. While it is usually best to be optimistic in any business, it is not easy to create business in that way.

At the same time, the trade is improving and will be in good volume by fall. The actual advance in price here has been 10 to 15 cents a ton and is enough to show that the tone of the market is good. The shippers who, for a long time, had complained of next to no orders are now reporting at least a fair volume and complaint has about ceased. They all look for a steady improvement.

It is still reported that some coal bought several months ago is to be found in consumers' hands. This is more generally the case in Canada than here, but the demand is also better in that market than it was. Good salesmen find it profitable to cover the territory. It is still common for shippers to say that business does not come in to any great extent of its own accord. It must be gone after.

Bituminous prices are rather unsteady at $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for same three-quarter, $4.20 for mine run and $3.70 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The demand is active and the supply is only moderate. Just now the surplus is going into the Lake trade, so that the local and all-rail supply is decidedly light. Injudicious publications have disturbed the consumers till they are demanding coal much as they did during the scarcest period of the war. If people were to consider the situation they would find that with no real surplus it is folly to talk of buyitng coal early, for the most that can be done is to transfer it from one consumer to another. The old reason for urging early buying was that there was a midsummer surplus that held up the mining. This will not be the case this year.

The local prices of anthracite are strong and steady only because the liberal premium that might be obtained is not asked even by the independent operators, for they

fear the return of the coal administration and the old restrictions. Regular prices are as follows:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8 55	$10 20
Egg	8 75	10.50
Stove	9 00	10 70
Chestnut	9.10	10 80
Pea	7 20	9 15
Buckwheat	5 70	7 75

CLEVELAND

Both labor and car shortage have contributed to a marked decrease in the receipts of bituminous coal. The lake trade has suffered likewise, and with the July Fourth holiday out, July shipments likely will show up poorly. Demand continues for all grades, with prices firm.

Bituminous—The past week has been the worst, from both the operators' and the lake shippers' standpoint, since the coal trade began showing a revival from its winter lethargy. The labor supply that a few days ago seemed fairly ample now seems distressingly short, and the holidays seem to have interrupted mine workers' ideas of a full day's work. Car supply, continually spotty, has grown worse, and on days southern and eastern Ohio mines have not had more than 20 per cent of their wants filled.

Meanwhile, factory operations in northern Ohio have continued showing a slow but consistent increase, and demand for steam coal has advanced in proportion. The shortage is by no means acute, but considerably more steam coal would be absorbed by the district were it available.

Anthracite and Pocahontas—Both grades continue extremely difficult to obtain and are in big demand by domestic consumers. Personal trips by some retailers to mining districts have failed to dislodge much additional tonnage. Anthracite prices in general have been advanced, while some have pushed Pocahontas up another notch. It is estimated that the demand for Pocahontas and anthracite now is about 15 per cent. above the summer normal, while dealers are able to get only 80 to 85 per cent. of normal supplies.

Lake Trade—Receipts of bituminous coal at Lake Erie ports for transshipment to the head of the Great Lakes continue light. Shipments from the Pittsburgh district, in particular, have fallen off. Last week the docks dumped only 864,464 tons, including 38,000 tons of vessel fuel, while in the week preceding they dumped a total of 990,000 tons. It appears that coal shipments in the last half of the season will not come anywhere near the mark set in the first half. Some of the 10,000-ton freighters must make two ports now in order to get a full cargo.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg	$11.15
Chestnut	11.65
Grate	11.45
Stove	11.55
Pocahontas:	
Forked	9.50
Lump	8.75
Mine-run	7.50
Domestic Bituminous:	
West Virginia splint	7.75 to 8.00
No 8 Pittsburgh	6.25 to 6.60
Massillon lump	7.50 to 7.60
Steam Coal:	
No. 6 slack	4.20 to 4.40
No. 8 slack	4.70 to 5.00
No. 8 ¾-in	5.40 to 5.55
Youghiogheny slack	4.85 to 5.15
No. 6 mine-run	4.50 to 4.60
No. 8 mine-run	4.90 to 5.05

DETROIT

Sales of bituminous, particularly the steam sizes, are still reported falling short of previous years.

Bituminous—With recollections of the troubles experienced by consumers of steam and domestic coal in the attempt to provide for their requirements in the last two winters, wholesalers and jobbers in the Detroit market are striving to guard against a repetition of these difficulties during the coming winter by urging their customers to stock up at once. Warnings of a threatened shortage in coal supply appear not to arouse the buyers to action, as jobbers say the quantity of bituminous coal now being brought into Detroit is considerably less than should be sent here to make suitable provision for the consumers.

Some of the manufacturing plants are said to be holding back because the managements want to get reserve stocks as clear as possible of the coal of inferior grade that was bought a year ago under the regime of the federal fuel administration. The car shortage situation which is reported becoming a factor in the situation in various sections which supply coal to Detroit, is causing some anxiety, in consideration of its possible relation to future supply.

Little coal is reported on tracks about town. Hocking lump is quoted on net tons at the mines at $2.75 to $3. Mine run from Ohio ranges around $2, and Ohio slack is said to average about $1.50. West Virginia gas or splint block is said to be offered at $3 to $3.25; mine run at about $2.10 to $2.20 and West Virginia slack at $1.90 to $2. Smokeless mine run is short in supply, with price quoted at $2.75 to $3.

Anthracite—Household consumers are being warned that anthracite may be difficult to obtain if orders are held back too long. With present temperatures it seems difficult to interest consumers in making provision for winter. Retail dealers have a small amount of stock on hand, which would speedily be depleted should a strong demand develop.

Lake Trade—Movement of coal to Lake loading docks is much lighter than a few weeks ago, and is being impeded by car shortage. Vessel capacity exceeds cargoes and a number of ships are obliged to wait, while some are shifted from port to port to complete loading.

COLUMBUS

A better steam trade is reported from all fields, with the domestic demand holding up well. The Lake trade is steady and a considerable tonnage is moving to the Northwest. Prices are firmer all along the line.

Producers and jobbers report a better steam demand from all sections. This is apparent in every locality and presages a better movement of steam sizes. A canvass of the situation shows that reserve stocks are fairly low and that large users must enter the market in order to replenish their stock of fuel. With iron and steel plants resuming operations, fuel requisitions are gradually increasing. General manufacturing is also improving, judging from the better demand for steam grades. Quite a few contracts have been made and prices are distinctly higher. The low priced coal of several months ago is not found to any extent as producers and shippers believe that they can get a good figure on contracts. Railroads are not using a large tonnage as yet, but they are taking more on their contracts.

The domestic trade is gradually expanding as the season advances. Retail stocks are being increased in anticipation of a rush of orders in August and September. Many of the householders have placed orders for July after Sept. 1 and at the market figures prevailing at that time. Some deliveries are being made, although the unsettled real estate conditions act as a deterrent. Householders are loath to stock up when they are not assured of retaining their dwelling. Retail prices are stronger and every change is toward higher levels. Pocahontas is in good demand and retails at $7.50. Splints are also moving rapidly at $6 to $6.25. White Ash and Island Creek sell at $6.50. Semi-smokeless is quoted at $7, while Hocking lump is stronger at $5.75.

The Lake trade is rather steady, and a considerable movement from Ohio and West Virginia mines to the Northwest is reported. Docks are in good shape as no congestion is reported. Vessels are plentiful as the grain trade has not started to any extent. On the whole, the Lake trade is moving along steadily.

CINCINNATI

Decided improvement in all branches during the past week. Volume of business increasing daily, as contract makers for yearly supplies adding to the already huge bulk of business being transacted.

Domestic users in larger numbers than for several weeks past have placed their orders for the winter supply, after having held off for several months, believing that prices would drop. The market, however, remains firm with no price advances, but many dealers look for an increase some time this fall.

Industrial users have ceased their intentions to keep buying merely for their day-to-day requirements and are placing orders for their winter supply and also for weeks ahead for present use.

The lump-coal situation continues unchanged, little business, except for the domestic users, being transacted. The demand for mine run, however, has increased.

All users are clamoring for smokeless coal, but with little prospect of getting it. The big howl is coming from the householders. Those who had placed their orders early enough now have their bunkers pretty well filled with the hard stuff, while those who waited for the come down in prices have been disappointed. All this despite the fact that thousands of dollars were spent in advertising in an effort to get these people to buy early.

LOUISVILLE

Short production of eastern Kentucky block resulting in better inquiry for western Kentucky lump. Block and lump in fair demand, with steam and mine-run draggy. Prices holding up well. Some cutting by retailers.

Retail stocking as a whole is fairly good, but would be better if retailers could secure supplies of block coal without taking steam. Operators are refusing to increase production of block, due to inability to dispose of screenings. Steam demand is slightly better, but continues quiet as a whole.

Eastern Kentucky block is a little scarce, resulting in western Kentucky operators receiving better inquiries on high-grade lump, and some business. However, conditions in western Kentucky continue dull, with the mines working about two full days a week. Prices are weak. Eastern Kentucky is working about five days. Mine prices for the eastern Kentucky section are firm. The labor situation shows no material change. The car supply situation is worrying some operators, due to the poor conditions of cars and prospects for severe shortage this fall.

Movement by river is fair and equal to all demand for river coal from such dealers as are located on the wharves of the three falls cities. Steamboat consumption is much lower than formerly, due to smaller boats and gasoline boats being in the trade.

Quotations for the field are as follows:

	Eastern Kentucky	Western Kentucky
Block	$3.50@$3 75	$2.00@2 30
Mine-run	2 00@ 2 75	1.85@2 00
Nut and stove	1.85@ 2.25	1 50@1 75
Pea and slack		1.35

These prices range from low grades to top prices asked by mines of all kinds throughout the fields, based on quotations made to dealers and consumers.

There is practically no Indiana coal moving into the state, or even western Louisville at the present time, due to the low prices on Kentucky coal and large offerings of spot coal.

BIRMINGHAM

Spot furnace coke easier, foundry coke stroner. Possible over production. Coal will control coke price. Market quiet, with only a moderate demand for steam fuel. Domestic continues strong, no improvement in supply being noted. Production at commercial mines confined to from one to four days per week, some few operations being idle altogether.

There is no material change in the general market situation here, the demand for steam coal being light and confined for the most part to renewal of expiring contracts and a scattering of small spot orders. During the week the Southern Ry. closed contracts for 1919-1920 requirements aggregating approximately a minimum tonnage of 700,000 with about 25 per cent. increase above these figures as a maximum. Takings were confined to Big Seam mine-run from the upper and lower benches and from the Corona seam, prices according to reports ranging from $2.25 to $2.60 per net ton mines. The Louisville & Nashville lines are still obtaining their supply from this district under tentative contracts since July 1. The Central of Georgia is obtaining bids on its fuel supply, contracts to date from Aug. 1. The A. B. & A. is in the market for additional tonnage, having closed contracts recently for around 150,000 tons. Quotations are based on Government prices, which were shaded in some instances in the contracts made by the Southern, due to more favorable cost conditions at some of the mines over other operations.

The domestic market is still tight, quotations ranging from $3 to $5.50 for lump, with no improvement in the supply.

Production for the week ended July 5, as compiled by the Alabama Coal Operators Association, totaled 187,173 tons or about 50,000 tons short of the previous like period, this loss being attributed to some extent to the holiday on the Fourth. Commercial mines are running from one to four days per week, furnace companies making a slightly better schedule

Coke

CONNELLSVILLE

Spot furnace coke easier, foundry coke stronger. Possible overproduction. Coal will control coke price.

The spot furnace coke market has softened further, but foundry coke is stronger for both ordinary and special brands. For the past ten days there has been practically no demand for spot or prompt furnace coke. As is almost invariably the case at this time of year, the furnaces made more ample provisions than necessary against possible interruptions to shipments by reason of the holiday, and none is now in the market. Very considerable quantities of coke have accumulated on track, but as the holders have contracts and can move the coke gradually in that way it is not going to be forced on the market. A price of $4 would readily be accepted, but this would hardly be shaded. The pre-holiday buying had put the market up to $4.25 as minimum. Foundry coke on the other hand is stronger.

It is seriously questioned whether the operators have not overshot the mark and blown in too many ovens. There was only a slight decrease, 8000 tons, in the week in which Independence Day fell, while the following week, the first half of which witnessed Fayette County's celebration in honor of the returning soldiers, showed an increase of 27,000 tons.

The best judges of the situation are now convinced that for the remainder of this year, if not for an indefinite period, Connellsville coke will simply bring its coal value plus the actual cost of coking without fixed charges. This cost ranges from 50c. at the low-cost operations to 75c. at the highest cost operations. The formula works out exactly at present, coal being salable at $2.35 while coke is $4, one and a half tons of coal being required for one ton of coke. In nearly all quarters coal is expected to advance within a few months, and perhaps quite sharply. It seems likely that sliding-scale contracts made for the half year, based on pig iron prices from month to month, will not prove as advantageous to coke operators as they expected, for beyond question coal is much more likely to advance than pig iron. The market is quotable and follows: Spot and prompt furnace, $4; spot and prompt foundry, $4.75@5.50; contract foundry, $5@5.50, per net ton at ovens.

The *Courier* reports production in the Connellsville and Lower Connellsville region in the week ended July 12 at 157,838 tons, an increase of 27,048 tons.

Buffalo—The market is fairly steady, with certain domestic and steam grades a little more active. Shippers are looking for a better market before long, but cannot predict it till iron is moving more liberally. Quotations are $7.80 for 72-hr. Connelsville foundry, $7.10 to $7.35 for 48-hr. furnace and $6.20 for off grade. Crushed domestic sizes sell at $6.60 and breeze at $3.85 to consumers.

Middle West

GENERAL REVIEW

No change of any moment in market conditions. Screenings and mine-run still glut market.

There have not been many evidences of change in the Middle-West coal market in the past week. Lump and egg coal continue to be in great demand, and practically all of the mines are from one to three weeks behind on shipments of this size. We understand that both lump and egg coal are selling at a premium in some cases. Nut and stove sizes are not moving so well, although stove size is moving better than nut. This is because the stove size, which is 2 x 1¼ in. in dimension, goes to many points in Iowa, on a freight rate which is less than the freight rate from the same mine on either egg or lump coal. Screenings and mine run, as heretofore, continue a serious drag on the market, and an accumulation of these two kinds of coal at the mines is hindering production in one or two of the largest producing fields.

The expected boom, which was to come after peace was signed, has not arrived, or if it has arrived, it has not affected the coal market in the Middle-West. The big manufacturing plants and public utility plants are still maintaining a very lackadaisical attitude toward their fuel supply for the coming winter months.

There has been of late an actual car shortage at the mines in both Illinois and Indiana. This shortage, so far, has affected only the operators and the miners, as the public are not buying enough coal to notice whether or not their shipments are delayed.

CHICAGO

Strikes in many industries has bad effect on coal market conditions. Eastern coal preferred by retailers.

Chicago operators and jobbers are certainly on their toes these days, as the steam coal situation in Chicago has been very discouraging. Conditions may be even worse now, with the strike in progress at the plant of the Corn Products Co., as well as at the International Harvester plants. Both of these concerns use considerable quantities of coal, and producers of this coal are now forced to look elsewhere for a market, adding another burden to a market already weakened to a point of collapse. It is further rumored that labor troubles are brewing at the Union stockyards. The various packing companies at this plant consume more screenings and fine coal than any other Chicago industry. If these people are forced to close their plants, on account of strikes, it will mean a tremendous tonnage of screenings thrown on the market. It is hoped that the packers will continue in operation, because if their plants are closed down it will result in a calamity to the Chicago steam coal trade which will be far-reaching in its effect.

The Chicago domestic market has been a little hard up on business for the mines in Illinois and Indiana. This is easily explained by the fact that the retailers are finding it almost impossible to obtain labor to unload the coal as it arrives. Furthermore, they feel that if they are to have any eastern coal at all, now is the time to get it. They are everywhere giving this business preference over coal from Illinois and Indiana.

MILWAUKEE

Coal market slow and dock yards in danger of becoming stocked up too early. Shortage of stove and nut anthracite.

The outstanding feature of the Milwaukee coal market is a shortage of stove and nut sizes of anthracite. Notwithstanding the total receipts of anthracite thus far this season exceeds that of last year by nearly 75,000 tons, the amount of the two sizes named that has been available for delivery up to the present time is fully 20 per cent. less than requirements call for. Egg and pea anthracite are plentiful.

The demand for coal is not what it should be in the face of published warnings of a probable shortage in the fuel supply when the cold season arrives, and there is danger that the receiving yards will become choked up long before the Lake season ends and thus force a check on receipts. Receipts thus far since the opening of navigation foot up to 271,879 tons of anthracite and 1,426,457 tons of soft coal, a gain over last year of 74,046 tons of the former and 310,003 tons of the latter. The byproduct plants are making every effort to market coke, but stock piles are steadily increasing.

ST. LOUIS

Unusual shortage of high-grade domestic coals. Oversupply of steam sizes. Conditions show improvement in Mount Olive and Standard fields. Car shortage severe in places. Coal shortage more apparent daily.

The local domestic situation shows considerable improvement. The tendency seems to be entirely for Carterville, and all retailers are sold up for thirty days on this coal. Orders for anthracite and smokeless are also good. There is, however, little anthracite, and no smokeless is coming in.

The Carterville situation is most serious. Some mines are sold up on the lump size for the month of August and are taking only a limited quantity of lump business for September. Practically all mines are sold up in the Carterville district for July, and more than half are not taking orders for August delivery. The egg size seems a little easier, but mines are sold ahead on that. Nut is troublesome and screenings have blocked everything out. This is causing the local dealer to push the other grades of coal, preferably Mount Olive. The situation in the Carterville field is a peculiar one. The mines have worked but two or three days a week, and the days that they decide to run the railroads fail to deliver equipment. The car shortage is beginning to be severely felt.

Similar conditions prevail in the Du Quoin field. A better tonnage of this coal is coming into the St. Louis market than has moved in here in over three years. The railroad fuel tonnage out of both of these fields has shown considerable improvement the past week.

The Mt. Olive situation is normal. Steam sizes bother the operators some, but it is not so serious in this field as in others. A better tonnage of this coal is moving to the St. Louis market, but the steam tonnage and a large portion of the domestic tonnage is moving north and northwest, with a fairly good steam tonnage to Kansas City.

The Standard field presents the same old difficulty, that of not having a market for anything, although the demand for domestic sizes appears to be just a little better than last week. This means that the condition of the steam market is serious, and screenings got down to as low as $1.10. The country business on domestic sizes shows considerable improvement, but in a general way the Standard field has not as yet begun to come into its own.

A careful survey of the entire situation presents the fact that there is going to be a serious coal shortage in the St. Louis district on the higher grade coals.

The local haulers association contemplates asking 25c. a ton more for hauling, and there is considerable feeling over this on the part of the dealers who have their hauling done, because they feel that coal prices ought to be increased accordingly. Dealers who own their own equipment, however, do not think the price of coal should be advanced. It appears like a freeze-out for the dealers who haven't their own teams.

Coal and Coke Securities

New York Stock Exchange Closing Quotations July 21, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	150	154
Burns Brothers, Pfd	(BB)	110	115
Central Coak & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	49½	51
Colorado Fuel & Iron, Pfd	(CF)	105	125
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	38	39½
Elk Horn Coal, Pfd	(EH)	....	47½
Island Creek Coal, Com	(ICR)	39	....
Island Creek Coal, Pfd	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	63	....
New Central Coal of West Va	(NCC)	5	....
Pittsburgh Coal, Com	(PC)	67¾	68
Pittsburgh Coal, Pfd	(PC)	94	97
Pond Creek Coal	(PD)	19	19½
Virginia Iron, Coal & Coke	(VK)	64	68

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	97	....
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	75½	....
Colorado Fuel & Iron, Gen. 5s, 1943	90½	92
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	76½	78
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	88
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	96	....
Kanawha & Hocking Coal & Coke, 1st 6s, 1917	99½	101
Lehigh Valley Coal, 1st Gtd. 5s, 1933	79½	....
Lehigh Valley Coal, Gtd. 1st. Red. to 4½, 1913	90	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	80½	....
Pleasant Valley Coal, 1st S. F., 5s, 1928	83½	....
Pocahontas Coal & Coke, Joint 4s, 1941	84½	87
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	98	....
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	....	80½
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	90½	93
Tenn. Coal, Iron & R. R., Gen. 5s, 1951	87	....
Utah Fuel, 1st Sinking Fund 5s, 1931	55	70
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	85½	85½
Virginia Iron, Coal & Coke 1st 5s, 1949	....	....

COAL AGE

Volume 16 New York, July 31, 1919 Number 5

Facts About the Coal Shortage

By R. Dawson Hall

MISAPPREHENSION seems to have arisen in regard to the coal shortage, and relative to the attitude of the coal operators thereto. The public has heard that the National Coal Association, Dr. H. A. Garfield, former fuel administrator, and C. E. Lesher, statistician for the United States Geological Survey, have declared there is a coal shortage in prospect and that everybody should lay in his coal now. Yet the public finds that when some of the people, who use anthracite, go to buy coal they have to wait their turn, for hard coal is not being produced as fast as it is being sold.

They conclude, therefore, quite naturally, that the three aforesaid parties are engaged in a conspiracy to cause a stampede and raise the price of coal. They cannot understand—who could?—why there is any need to press the buying of coal when the producer is unable for months at a time to supply what is ordered. Now, as a matter of fact the old-line anthracite companies are not urging anyone to buy coal. They were doing so most vigorously a few months ago, when the mines were working part time, but not now. The National Coal Association, which is the body that has been predicting the shortage, does not include any anthracite operators, and its interests lie not in the sale of anthracite but of bituminous coal. The anthracite operators should not be blamed for the failure of the public, natural enough in its way, to differentiate between the association and the representatives of the anthracite industry.

The anthracite operators believe that if the public is stampeded, prices for hard coal will go up, and the independent operator who puts up his price whenever the demand permits will get the benefit. The small retailer may do the same. The old-line companies will keep their prices at the announced circular, while the independents and retailers will reap the harvest. The small boys will have rung the bell of higher prices and skipped out, and the offenseless but less nimble old-line company will remain to face the ire of the householder.

Consequently, the big anthracite corporations are keeping quiet about a possible domestic anthracite shortage, which may or may not occur, but which, if it is to come, no amount of publicity at this hour can possibly avert. However, the talk about coal shortage is helping the anthracite operators to get rid of their steam sizes of hard coal which, until lately, have been in such small demand that they had to be stocked.

The bituminous coal market is in a different condition. The best of steam coal is hard to get, though the mines that produce that grade are working steadily. The public is showing a wonderful discrimination. It requires that its coal give a large number of thermal units per pound of fuel. Unfortunately, there are big states and sections of states that do not produce coal of high thermal value. This is not a matter of coal preparation; it is a matter of natural coal quality. The coal may have little ash and a small percentage of pyrite, but it may still be an inferior coal because it has too much volatile matter.

It is necessary that this coal of inferior heat-giving quality—the coal of western Kentucky, Illinois, Indiana and Iowa—be mined if the needed amount of coal is to be produced yearly. These coal-producing areas and some others are not now as busy as they should be. This fact has exercised all those who know anything about the coal industry. If they do not get to work soon the shortage will be of almost unexampled severity. Even if they do work full time there will be a shortage, for stocks are low, men are scarce and growing scarcer, due to the migration to Europe, while railroad cars are in short supply and apt to become still harder to obtain.

The Railroad Administration has restricted the number of man-shifts a month that may be expended in car repairs. Consequently, the long lines of cars seen along the sidetracks will not represent transportation possibilities unless the Administration soon modifies its restrictive rules and permits these cars to be repaired.

For these reasons, a shortage of bituminous coal is to be expected. Already the best of bituminous steam coals cannot be bought on the open market. The whole output of these grades of bituminous coal has been contracted for. Soon the inferior grades of soft coal will be in like demand, but till they are it is best to publish the prospective shortage broadcast, for in so doing the demand is stimulated and the shortage made less severe.

The work of mining a year's supply of coal cannot be done by the miners in a month, any more than the work of reaching Chicago can be done by the Broadway Limited in two hours unless the engineers at the throttle have kept that flyer steadily pounding the rails in the eighteen hours prior thereto.

Selection of an Electric System*

By Terrell Croft
St. Louis, Mo.

SYNOPSIS—*Formulas and examples of their application as applied to the electrical problems incident to mine installations are here given. It is highly important for the management to know just what results to expect before electrical installation begins.*

A THREE-WIRE, 125-250-volt, direct-current system for mine service is illustrated diagrammatically in Fig. 1. A pressure of 250 volts is obtained from outside conductors for power and mine-locomotive service. The lighting feeders are operated three-wire 125-250 volts, while the lighting branches are two-wire 125 volts. This system provides a pressure of 250 volts for power and one of 125 volts across the lamps. It should be understood that a pressure of 125 volts (more or less) is more economical and satisfactory for incandescent lighting than a higher or lower voltage. A three-wire generator may be used as shown, one machine satisfying the requirements for both lighting and power.

Substations are used in mining practice where it is necessary to convert alternating current to direct current or where it is necessary to step down a high alternating transmission voltage to a low alternating distribution voltage. Where it is necessary merely to lower an alternating voltage, then only transformers are required at the substation, which may, where the

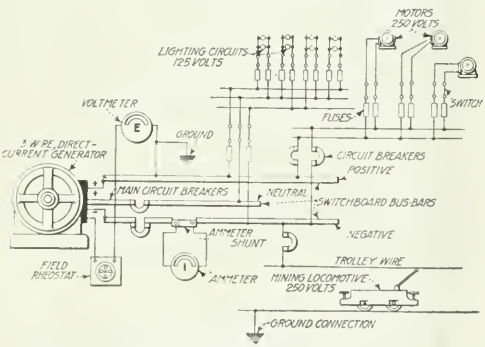


FIG. 1. TYPICAL CONNECTION DIAGRAM 125-250 VOLT DIRECT-CURRENT SYSTEM

power handled is small, comprise merely a transformer on a pole. Where the power handled is considerable, a more elaborate transformer substation may be required. It may consist of a building to house the transformers and of suitable lightning protection and switching equipment and a switchboard to carry the metering instruments. Outdoor substations, which may be for large amounts of power and high voltages, are frequently used now. For converting alternating to direct current, a substation containing a motor-generator or a converter with its transformers is necessary.

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Underground substations are often desirable economically where the workings cover a considerable area. They comprise an underground room which should, preferably, be lined with cement or brick and should be roofed to render it clean and dry. Such substations should be located as near as is feasible to the center of the then existing underground load. The high-tension alternating-current feeders supplying the station comprise suitably armored and insulated cables which may be carried in the shafts, entries or tunnels or down specially prepared boreholes from the surface direct to

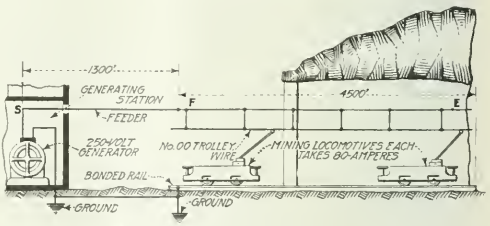


FIG. 2. EXAMPLE IN DETERMINATION OF ELECTRIC HAULAGE CONDUCTORS

the substation location. In underground substations, a good construction is to support the wiring on suitable insulators carried on a pipe framework near the ceiling of the station room. Usually it is not desirable to carry conductors in conduits in the floor of an underground substation.

A switchboard for a typical motor-generator mine substation is shown diagrammatically in Fig. 3. This shows a surface substation equipment. It does not, however, differ essentially from that which would be used in an underground substation except that the ordinary underground installation would have fewer panels.

The three requirements which any conductor for the transmission or distribution of electrical energy should satisfy may be stated thus: The wire should be selected of such a size (a) *that it will convey the electrical energy to the location where it is to be utilized without an excessive loss in potential, that is, without excessive* $I \times R$ *voltage drop;* (b) *that the current will not heat it to a temperature which will injure the insulation of the wire or originate a fire, and* (c) *that the cost due to the power loss (the* $I^2 \times R$ *watts loss) in the wire caused by the current being forced through the resistance will not be excessive.* A conductor may satisfy one of these three conditions and not satisfy the other two. Hence, as a general proposition, it is always desirable to examine the conductor size selected for any given condition from the three different standpoints outlined above.

The safe current-carrying capacity of wires should also be considered when designing circuits. A conductor may have ample cross-sectional area and convey current a given distance with a sufficiently small drop in voltage but yet may be so small that it will overheat. After a wire has been selected with reference to voltage drop, the National Electrical Code safe current-carrying-capacity table (Table I) should be consulted. If the wire first selected is not large enough to safely

TABLE I. CURRENT-CARRYING CAPACITY OF BARE COPPER CONDUCTORS USED IN MINES

(Bureau of Mines Technical Paper No. 138, "Suggested Safety Rules for Installing and Using Electrical Equipment in Bituminous Coal Mines," by H. H. Clark and C. M. Means)

Size of Conductor, B. & S. Gage	Current Capacity, Amperes	Size of Conductor, Circular Mills	Current Capacity, Amperes	Size of Conductor, Circular Mills	Current Capacity, Amperes
10	80	250,000	690	750,000	1,520
8	105	300,000	790	800,000	1,590
6	145	350,000	880	850,000	1,660
4	210	400,000	965	900,000	1,730
2	280	450,000	1,050	950,000	1,800
1	320	500,000	1,140	1,000,000	1,870
0	375	550,000	1,215	. . . .	. . .
00	335	600,000	1,285	. . . .	. . .
000	525	650,000	1,370	. . . .	. . .
0000	615	700,000	1,450	. . . . .	. . .

carry the current in accordance with the value specified by the code table, a wire which is, on this basis, large enough should be used. Bureau of Standards Circular No. 23, "Standardization of Electrical Practice in Mines," states: "The table of carrying capacities of the National Electrical Code should be followed where practicable."

The allowable voltage drop in circuits is usually taken as about from 1 to 3 per cent. for incandescent lighting circuits and from 5 to 10 per cent. for motor circuits. That is, on a 110-volt incandescent lighting circuit the allowable drop should not exceed 3 volts, while on a 220-volt motor circuit the allowable drop should not exceed 22 volts.

The power loss in any circuit, either alternating or direct current, may, assuming that 11 ohms is the resistance of a circular mil foot of copper conductor, be computed by using one of the following formulas:

For any conductor

(1) $P = 11 \times I^2 \times L/circ.mils$ (watts)

Wherein

P = Power loss in conductor in watts;
I^2 = Current in amperes in conductor;
L = Length of conductor in feet;
$Circ.mils$ = Area of conductor in circ.mils.

For a two-wire circuit, direct-current or single-phase alternating,

(2) $P = 22 \times I^2 \times L/circ.mils$ (watts)

For a three-wire, three-phase circuit, assuming balanced current,

(3) $P = 33 \times I^2 \times L$ $circ.mils$ (watts)

P = Power in watts lost in circuit;
I = Current in amperes which flows in each of the wires of the circuit;
L = Length (one way) of circuit;
$Circ.mils$ = Cross-sectional area of each of the wires in circ.mils.

The foregoing formulas can be used only when all of the wires of the line are of the same size.

The calculation of a two-wire, direct-current circuit is effected by means of the following formula:

(4) $Circ.mils = 22 \times I \times L \ V$

Wherein

V = Allowable drop in circuit;
I = Current in amperes which will flow in circuit;
L = Length one way or single distance to load center of circuit, in feet;
$Circ.mils$ = Cross-sectional area of the conductor in circ.mils.

Example—If it is required to transmit 25 hp. 2000 ft. with a voltage of 250 at the generator and 220 at the motor, the current required $= I = (25 \times 746) \div 220 = 85$ amp. Then, circ.mils $= (22 \times 85 \times 2000) \div 30 = 124{,}700$. Two naught or 3/0 wire is indicated. With 00 wire, having a resistance of 0.078 ohm per 100 ft. or 0.312 ohm for the line, the drop in voltage will be $0.312 \times 85 = 26.5$ volts.

Calculations of three-wire, direct-current circuits are made with the formula which is used for computing two-wire, direct-current circuits. In a balanced three-wire circuit no current flows in the neutral wire. In making wiring calculations in practice for three-wire circuits, it is assumed that the circuit is balanced. Ascertain the current that will flow in the outside wires of the three-wire circuit and then use the two-wire, direct-current formula. The drop in voltage V in the formula is the drop in both the outside wires and is twice the drop between the receivers connected between the neutral and the outside wire. Obviously V can be twice as great for a three-wire circuit as for the equivalent two-wire circuit. The neutral wire, if unfused, should be the same size as each of the outside wires in order to conform to National Electrical Code requirements. But if properly fused it may be smaller. If

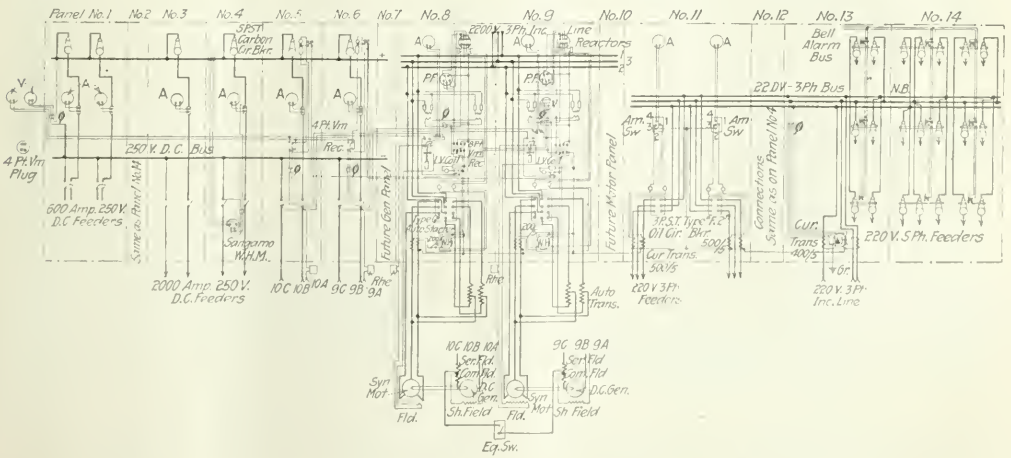


FIG. 3. DIAGRAM OF TYPICAL SYNCHRONOUS-MOTOR-GENERATOR SUBSTATION SWITCHBOARD

the neutral is permanently grounded no fuse is permitted in it, in which case it must be the same size as the outers. Grounding of the neutral is required by the National Code except for private plants where the pressure does not exceed 550 volts. This is, however, usually desirable in any case.

The allowable voltage drop in trolley-wire-and-feeder circuits is usually taken at from 15 to 20 per cent., while 25 per cent. may be permissible. A 50 per cent. drop might be allowed when the loaded trip is being accelerated from one of the farthest entries which is not used frequently. There are, however, mines where the voltage drop is over 75 to 80 per cent. when loaded trips are being started from the inside parting. Such conditions represent extremely poor practice. Such drops of potential are doubtless responsible for more trouble due to burnouts of motors and control equipment than any other condition around a mine.

The current required by the locomotives to take a trip up a certain grade is independent of the voltage on the trolley wire. This means that the same current is required to take a trip up a grade with 50 volts on the trolley wire as would be required if 250 volts were available. However, the effect of the low voltage is to reduce the speed so that the time required to ascend a certain grade is much longer with the reduced voltage. It results in excessive overheating of the motors. It not only reduces their life, but may cause frequent burnouts.

In estimating the current required by mining locomotives it is usually sufficient to base computations on 60 per cent. of the total current to be used, assuming that all of the receivers are developing simultaneously their rated outputs. That is, a demand factor of 60 per cent. is assumed. The average mine locomotive, when operated at between 20 and 25 per cent. adhesion on a 250-volt circuit with the motors in parallel, requires about 30 amp. per ton for gathering locomotives and about 25 amp. per ton for main-haulage locomotives. When operated on a 500-volt circuit, the current taken will be one-half as great.

The resistance of steel rails varies with the chemical composition of the steel. Sulphur-manganese content, particularly manganese, tends to change the resistance materially. The resistance of the steel rail will vary from about 8 to 15 times that of a copper section of the same area and at the same temperature. That is, the "rail to copper ratio" varies between 8: 1 and 15: 1. For the steel rails used in mine haulage the ratio is about 12: 1.

To calculate the equivalent circular mils of copper corresponding to any given weight of rail in pounds per yard for any rail to copper ratio, multiply the weight of the rail in pounds per yard by the constant corresponding to this ratio as determined by the composition of the steel. Such constants are given in Table V. In another table (Table IV) presented herewith these equivalents have been computed for rails of different weights and for different "rail to copper ratios."[1]

The distance L in the trolley-wire formulas is the actual distance to the load, if the load is concentrated at one point. If, as would be the case where a number of locomotives are shifting along the track, the load is uniformly distributed, then L would be taken as equal to one-half the length of the line.

In computing the wire size required for trolley and feeder, where the steel-rail return circuit conditions are not definitely known, it may be assumed that the track-return resistance is equal to the trolley resistance. This is the most economical condition (Ohio Brass Co.) for the transmission of power using the track return. Table

[1]The area of a steel rail in square inches is equal to about one-tenth of the weight in pounds per yard. Hence, since the rails are designated by the weight in pounds per yard, the approximate area can be calculated readily. The resistance of steel rails, including the ordinary bonding that exists in mines, is about 12½ times as great as the same area of copper. A square inch of copper contains 1,270,000 circ.mils. From this it is evident that a square inch of steel rail in a mine will have approximately the same resistance as a section of copper having an area of 100,000 circ.mils. Then to find the equivalent copper section of any weight of rail it is only necessary to add together the areas of the two rails and allow 100,000 circ.mil copper for each square inch section. The result, although approximate, will be sufficiently accurate for practical computations. In other words, the copper equivalent of a steel rail in circular mils is approximately ten thousand times its weight in pounds per yard on the basis of a 12 : 1 ratio.

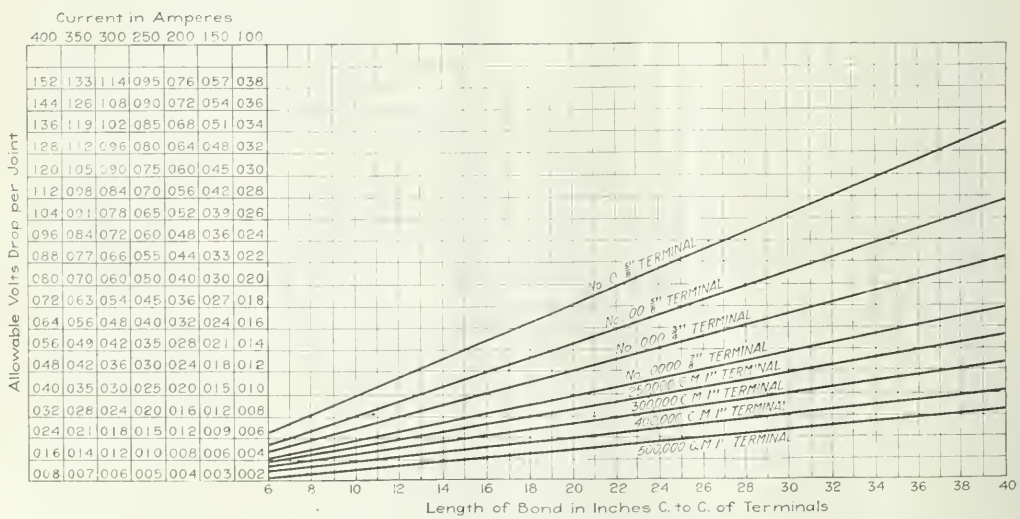


FIG. 4. GRAPH FOR FINDING LENGTH AND SIZE OF RAIL BOND REQUIRED TO PROVIDE A GIVEN VOLTAGE DROP PER JOINT (OHIO BRASS COMPANY)

TABLE II. VOLTAGE DROP IN TROLLEY WIRES, FEEDERS AND TRACK
(Ohio Brass Co.)
Two-wire system; 250-volts at mine entrance; track resistance equal to trolley-wire and feeder resistance; 100 amp. in circuit.

Distance in Mine in Feet	Volts Loss: One 4-0 Trolley Only	Volts Loss: One 4-0 Trolley and One 4-0 Feeder	Volts Loss: One 4-0 Trolley and Two 4-0 Feeders	Volts Between Track and Trolley: One 4-0 Trolley Only	Volts Between Track and Trolley: One 4-0 Trolley and One 4-0 Feeder	Volts Between Track and Trolley: One 4-0 Trolley and Two 4-0 Feeders
1,000	10	5	3	240	245	247
2,000	19	10	6	231	240	244
3,000	29	14	10	221	236	240
4,000	39	19	13	211	231	237
5,000	49	24	16	201	226	234
6,000	59	29	20	191	221	230
7,000	68	34	23	182	216	227
8,000	78	39	26	172	211	224
9,000	88	44	29	162	206	221
10,000	98	49	33	152	201	217
12,000	117	59	39	133	191	211
15,000	146	73	49	104	177	201

II is based on this assumption. In computing, the formula $Circ.mils = 22 \times L \times I \div V$ can be used.

Example—What size of feeder should be used for the haulage installation diagrammed in Fig. 2? The trolley wire is No. 00 copper and the length of track to be served is 4500 ft. The distance from the generating station to the nearest end of the track is 1300 ft. The trolley wire will be fed from the feeder at equidistantly spaced locations. Two mine locomotives, each of which requires a current of 80 amp., are to be operated. The total allowable drop is 10 per cent. of the receiver voltage. *Solution*—Allowable drop is $0.10 \times 250 = 25$ volts. The total current is $80 + 80 = 160$ amp. The load center would be taken as one-half of 4500, or 2250 ft. from the feeding end of the track. Hence, the distance L for substitution in the equation will be: 1300 ft. + 2250 ft. = 3550 ft. Then substituting in the equation, thus:

(5) $Circ.mils = 22 \times L \times I \div V = 22 \times 3550 \times 160 \div 25 = 499{,}840$

Therefore, theoretically a 499,840-circ-mil cable should be used from S to F. From F to the end of the run E a smaller cable can be employed because the No. 00 trolley wire, which has an area of 133,200 circ.mils, is connected in parallel with the feeder. Therefore, the feeder from F to E should, theoretically, have an area of 499,840 — 133,200 = 366,640 circ.mils. In practice a 500,000-circ.mil feeder would, probably, be used from S to F and a 400,000 circ.-mil cable from F to E. The conductor sizes in this problem work out rather large because the distances involved are relatively great. Furthermore, a drop of only 10 per cent. has been assumed. In practice, a No. 0000 trolley wire would be used instead of the No. 00 wire shown and the size of the feeder from F to E would then be decreased accordingly.

To find voltage loss at any other current divide current in amperes by 100 and multiply the result by the voltage loss in the table.

Example—What will be the voltage between the trolley wire and the track at a point 3000 ft. from the mine entrance in a mine where there are installed a 4-0 trolley and one 4-0 feeder. Current is 500 amp.; track resistance is assumed to equal trolley-wire-and-feeder resistance. *Solution*—Volts loss with 4-0 trolley and 4-0 feeder at 3000 ft. = 11 volts, 500 amp. ÷ 100 = 5; $5 \times 14 = 70$ = volts loss. 250 volts at mine entrance — 70 volts loss = 180 volts between trolley and track.

To find loss in a mine using 3-0 trolley or feeder, multiply voltage loss in Table II by 1.261. To find loss in mine using 2-0 trolley or feeder, multiply voltage loss in Table II by 1.587.

Example—What will be the voltage in a mine using 3-0 trolley and two 3-0 feeders, at a point 5000 ft. from the mine entrance, the current being 100 amp. *Solution*—Look in Table II and find under "One 4-0 Trolley and Two 4-0 Feeders" and opposite 5000 ft. the loss to be 16 volts. Multiply 16 by 1.261, which gives 20 volts. 250 volts — 20 volts = 230 volts.[2]

An empirical formula sometimes used for computing trolley-and-feeder-wire sizes is:

(6) $Circ.mils = 14 \times L \times I \div V$ (circ.mils)

Wherein

$Circ.mils$ = Area in circ.mils of conductor required;
L = Single distance in feet; that is, length of line from supply point to load center;
V = Allowable drop in volts.

This formula is based on the assumption that the rails and ground make contact at places. The rail-return circuit may have a very low resistance. The constant "14" is used instead of the usual constant "11" to allow something for track resistance.

In computing the wire size for trolley and feeder where the steel-rail conditions are definitely known the first step is to compute the voltage drop which will occur in the rails with the assumed load current flowing. Allow the remainder of the permissible drop for the feeder and trolley combined. Then compute with the formula $Circ.mils = 11 \times L \times I \div V$ the area required for combined feeder and trolley. Now from the area thus obtained, subtract the cross-section of the trolley to obtain the circular-mil cross-section of the feeder.

Example—What size trolley wire should be used for a ten-ton locomotive for a main-haulage system where the distance from the substation (which is located at the mouth of the mine) to the parting is 2000 ft. and 40-lb. rails are used. The voltage is 250. *Solution*—The copper equivalent is taken from Table IV for a 40-lb. rail as 424,000 circ.mils on the basis of a 12:1 ratio. Then the equivalent copper section of two rails is $2 \times 424{,}000 = 848{,}000$. The current at full load on the basis of 10 amp. per ton is 350 amp. Assuming a maximum drop of 20 per cent. it is $0.20 \times 250 = 50$ volts. Now first ascertain the drop in the rails, thus:

(7) $V = (11 \times D \times I) \div Circ.mils = (11 \times 2000 \times 350) \div 848{,}000 = 9.1$ *volts*

[2] To find current taken by a 250-volt motor, multiply the horsepower by 3. To find current taken by a 500-volt motor, multiply the horsepower by 1½.

TABLE III. AREAS AND RESISTANCES OF STEEL RAILS IN OHMS AT 75 DEG. F., NO JOINTS

Weight of Rail, Lb per Yd	Actual Area, Sq.In.	Actual Area, Circ. Mils	Resistance per Mile: 8 to 1 Ratio	Resistance per Mile: 12 to 1 Ratio	Resistance per 1000 Ft: 8 to 1 Ratio	Resistance per 1000 Ft: 12 to 1 Ratio
16	1.57	1,986,200	0.2223	0.3345	0.0421	0.0634
20	1.96	2,494,700	0.1799	0.2683	0.0341	0.0508
25	2.45	3,119,300	0.1447	0.2150	0.0274	0.0407
30	2.94	3,743,500	0.1208	0.1789	0.0228	0.0338
35	3.43	4,367,700	0.1018	0.1513	0.0193	0.0268
40	3.92	4,978,300	0.0912	0.1340	0.0173	0.0254
45	4.42	5,627,700	0.0792	0.1191	0.0150	0.0226
50	4.90	6,238,800	0.0714	0.1071	0.0135	0.0203
60	5.88	7,486,600	0.01596	0.0892	0.0113	0.0169
70	6.86	8,734,400	0.01531	0.0766	0.0097	0.0145
75	7.35	9,230,900	0.01478	0.0719	0.0091	0.0136
80	7.84	9,982,100	0.0447	0.0670	0.0085	0.0127
90	8.82	11,229,900	0.0398	0.0596	0.0075	0.0113
100	9.80	12,477,700	0.0375	0.0537	0.0071	0.0111

(This table is based on General Electric Co. data. The values are for a mile or a thousand feet of single continuous rail. They are not for a mile or a thousand feet of track.)

Therefore, the balance of the allowable drop which will occur in the trolley wire is 50 — 9.1 = 40.9 volts. Then the area of the trolley wire will be:

(8) $Circ.mils = (11 \times D \times I)/V = (11 \times 2000 \times 350)/40.9 = 188{,}000$ *circ.mils.*

This area lies between No. 000 and No. 0000 wire. But since a gathering locomotive will probably operate from the parting, the trolley wire should be No. 0000 (211,500 circ.mils) and no feeder will be required.

The following table (from the General Electric Co.) gives the copper-equivalent areas, in circular mils, of steel rails of various weights and resistivities; that is, of various weights and "rail to copper ratios." The ratio varies from about 8:1 to 15:1. For steel rails used in mine haulage the ratio is about 12:1.

TABLE IV. CIRCULAR MILS COPPER-EQUIVALENTS OF STEEL RAILS

Weight of Rail, Lb. per Yd.	Ratio of Resistance of Steel to Resistance of Copper — 8 to 1	10 to 1	12 to 1	13 to 1	14 to 1	15 to 1
12	190,988	152,850	127,323	117,529	109,134	101,858
16	254,646	209,925	169,764	156,706	145,512	135,811
20	318,308	254,805	212,206	195,882	181,890	169,764
25	398,886	318,595	265,257	244,853	227,363	212,206
30	477,463	382,515	318,309	293,823	272,836	254,647
35	557,040	445,735	371,360	342,794	318,308	297,088
40	636,618	509,910	424,412	391,764	363,780	339,528
45	716,196	572,930	477,463	440,735	409,253	381,968
50	795,773	636,618	530,515	489,705	454,725	424,410
60	954,928	763,942	636,618	587,646	545,670	509,292
70	1,114,083	891,260	742,721	685,587	636,615	594,174
75	1,193,660	954,927	795,773	734,558	682,087	636,615
80	1,273,238	1,018,589	848,825	783,528	727,560	697,056
90	1,432,393	1,145,913	954,928	881,469	818,505	763,938
100	1,591,546	1,273,236	1,061,030	979,410	939,450	848,820

The area in square inches of the cross-section of a rail is approximately one-tenth of its weight in pounds per yard, and its copper equivalent in circ.mils is approximately 10,000 times its weight in pounds per yard at the 12:1 ratio.

To obtain the circular mil copper equivalent of any steel rail, multiply its weight, in pounds per yard, by the proper constant in the following table. Select the constant to correspond to the "rail to copper ratio" of the steel rail in question.

TABLE V. CONSTANTS FOR COMPUTING CIRCULAR MIL COPPER EQUIVALENTS OF STEEL RAILS

Rail to Copper Ratio	Constant	Rail to Copper Ratio	Constant
8	15,900	12	10,600
9	14,130	13	9,800
10	12,740	14	9,090
11	11,580	15	8,490

The ampere capacity given in Table VI is the maximum current that the bond will carry continuously without showing an appreciable rise in temperature when the bond is installed on the rail where it will be exposed to the air. If concealed by joint plate, only a slight increase in temperature will be shown as concealed bonds are usually of short length and the heat will be dissipated rapidly through the terminals into the rail. Load currents of two or three times the values given can be carried for short periods without injurious heating (General Electric Co.).

TABLE VI. RESISTANCE OF BONDS IN OHMS AND SAFE CARRYING CAPACITY IN AMPERES

Size of Conductor	Diameter of Terminal in Inches	Resistance per Inch of Conductor at 75 Deg. F	Ampere Capacity
1/0	½	0.00000829	210
2/0	⅝	0.00000657	265
3/0	¾	0.00000521	335
4/0	⅞	0.00000414	425
250,000 cm.	1	0.00000350	500
300,000 cm.	1	0.00000275	600
350,000 cm.	1	0.00000250	700
400,000 cm.	1	0.00000219	800
450,000 cm.	1	0.00000196	900
500,000 cm.	1	0.00000175	1,000

One method of computing the proper size rail bond is that suggested by the Ohio Brass Co. The following example indicates its application.

Example—What size bond should be used in a mine having a haulage 3000 ft. long and using 30-ft., 30-lb. rails? The voltage is 250; the maximum current 300 amp. and the total allowable loss is about 15 per cent. *Solution*—The allowable loss is: $0.15 \times 250 = 37.5$ or say 38 volts. Allowing one-half of this in the track and one-half in the trolley, the allowable loss in each is 19 volts. The resistance of 3000 ft. of 30-lb. rail on the basis of a 12:1 ratio is (see Table III): $0.0338 \times 3 = 0.101$ ohm. Since there are two rails in parallel the total resistance of 3000 ft. of track will be $0.101 \div 2 = 0.051$ ohm. The voltage drop then in the 3000 ft. of track will be 0.051 ohm × 300 amp. = 15.3 volts. That is, the drop in both rails, assuming that they were continuous and without joints, would be 15 volts. Hence, the allowable loss in the joints is 19 — 15 = 4 volts. Since there are 100 joints, the allowable loss per joint is 0.04 volts. Since 300 amp. is to flow in the track the current in each rail will be 150 amp. Now, in the graph of Fig. 4 under the column headed "150 amp." the nearest value to 0.04 volts is 0.039. Following this horizontally it is found that this corresponds to a 30-in. No. 0 §-in. terminal bond or a 38-in. No. 00 §-in. bond. So any bond of this size and length or shorter is satisfactory for the joint. If the bond is to be carried around the fishplate, a longer one may be required. A shorter one will suffice when it is to be placed under the fishplate. If in the foregoing case the length of haulage had been 3500 ft., the drop in the continuous track would have been 17.1 volts and in the bonds 1.9 volts. The drop per joint would be $1.9 \div 100 = 0.019$ per joint. Under column headed "150 amp." 0.018 volts is the closest value. Following across horizontally it is found that any one of the following bonds will be satisfactory: 13 in. No. 0, § in.; 16 in. No. 00, § in.; 20-in. No. 000, ¾ in.; 26 in. No. 0000, ¾ in. In any case the shortest length feasible should be selected.

To calculate single-phase, alternating-current circuits where line reactance may be neglected the following formulas can be safely used in determining branch-circuit sizes and also for feeders and mains where the conductors are carried in conduit or are not long. Where the conductors are of considerable length the result given by the formula should be checked with the Mershon diagram (Fig. 5). The current may be found from this equation:

(9) $I = kw. \times 1000 \div E \times p.f.$ (amperes)

Wherein

I = Current in amperes in a single-phase circuit;
$Kw.$ = Kilowatts input of load;
E = Voltage of circuit;
$p.f.$ = Power factor of load.

To compute the wire size use the formula:

(10) $Circ.mils = 22 \times L \times I \div V$

Wherein all symbols have the same meanings as given above.

Example—Find the size of feeder to transmit 300 amp. with 15 per cent. allowable drop in voltage on a 250-volt circuit with a total distance of 3000 ft. from power

TABLE VII. FOR CALCULATING DROP IN ALTERNATING-CURRENT LINES WITH THE MERSHON DIAGRAM OF FIG. 5
[60 CYCLES]

Size of Wire (Circ. Mils) and B. & S. Gage	Safe Carrying Capacity, N. E. C. Rubber In.	Safe Carrying Capacity, N. E. C. Other In.	Resistance-volts in 1000 Ft. of Line (2000 Ft. of Wire) for 1 Amp. (The Values in This Column Are Really the Resistances of 2000 Ft. of Conductor at 75 Deg. F.)	Reactance-volts in 1000 ft. of line (2000 ft. of wire) for 1 amp. at 7200 alternations per minute (60 cycles per second) for the distance given in inches between centers of conductors. (The values in these columns are really the reactances of 2000 ft. of conductor)													
				½	1	2	3	4	5	6	8	9	12	18	24	30	36	48	96
14– 4,107	15	20	5.06	0.138	0.178	0.218	0.220	0.233	0.244	0.252	. . .	0.271	0.284	0.302	. . . .	. . . .	. . . .	. . . .	. . . .
12– 6,530	20	25	3.18	0.127	0.159	0.190	0.210	0.223	0.233	0.241	. . .	0.260	0.273	0.292	. . . .	. . . .	. . . .	. . . .	. . . .
10– 10,803	25	30	2.00	0.116	0.148	0.180	0.199	0.212	0.223	0.221	0.244	0.249	0.262	0.281	. . . .	. . . .	. . . .	0.326	0.358
8– 16,510	35	50	1.26	0.106	0.138	0.169	0.188	0.201	0.212	0.220	0.233	0.238	0.252	0.270	0.284	0.293	0.302	0.315	0.347
6– 26,250	50	70	0.790	0.095	0.127	0.158	0.178	0.190	0.210	0.209	0.222	0.228	0.241	0.260	0.272	0.283	0.291	0.305	0.337
4– 41,740	70	90	0.498	0.085	0.117	0.149	0.176	0.180	0.190	0.199	0.211	0.217	0.230	0.249	0.262	0.272	0.281	0.294	0.326
2– 66,370	90	125	0.312	0.074	0.106	0.138	0.156	0.169	0.180	0.188	0.194	0.206	0.220	0.238	0.252	0.262	0.270	0.277	0.309
1– 83,690	100	150	0.248	0.068	0.101	0.132	0.151	0.164	0.174	0.183	0.190	0.201	0.214	0.233	0.246	0.256	0.265	0.273	0.305
0–105,500	125	200	0.196	0.063	0.095	0.127	0.145	0.159	0.169	0.177	0.184	0.196	0.209	0.228	0.241	0.251	0.259	0.267	0.299
2/0–133,100	150	225	0.156	0.057	0.090	0.121	0.140	0.153	0.164	0.172	0.179	0.190	0.204	0.222	0.236	0.246	0.254	0.262	0.294
3/0–167,800	175	275	0.122	0.052	0.085	0.116	0.135	0.148	0.158	0.167	0.173	0.185	0.199	0.217	0.230	0.241	0.249	0.255	0.287
4/0–211,600	225	325	0.098	0.046	0.079	0.111	0.130	0.143	0.153	0.161	0.168	0.180	0.193	0.212	0.225	0.235	0.244	0.251	0.283
250,000	235	250	0.085	. . . .	0.075	0.106	0.125	0.139	0.148	0.157	0.164	0.175	0.189	0.207	0.220	. . . .	. . . .	. . . .	. . . .
300,000	275	400	0.075	. . . .	0.071	0.103	0.120	0.134	0.144	0.153	0.160	0.171	0.185	0.203	0.217	. . . .	. . . .	0.242	0.274
350,000	300	450	0.061	. . . .	0.067	0.099	0.118	0.128	0.141	0.149	0.157	0.168	0.182	0.200	0.213	. . . .	. . . .	. . . .	. . . .
400,000	325	500	0.052	. . . .	0.064	0.096	0.114	0.127	0.138	0.146	0.154	0.165	0.178	0.197	0.209	. . . .	. . . .	0.237	0.269
500,000	400	600	0.042	. . . .	. . . .	0.090	0.109	0.122	0.133	0.141	0.148	0.160	0.172	0.192	0.202	. . . .	. . . .	0.231	0.263
600,000	450	680	0.035	. . . .	. . . .	0.087	0.106	0.118	0.128	0.137	0.143	0.155	0.169	0.187	0.200	. . . .	. . . .	0.226	0.258
700,000	500	760	0.030	. . . .	. . . .	0.083	0.102	0.114	0.125	0.133	0.141	0.152	0.165	0.184	0.197	. . . .	. . . .	0.223	0.255
800,000	550	840	0.026	. . . .	. . . .	0.080	0.099	0.112	0.122	0.130	0.138	0.148	0.162	0.181	0.194	. . . .	. . . .	0.220	0.252
900,000	600	920	0.024	. . . .	. . . .	0.077	0.096	0.109	0.119	0.127	0.135	0.146	0.159	0.178	0.191	. . . .	. . . .	0.218	0.250
1,000,000	650	1,000	0.022	. . . .	. . . .	0.075	0.094	0.106	0.117	0.125	0.132	0.144	0.158	0.176	0.188	. . . .	. . . .	0.215	0.247

[1] For other frequencies the reactance will be in direct proportion to the frequency.

house to center of distribution. *Solution*—The allowable voltage drop is $0.15 \times 250 = 37.5$. Then substitute in the equation: $Circ.mils = 22 \times L \times I / V = 22 \times 3000 \times 300/37.5 = 528{,}000$ *circ.mils*. The nearest standard size to 528,000 circ.mils is 500,000, which would be used. A 500,000 circ.mil conductor with rubber insulation has a safe current-carrying capacity of 400 amp. Hence it is ample for the 300 amp. of this problem.

The calculations of a single-phase branch which feeds from a three-phase circuit are made in the same way as are those for any other single-phase circuit. However, it should be recognized that if the branch is connected between one of the three phase-wires and the neutral the voltage imposed on the branch circuit will be $0.58 \times$ the voltage across any two wires of the three-phase circuit.

To calculate a three-phase, three-wire, alternating-current circuit where line reactance can be neglected, the following formulas can be used. The limitations for this method are the same as those outlined elsewhere for single-phase circuits. As with the single-phase equation, the Mershon diagram (Fig. 5) should be used on circuits of considerable length for checking the results obtained. Where the current is not known it may be obtained with the equation:

(11) $I_3 = Kw. \times 1000/E \times p.f. \times 1.73 =$
$I_3 = Kw. \times 580/E \times p.f.$ (Amperes)

Wherein I_3 = the current in each of the three wires of a balanced three-phase, three-wire circuit. The other symbols have the same significance as in the preceding formula. Then when the current is known compute the wire size thus:

(12) $Circ.mils. = 11 \times I_3 \times L \times 1.73/V =$
$Circ.mils = 19 \times I_3 \times L/V$

wherein the notation is the same as outlined in this and in preceding paragraphs.

How to Use the Mershon Diagram.—By means of Table VII calculate the resistance-volts and reactance-volts in the line, and find what per cent. each is of the e.m.f. delivered at the end of the line. Starting from the point on the chart (Fig. 5) where the vertical line corresponding with power factor of the load intersects the smallest circle, lay off in per cent. the resistance e.m.f. horizontally and to the right; from the point thus

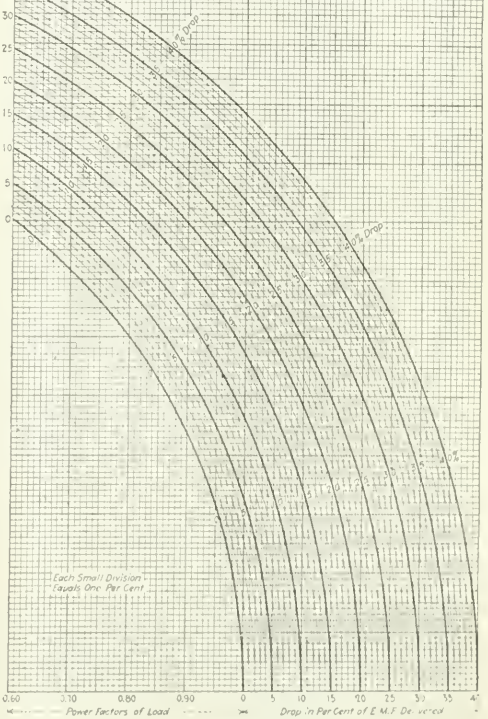


FIG. 5. THE MERSHON DIAGRAM

TABLE VIII. APPLICATION OF ALTERNATING-CURRENT LIGHTING PROTECTORS (WESTINGHOUSE ELECTRIC CO.)

General Class	Type	Max. Volts	Station Capacity	Usual Application	Remarks
Carborundum block	MP	400 750	Unlimited	Outdoors on line for protection of low-voltage motor installations	A low-priced arrester giving good protection on low-voltage circuits
Non-arcing-metal cylinder	C	1,250 2,500	200 kw. (or higher if more than 2 miles from station)	Outdoors on line and for transformer protection	Maximum protection (within limits of station capacity), possible in low-priced arresters
Non-arcing-metal cylinder with series resistance (single-pole)	CR	2,500	Unlimited	Same as type C	Similar to type C but with resistance; for use at higher station capacities. Single-pole only.
Non-arcing-metal cylinder with series resistance (double-pole)	G	2,500	Unlimited	Same as type C	Similar to type CR multiple
Cupped-disk gap	W	6,600 13,200	Unlimited	Outdoors for transformer protection	Similar to type CR but for higher voltages
Graded-shunt resistance	S	3,500 7,000 11,000 13,200	2,000 kw.	Indoors for apparatus. Outdoors for transformers	Greater protection than foregoing. A low equivalent arrester suitable for small stations or extra good protection of transformers
Graded-shunt resistance	L.E.	2,000 to 39,000	Unlimited	Same as type S	Same as type S except for larger stations and higher voltages
Electrolytic or aluminum cell	AK	2,000 to 145,500	Unlimited	Same as types S and L. E.	Maximum protection possible in present state of the art. Should be used in all cases of high voltage and at all voltages where conditions are severe or importance of protection is considered above cost

obtained lay off upward in per cent. the reactance e.m.f. The circle on which the last point falls gives the drop in per cent. of the e.m.f. delivered at the end of the line. Every tenth circle arc is marked with the per cent. drop to which it corresponds.

Example—What will be the performance of a 00 three-phase, 60-cycle line, 24-in. spacing, 63,000 ft. long when delivering 500 kw. at 5737 volts and 85 p.f.? *Solution*—Voltage to neutral each wire $=5740 \div 1.73 = 3317$. Current per wire $= 500 \times 1000 \div 3 \times 3317 \times 0.85 = 59.1$ amp. The resistance drop is $0.078 \times 58.1 \times 63 = 290$ volts, or $290 \div 3316 = 8.7$ per cent. The reactance drop is $0.118 \times 59.1 \times 63 = 439$ volts, or $439 \div 3317 = 13.2$ per cent. On the diagram follow 85 per cent. vertically to the 0 curve, thence horizontally 8.7 squares and vertically 13.2 squares gives 14.5 per cent., or say 15 per cent. total drop in voltage. The total voltage drop indicated is $5737 \times 0.15 = 860$ volts and the generator voltage required is 6597 volts. The line power loss is $3 \times 59.1 \times 290 \times 1000 = 51.4$ kw. $= 51.4 \div 500 = 10.3$ per cent.

Example—What is the performance of a 0 single-phase, 60-cycle line, 18-in. spacing, 10,000 ft. long when delivering 250 kw. at 2000 volts and 0.80 p.f.? *Solution*—The current is $250 \times 1000 \div 2000 \times 0.80 = 156.2$ amp. From Table VII the line reactance is 0.228 $\times$ 10 and the voltage drop from this is $0.228 \times 10 \times 156.2 = 356.3$ volts or 17.8 per cent. due to reactance alone. The line resistance is 0.196×10 and the voltage drop from this is $0.196 \times 10 \times 156.2 = 306.3$ volts or 15.2 per cent. due to resistance alone. On the diagram follow 0.80 p.f. vertically to the 0 curve then 90 horizontally a distance equal to 15.3 per cent., then rise vertically a distance corresponding to 17.8 per cent. and the circular arc of 23 is reached, indicating a 23 per cent. drop in terms of receiver voltage, or 23 per cent. of 2000 volts $=$ 460 volts. The generator voltage is 2460 and the line drop is 18.7 per cent. The line power loss $= 306.3 \times 156.2 \div 1000 = 47.9$ kw.

Co-operation Between Byproduct Coke Ovens and Gas Works

Serious problems, claiming the attention of many in Great Britain who deal with fuel, are the conservation of coal supplies and the economical production of heat, light and power. It cannot be said that the most efficient use is being made of the gas obtained by the carbonization of coal in coke ovens. The future development of the coking industry will probably be in two main directions: (1) Coke-oven plants will become large heat, light and power producers, or (2) large centers of chemical activity.

Notwithstanding extravagant claims of electrical engineers, the best and most economical way of treating coal for the production of heat, light and power is by carbonizing the coal and subsequently recovering gas, coke and byproducts in the modern byproduct coke oven. And just as the byproduct coke oven is the ideal carbonizing system, so also it should be agreed that existing gas works are the best and most efficient distribution agencies. There should be the closest coöperation between the gas and the coke industries. The universal use of coke-oven gas (recommended by gas authorities) could be advised only where the circumstances of geographical position, availability of supply and the necessity of gas works (as an extension to carbonizing plants) justified its serious consideration.

Experience has demonstrated that coke-oven gas can be made as suitable as any retort gas for any purpose whatever. There should not be any fear that a suitable illuminating power could not be maintained. The greatest difficulty might be, perhaps, the difficulty of maintaining a constant supply. It has been considered that the possibility of miners' strikes might effectuallly prevent any extension of the use of coke-oven gas; but it should be remembered that gas works themselves are liable to that disability. It is a question of stocks, and the same remedy is available to both.

Coal gas at present offers the best and most economical medium for the supply of energy in the form of heat, light and power. To maintain that power in the future, gas must be supplied at the lowest possible price. Those gas companies favorably situated in the vicinity of coking plants and able to procure a supply of suitable gas therefrom are provided with a means of crushing electrical competition for many years to come. There is no question but that, generally speaking, coke-oven proprietors can afford and are willing to sell their surplus gas at a much lower figure than any gas works would consider; in many cases it can be bought for less than half what it costs to produce it in a gas works. On the Continent and in America, coke-oven gas has been carried distances of 100 miles, so that there should be no hesitation in accepting contracts up to 50 miles.

Any considerable extension in the use of coke-oven gas in the direction indicated would almost render unnecessary the great central power and heat distributing centers of which so much is heard and which would entail an enormous outlay to develop.

Depletion and Depreciation of Coal-Mining Properties*

By D. C. Burdick
Sturgis, Ky.

SYNOPSIS—*Much attention has recently been given to depletion and depreciation charges against coal operation. An equitable distribution is sometimes difficult to secure, but charges should be graduated and of such an amount that the total investment may be extinguished when the property is worked out.*

THE subject of depreciation of coal properties has probably received more attention and discussion in the last two years than ever before in the history of coal mining. This subject has been brought to the attention of the operator, more especially the small operator, through regulation of prices by the United States Fuel Administration during the war. We may well consider this as one of the benefits of the war, as it has brought to attention the great necessity of properly accounting the cost of a ton of coal mined and loaded on a railroad car for shipment.

Depreciation and depletion have been given small attention in the past in computation of cost simply from the fact that the operator did not sign a check in payment thereof, no thought being given as to how he was to dispose of the amount standing on his books against property plant and equipment at the time when his mine was exhausted and further income from the investment had ceased. Now the problem is, How shall we properly dispose of the property investment?

Probably the most comprehensive method of explaining my views on the subject is to theoretically invest in a coal mine and carry the depreciation and depletion through to the end of the operation. The first procedure, of course, is the purchase of the minerals, and for complete handling I shall consider that in purchasing the minerals it is also necessary to purchase the surface.

Mineral Rights and Plant Site

For example, I shall assume a tract containing 500 acres and presume the price paid to be $200 per acre for the coal and surface, presuming the surface to be average farm land and valued for this purpose at $100 per acre. On this basis the minerals will cost $100 per acre. On this acreage a plant site must be selected, which I shall assume will require 20 acres. I now arrive at the value of minerals and real estate to be depleted, by the following:

500 acres coal @ $100 per acre	$50,000
20 acres plant site @ $100 per acre	2,000
Total to be depleted	$52,000

Assuming the amount of recoverable coal from this tract to be 5000 tons per acre, we find that we have 2,500,000 tons of coal to be mined; and assuming the life of the mine or the time required to remove the coal to be 20 years, I find the average yearly output to be 125,000 tons.

I also find, by dividing the cost of the minerals and plant site by the recoverable tonnage, that it will take 2.08 cents per ton to wipe out the investment during the life of the mine. Please bear in mind this charge for depletion of minerals and plant site. This should be credited to reserve for depletion and should not be confused with depreciation of plant and equipment. The simple method of handling this depletion would be to charge 2.08 cents for every ton of coal mined during the life of the mine to the cost of the coal, crediting the proper reserve. However, it may be desirable to graduate the charge for depletion, charging a higher rate during the earlier operation of the mine when other operating costs are low on account of the accessibility of the coal to the mine opening.

Assuming the graduated method is desirable, I submit the following table of graduations, allowing the first year of operation for development:

Years Development	Mined, Tons	Depletion Rate Cents per Ton	Total Depletion
2	125,000	4.17	$5,212.50
3	125,000	3.95	4,937.50
4	125,000	3.73	4,662.50
5	135,000	3.51	4,387.50
6	125,000	3.27	4,112.50
7	125,000	3.07	3,837.50
8	125,000	2.85	3,562.50
9	125,000	2.63	3,287.50
10	125,000	2.41	3,012.50
11	125,000	2.19	2,737.50
12	125,000	1.97	2,187.50
13	125,000	1.53	1,912.50
14	125,000	1.31	1,637.50
15	125,000	1.09	1,362.50
16	125,000	.87	1,087.50
17	125,000	.65	812.50
18	125,000	.43	537.50
19	125,000	.21	262.50
20	125,000	Nothing	.. ..
Total	...	..	$52,012.50

The figures in this table are unverified, but they give an idea of how the graduated scale would work out. The graduating scale is arrived at approximately by doubling the average rate of depletion, using the amount thus obtained as a maximum rate; then divide this rate by the number of years of operation, exclusive of the development year, and reduce the rate each year by the amount thus obtained. In the present case the formula is: Average rate, 2.08 + cents per ton × 2 = 4.17 ÷ 19 years = 0.22, or the amount of reduction in rate each year.

This apparently takes care of the amount invested in minerals. At the beginning of this paper mention was made of the purchase of surface as well as the minerals. Assuming this surface has a marketable value of $100 per acre, we find that we have invested in this class of property, 500 acres of surface at $100 per acre = $50,000; less the 20 acres to be used for plant site at $100 per acre = $2000, leaving $48,000 invested in marketable farm land. It being assumed that this land may be rented or tilled to produce income to cover interest on the investment, therefore no depletion should be considered on this part of the investment as

*Paper presented before the Kentucky Mining Institute, Lexington, Ky., June 6, 1919.

it is assumed that the land can be sold at any time for $100 per acre.

The depreciation of plant and equipment is a more complex problem than that of depletion. There are four fundamental groupings of losses: Class A—Physical (these can be foreseen). (1) Wear and tear due to operation. (2) Those arising from the passage of time and exposure to the weather. Class B—Functional (these cannot be foreseen). (3) Obsolescence. (4) Inadequacy.

The losses falling under Class A require no explanation. Class B, Obsolesence, refers to loss of asset value due to the progress of invention, machinery being especially subject to this form of depreciation.

Inadequacy usually arises from the growth of a business. Presuming the plant and equipment necessary to mine the tract of 500 acres of coal to cost $150,000, and also presuming that the original plant and equipment and subsequent additions shall be maintained in good repair throughout the life of the mine, I would proceed to write off the original investment and subsequent additions in the following manner:

As a basis for the amount to be used for depreciation purposes charge 10 cents per ton each month for all coal mined during the month to expense and credit depreciation reserve. My reason for using a per-ton basis rather than a percentage of the value of the equipment is that it distributes the depreciation expense more evenly on the cost sheet and compensates for uneven running time. It might occur to some that buildings should receive a lower rate of depreciation than machinery and equipment on account of the usually longer life of a building. In this connection, however, it must be borne in mind that no matter what physical condition a mine building may be in at the time the coal is exhausted the building is of no further value other than salvage. This point is immaterial, however, from the fact that the operator may distribute the amount available for depreciation in any manner he sees fit.

I would suggest the plant and equipment be subdivided in a general way, say about as follows:

Mine Openings—Under this heading would be shown shafts, slopes, main entries, airways, etc.

Mine Buildings and Fixtures—Covers permanent structures.

Machinery—Covering engines, generators, pumps, boilers, etc.

Mine Equipment—Covering mining machines, motors, mine cars and the like.

Steel Rail—Covering all rail used in development of the mine and additional rail purchased during the life of the mine of 20 lb. weight or over, used in extension of main haulage roads. Rail lighter than 20 lb. per yard and commonly known as room rail, as well as all wooden rail and ties, should be charged to mine expenses as used.

Copper Wire—Covering all copper wire used in the original development of the mine and additional copper wire of 1/0 size and over purchased during life of the mine. Copper wire smaller than 1/0, as well as all fixtures for installing trolley wire and feeders, should be charged to mine expenses as used.

Live Stock—Horses, mules, etc.

Wire Ropes—Hoist and haulage ropes.

Miscellaneous Equipment—All appurtenances not covered in the foregoing.

My experience in handling short-life equipment such as live stock and wire rope is to depreciate it on a basis of probable life and charge replacements to property account and retirements, less salvage, to depreciation reserve. I have found that the average life of a mine mule is five years, therefore I charge to depreciation reserve at the rate of 20 per cent. per year on the capital invested in this class of equipment. When a loss occurs either from natural causes or accident, the value of the mule lost, less salvage, is charged to depreciation reserve and the replacement is charged to property account. In this manner the property account reflects the true value of the physical inventories of live stock.

Wire rope is handled in the same manner except due consideration should be given the life of the rope, for which there is no fixed standard, as its life is contingent on the service in which it is used; for example, a shaft rope would have considerably longer life than a rope used in a slope. There may be other items of short-life equipment which may be handled in a similar manner.

Equipment subject to obsolescence and inadequacy falling in Class B cannot be foreseen, and no special depreciation is considered. However, should the occasion demand that certain equipment be retired for reason of obsolescence or inadequacy, the value of the equipment retired, less salvage, should be charged to depreciation reserve and the replacement to property account.

I shall now proceed to distribute the original plant and equipment investment of $150,000 under the headings enumerated and carry the depreciation out for a period of one year.

Estimated tonnage mined in 12 months = 125,000 tons, and 125,000 × 10 cents per ton = $12,500, or the amount avilable for depreciation purposes.

First deducting the amount of depreciation to be set up for short-life equipment. Live stock, book value, $1500 at 20 per cent. per year = $300. Wire rope, based on five years' life as a shaft rope, book value $599 at 16⅔ per cent. per year = $100. Total available depreciation, $12,500. Less depreciation short-life equipment, $400. Leaves available $12,100 for the balance of the plant equipment to be prorated to value shown opposite each class of equipment.

Class of Equipment	Book Value	Reserve for Depreciation in One Year
Mine openings	$75,000	$6,133
Buildings and fixtures	25,000	2,043
Machinery	20,000	1,635
Equipment	13,000	1,064
Steel rail	5,000	408
Copper wire	5,000	408
Live stock	1,500	300
Wire rope	500	100
Miscellaneous equipment	5,000	409
Total	$150,000	$12,500

It will be noted from this statement that the original plant and equipment investment will be fully depreciated during a period of 12 years. This is conservative, however, as the additions to plant and equipment during the life of the mine, the obsolescence and inadequacy replacement, all of which must be taken care of, being at this time wholly unknown quantities, will no doubt necessitate the continuance of the depreciation reserve well along toward the exhaustion of the mine. If, however, conditions are such in later years that the rate of depreciation may be reduced, it no doubt would be a

happy state of affairs for the operator since it would come at a time when his other operating costs were high on account of accessible coal being a long distance from the mine opening.

Up to this point it will be noted no mention or allowances have been made for salvage at the time the mine is worked out and abandoned. There is no doubt that a considerable salvage will be realized and it may be the desire of some to consider this.

As a conservative allowance for salvage I would rate steel rail, trolley wire and brass, trolley equipment and other copper wire at 50 per cent. of their original cost and all other shipments at 10 per cent. However, in the case of trolley wire and steel rails, inasmuch as additions to this class of equipment are charged to property account up to the last period of operation, a considerable portion of the salvage value may be required to entirely clear the books of the capital investment.

Investment in commissary and dwellings, from which a rental is received, should be handled under the head of real estate, and depreciation on this class of property should be charged to the real estate department expenses. No earnings or expenses in connection with this department should be considered in computation of the cost of coal.

In concluding this paper I might say that the object I had in mind in its preparation was to express my ideas in as few words as possible with no thought for technical terms, but to create discussion in order to bring out the views of others.

Low-Sulphur Coal in Illinois*

By Gilbert H. Cady
Illinois State Geological Survey, Urbana, Illinois

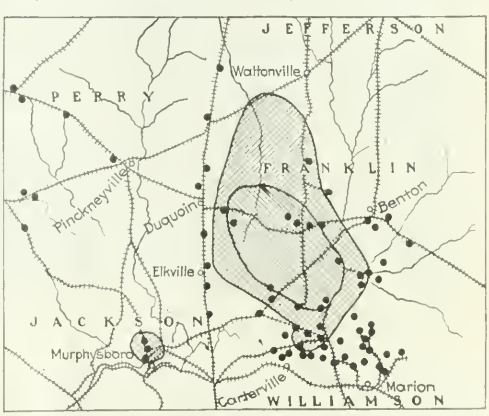
Extensive sampling of coal in Illinois during the past 10 or 12 years by the State Geological Survey, in coöperation with various organizations, such as the U. S. Bureau of Mines, the University of Illinois and the Illinois Coöperative Mining Investigations, has made possible the delineation of two areas of low-sulphur coal in the southern part of Illinois. The sulphur content is less than 1.25 per cent., so that if otherwise suitable these coals can be employed for metallurgical uses and for the manufacture of water-gas and retort gas. One of these areas is small and lies in Jackson County, near Murphysboro, the other is much larger and includes a large port of the famous Franklin County field.

A small area of No. 2, or Murphysboro, coal has been worked for many years near the town of Murphysboro, Jackson County, Illinois. In two mines, at least, the coal has a sulphur content of less than 1.25 per cent. It is doubtful, however, whether this field will ever be a source of large tonnage as the total area underlain by low-sulphur coal in workable thickness is probably less than 15 square miles (24.14 sq.km.), and a large part of it has already been worked out.

The location of the area of low-sulphur coal in the Franklin County field is shown in the accompanying map. The small area underlain by the Murphysboro low-sulphur coal is shown near the town of that name in the central part of Jackson County. The larger area lies in the west side of Franklin County, extending also about 6 miles (9.65 km.) south into Williamson County, about 4 miles (6.43 km.) west into northern Jackson and western Perry County, and northward an undetermined distance into Jefferson County. All but the northern limit of the area is fairly well defined by sampling in numerous mines. The inner cross-lined area is underlain by coal having less than 1 per cent. sulphur, the outer boundary surrounding the area underlain by coal having less than 1.25 per cent. sulphur.

The coal mined in the district is No. 6 or Herrin coal, commonly known as the Carterville or Franklin County coal. The bed has a thickness varying from about 8 ft. (2.4 m.) on the border of the low sulphur area up to more than 10 ft. (3 m.) in the general portion, locally having a thickness of 14 to 15 ft. (4.2 to 4.5 m.). The sulphur content, in general, decreases as the thickness of the coal increases.

Another peculiarity is the variation in the character of the roof that accompanies the variation in thickness. Near and beyond the border of the low-sulphur area there is a limestone cap-rock within about 25 ft. (7.6 m.) of the bed, but in the central part of the area the cap-rock is either absent or at a much greater height above the coal.[1] This relationship between the roof rock, the thickness of the coal, and the amount of



LOCATION OF LOW-SULPHUR COAL AREAS

sulphur present seems to hold consistently throughout the field. There is also a decrease in the interval between No. 6 and No. 5 coals and an increase in the interval between No. 6 and No. 9 coals operating geographically across Franklin County field the same as the decrease in the sulphur content. These stratigraphic variations accompanying the chemical variation make it possible to estimate roughly the character of the coal even from drill records and to determine the approximate extension of the low-sulphur field in areas not yet mined.

*Paper to be presented at the Chicago meeting of the American Institute of Mining Engineers, in September, 1919.

[1] G. H. Cady, Coal Resources of District VI: Illinois Coal Mining Investigations *Bulletin* 15, pp. 29-47, 1916.

A Rapid Unloading Machine

Machine Described Is Intended for Rapid Unloading of Granular Bulk Materials from a Ship's Hold and Finds Its Application in the Handling of Coal for Export and Bunkering

THE automatic unloader shown in the accompanying illustrations is intended for handling coal, ore and similar granular bulk material. It is built by the Wellman-Seaver-Morgan Co. of Cleveland, Ohio. Unique in design, it has proved to be one of the most successful devices for unloading cargoes from lake steamers that have ever been devised. Although of large proportions, the design has been simplified and the control perfected to such a point that the machine is the last word in delicacy of control and operation.

The unloader consists of a main framework mounted on trucks which travel along the runway rails located approximately as shown in Fig. 1. The main framework extends back to the rear of the runway over a temporary storage pile where the ore or other material can be discharged if desired. Between the front and rear runway space is provided for railroad tracks whereon cars are placed under the machines and loaded.

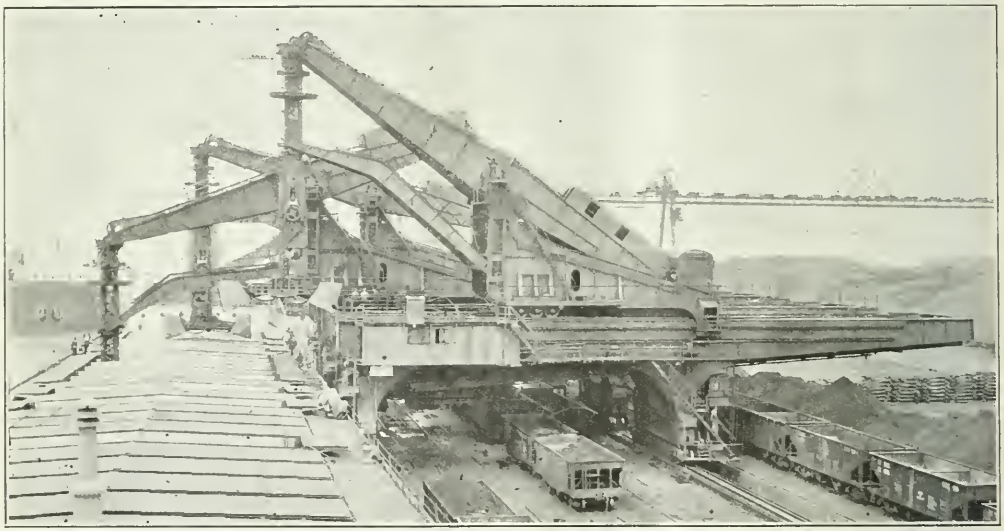


FIG. 1. UNLOADERS AT THE DOCKS OF THE UNITED STATES STEEL CORPORATION, CONNEAUT, OHIO

The girders of the main framework form a support for runway rails, on which a trolley travels. This trolley supports a balanced walking beam, from the outer end of which a stiff bucket leg depends. At the lower end of this leg is the bucket, which is operated by machinery located on the walking beam. All horizontal movements of the bucket are accomplished by means of moving the trolley backward and forward on the girders. The vertical movements of the bucket are accomplished by the operation of the walking beam. The forward portion of the beam being out of balance, the bucket descends by gravity as soon as the brakes of the hoisting mechanism are released.

The hoisting mechanism controlling this operation is located in the inclosed house at the rear end of the walking beam. Ropes from the winding drums of this mechanism pass around sheaves located in the rear end of the trolley and are anchored to the rear end of the walking beam.

In addition to the main parts of the machine which have been described there is also a receiving hopper located at the forward end of the main framework and between the main girders, provided for the purpose of receiving the material discharged from the bucket. The capacity of this hopper is about three full bucket loads, and its purpose is to act as a balancing point or temporary storage between the bucket and the cars or stockpile as the case may be. The bottom of the hopper is provided with outlet gates and the contents discharged as required into a larry, which runs on an auxiliary track suspended from the under side of the main girders.

The larry, after receiving its load from the main hopper, moves to a point such that its contents can be discharged either into the cars standing on the railroad tracks beneath the main span of the girders or into a temporary storage pile under the cantilever at the rear of the machines. The material so placed in this temporary stockpile cannot be reclaimed by means of these machines as their function is solely one of unloading the cargo from the ships.

Machines of this type have been made in two sizes, the smaller having a capacity of 10 tons and the larger size (such as is shown in Fig. 1) having a capacity of

17 tons in the bucket shells. The machine shown is electrically operated throughout and its speeds are regulated so as to operate through a complete cycle in about 50 seconds.

Some idea of the capacities of unloading attained by this method may be derived from a record which was made in Ashtabula by eight machines of this type having a capacity of 15 tons each, unloading seven boats having a total capacity of 70,000 tons in 22 hours actual time. At other points four machines working in boats having capacities up to 13,000 tons have unloaded these cargoes in about 3 hours, 25 minutes.

The operation of the machine is as follows: After the boat has been placed alongside the dock, the machine is moved opposite one of the hatches and the bucket is lowered through the hatch into the hold. After filling the bucket, the walking beam hoist mechanism is put in operation and the bucket hoisted out of the boat. At the same time the trolley is traversed backward so that the bucket is brought over the main hopper between the girders in the main framework, and its contents discharged into this hopper. The bucket is then immediately returned to the boat for another load.

The material in the main hopper is discharged into the larry, which has been brought to a point directly underneath the discharge gates of the hopper. The larry hopper is filled and the larry is moved to the desired discharge point and the gates are opened, discharging the hopper contents as required. The larry hopper is provided with scales so that the contents may be accurately weighed and recorded. In this way a car can be loaded to its allowable capacity and an accurate record kept of the amount of material so loaded, thus eliminating the necessity for the use of track scales.

If railroad cars are not available for immediate shipment, the larry is traversed to a position on the rear cantilever and its contents discharged into a temporary storage pile. From here the coal or ore is usually reclaimed for shipment or storage by means of a bridge located on the runway at the rear of the unloader.

Only two operators are required for the entire operation of one of these machines. One of the operators, whose station is in the bucket leg directly over the bucket shells, controls all of the motions of raising and lowering the bucket, of traversing the trolley back and forth, and moving the machine along the dock from one hatch to another. The second operator is stationed in a cab on the larry and from this station he controls the movement of the larry, the operation of its discharge gates, and the weighing of the material.

The bucket shells are each made of a single piece of plate formed to proper shape. These bucket shells are usually provided with manganese steel cutting lips so as to resist abrasion. The bucket shells themselves are carried on heavy cast steel arms mounted on rollers traveling in guides in the fixed portion of the lower end of the bucket leg. The position of the operator who controls the movements of the bucket, etc., as previously described is shown in Fig. 2. The view shows the bucket in operation in the hold of a modern ore carrier after most of the cargo has been removed and the balance has been scraped into position so as to be handled by the bucket.

The motor for operating as well as for closing the bucket is located in the machinery house at the back of the walking beam. Ropes from this bucket-closing mechanism are carried through the walking beam and the bucket leg and attached to a power drum directly over the operator. This power drum is geared to the closing chain drums, one of which is shown in Fig. 2. The bucket is opened by reversing the motor and the bucket shells are forced open by means of an opening chain located in the center of the bucket leg between the two closing chains.

In addition to the vertical movement, which is given to the bucket leg by means of the walking beam, it also has a motion of rotation around its vertical axis. This is accomplished by means of ropes attached to a segment on the bucket leg itself, the ropes being carried back in the walking beam to a rotating mechanism which is located adjacent to the bucket-closing mechanism. The bucket leg itself is carried on a roller bearing which is attached to the top end of the leg. This motion is introduced for the purpose of turning the bucket at right angles to the hatchway in order to secure as great a reach lengthwise of the boat as possible; thus the bucket is enabled to reach out under the hatches and

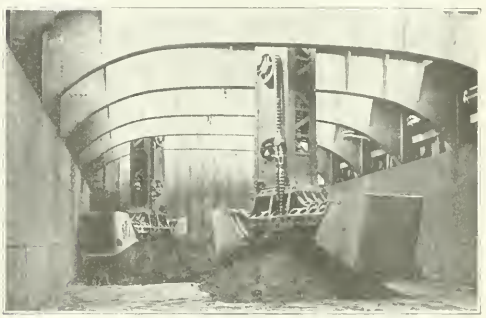


FIG. 2. UNLOADER LEG AND BUCKET AT WORK IN HOLD OF A MODERN BOAT

The leg is so mounted in the walking beam that it can rotate in a circle, allowing the bucket to reach out in all directions. These machines have often unloaded 97 per cent. of a cargo without the help of shovelers. The position of the operator who controls the movements of the bucket is shown above. The distance from point to point of the bucket shell when open is 21 feet.

remove ore which is not directly beneath the hatch opening. The distance from point to point of the bucket shells when open is approximately 21 feet.

The scale larry, into which the main hopper discharges, has a capacity of between 35 and 45 tons, and two larry loads are intended to constitute a full carload of ore. The discharge gates of the larry are suspended from the sides of the larry frame and operated by connecting rods which attach to cranks, also connected to the main larry frame. These gates are operated by means of a small motor which is carried at the rear of the larry. The gates are so arranged that all or a portion of the contents of the larry may be discharged. The hopper is suspended in the larry frame on scales so that its contents may be wholly or partially discharged and its weight be accurately recorded.

The mechanism for moving the larry back and forth on its track consists of winding drums upon which ropes are wound, the end of the rope being attached to the rear end of the cantilever on the main framework. The track is inclined and the larry is pulled up the incline by means of these ropes and descends by gravity.

As previously stated, these machines are usually electrically operated throughout. In some cases, however, machines of the same general type have been made to operate by steam and hydraulic cylinders, water being

supplied by means of a steam accumulator at a pressure of 1000 lb. per square inch.

The electrically operated machines are usually designed for 220-volt direct current. Alternating current is never used. The motors required for the equipment of one of these machines are as follows: Beam hoist, one 275-hp. motor; bucket closing, one 120-hp. motor; bucket rotating, one 25-hp. motor; trolley travel, one 120-hp. motor; hopper gates, one 100-hp. motor; longitudinal travel, one 100-hp. motor; larry travel, one 150-hp. motor; larry gates, one 40-hp. motor. The control equipment for these motors is of the magnetic switch type throughout, having master controllers in the operators' cabs in the bucket leg and on the larry.

Electric current is supplied to these machines by means of insulated conductor rails running the length of the main runways. The current is collected from these rails by means of pick-up shoes and distributed to the various portions of the machine. A similar collecting device is also employed for supplying the main current to the trolley. Conductor rails are attached to the main framework of the machine and the current collected from these rails by means of pick-up shoes attached to the trolley.

Among the advantages claimed by the makers for this machine are the following: The design is heavy; there is little to get out of order, resulting in low maintenance cost per ton of material handled. The control is accurate and positive, and manual labor is reduced to a minimum. The bucket is positively guided in passing through the hatches of ships, thus eliminating the danger of damage either to the boat or to the machines, arising from the use of rope-suspended buckets.

The operator travels with the bucket into the boat and can always see exactly what he is doing. The bucket is of large capacity, but is so suspended from the walking beam that the weight resting on the tank top of a boat is less than one-third of the weight of a rope-suspended bucket of equal capacity.

One particularly important consideration to be reckoned with is the extremely low cost obtainable with these machines. Records extending over long periods show unloading cost ranging from 2½ to 4½ cents per ton. This includes superintendence, labor, repairs and supplies on the machines, as well as the expense for power and light.

On account of the extreme reach of the bucket, it is possible for a machine of this type to discharge a much higher percentage of a ship's cargo than can be accomplished by ordinary rope-operated buckets. The bucket can be rotated at right angles to the hatch and reach out for ore which would be entirely inaccessible to an ordinary bucket. This unloader is not a combination machine. It is an unloader, pure and simple, and it does its work well.

IT IS OFTEN an advantage about a plant to have concrete harden quickly. The Bureau of Standards has developed a method whereby the rate at which concrete increases in strength with age is accelerated by the addition of small quantities of calcium chloride to the mixing water. Tests show that the best results are obtained when from 4 to 6 per cent. of this material—by weight—is added. While no deleterious effects on the durability of plain concrete thus treated have been indicated, on the other hand we are warned against the unrestricted use of this salt in reinforced concrete. Corrosion of ordinary reinforcing takes place in concrete treated with calcium chloride, where this concrete is exposed to weather or water.

Legal Department

NEGLIGENCE MUST CAUSE ACCIDENT TO BE ACTIONABLE—Even if defendant's mine foreman negligently directed plaintiff, a miner, to work on the right side of his room, that would not render defendant liable for injury to plaintiff disconnected with such order, and resulting from plaintiff's own act in mining coal almost across the face of his room, leaving a projection which he caused to fall by mining coal under it. (Texas Court of Civil Appeals Haney vs. Texas & Pacific Coal Co., 207 Southwestern Reporter, 375.)

KANSAS WORKMAN'S COMPENSATION ACT—Under the Kansas Workmen's Compensation Act, a miner who was ruptured while attempting to remove a rock which fell upon a fellow workman was not debarred to recover compensation for his suffering and diminished earning capacity merely because the injury was not so serious as to totally disable him for the first two weeks following the accident, nor because he can continue to earn as much as before the accident by undergoing pain and relying upon the friendly help of his fellow workmen. (Kansas Supreme Court, Raffaghelle vs. Russell, 176 Pacific Reporter, 640.)

CONTRIBUTORY NEGLIGENCE OF INJURED EMPLOYEE—Upon a derailment of cars in a mine, plaintiff, a triprider, refused to assist in replacing them on the track, and went to sleep at a point between the cars. A car went wild on an adjoining track, and some co-employee, evidently supposing that the car was on the track where plaintiff lay, called to him to "Look out." Plaintiff sprang from his position to the adjoining track and was injured by the car. Held that he could not recover from the company on the theory that he had been negligently placed in peril. (Alabama Supreme Court, Sanders vs. Alabama Co., 80 Southern Reporter, 360.)

INJURY TO CONVICT LABORER IN MINE—Where a prisoner in the custody of the State of Alabama was required to work in defendant's mine under some sort of an arrangement between the state and the company, the latter became liable for any injury to the convict directly attributable to negligence on the part of the company. But conscious violation of an established rule of the company designed to secure his and other workers' safety would preclude recovery of damages for his death, if resulting directly from such violation. On the other hand, a rule too impractical to be executed, or one habitually violated to the knowledge of the operator, is a nullity. These rules were lately laid down by the Alabama Supreme Court in a case in which a father sued for death of a minor struck by a tramcar while he was walking along a slope. (Murchison vs. Red Feather Coal Co., 80 Southern Reporter, 354.)

FORMATION OF COAL SALES CONTRACT—After negotiations for a sale of coal from plaintiff to defendant, plaintiff sent a formal contract to defendant in duplicate for execution. In neither the negotiations nor the contract was it stated whether the coal should be screened or mine run. Defendant signed the written contracts and returned one copy to plaintiff, but with a letter stating that it was defendant's understanding that screened coal would be delivered. Plaintiff promptly replied that the quotation was on run of mine coal, and requested statement whether the contract was accepted as written or not. Defendant did not reply. Under these circumstances it is held by the Georgia Court of Appeals in the case of South Atlantic Coal Co. vs. National Rosin Oil and Size Co., 97 Southeastern Reporter, 559, that there was no binding contract for a sale; the minds of the parties never having met on the particular kind of coal to be delivered under the proposed contract. The copy of the contract defendant returned to plaintiff signed must be read together with the accompanying letter, which constituted as much a part of the terms to which defendant agreed as if they had been stated in the proposed contract.

Gas Ignition at Alderson (Okla.) Mine Kills Fifteen Men

On Monday morning, June 30, an explosion occurred at Alderson, Okla., in the No. 5 mine of the Rock Island Coal and Mining Co. The gas ignition did not occur when the men were entering the mine, but at 11:15 a.m., when they had already been working for some length of time. It is interesting to note that no such ignition, unaccompanied by a violent explosion, has ever occurred before in the Oklahoma field. The explosion caused apparently the formation of a large amount of carbon monoxide, for none of the men who were killed struggled more than 15 yd. away from where they had been working. Some doubtless died from inhaling the flames. Several did not even move out of their working chambers, yet none of them were bruised by concussion, the ignition being of such a quiet nature that it could not in any real sense be termed an explosion. It did little or no damage to the walls or the roof of the mine. Another interesting matter was the marked localization of the ignition. It appears to have been confined to the area where standing gas existed.

The sweep of flame occurred on the third entry east, off the east slope, 4000 ft. away from the main shaft. Three theories are advanced as to the origin of the gas. One is that a mining machine cut into a "feeder." However, if it had, the men would have noticed the "bleed" long enough to warn them before the gas had escaped in sufficient quantity to cause a flare of such dimensions, as it attained, and the place would have shown traces of gas the following day. At least, that is the conclusion of State Mine Inspector Ed. Boyle. Another theory is that gas accumulated in the longwall working adjacent to slope No. 2. This is 68 ft. long and 15 ft. high. A third theory is that when a hole was bored from room 45, a tight room, to room 46, another tight room, and with the air none too good, the mixture exploded.

Some of the men were burned severely about their hands and faces, while several had no burns whatever. The rescue force of the United States Bureau of Mines at McAlester, which is under the direction of W. W. Fleming, was at the scene of action within half an hour after notification. The last body was brought to the surface shortly after 6 o'clock. T. O. Oglesby, resident mine superintendent. William Jones, mine superintendent, and Dr. O. W. Rice of Alderson took active part in recovering the bodies.

The investigating committee composed not only Chief Inspector Boyle, but J. J. Rutledge, the mining engineer of the United States Bureau of Mines in the Oklahoma district, Tom Scott, assistant state inspector for district No. 1; W. T. Williams, assistant state inspector for district No. 2, and Miller D. Hay, assistant inspector for district No. 3.

The men killed were: William Burns, American, 42, married; Andrew Braski, Pole, 39, married; Joe Volloc, American, 17, single; John Passetti, Italian, 42, single; John Bolden, Negro, 38, married; William Grisley, Lithuanian, 35, married, nine in family; Steve Kincaid, American, 41, single; Elmer "Babe" Booth, American, 25, single; Anstasio Soriano, Mexican, married; William Sherwood, American, 30, married; John Patrick, American, 40, single; John Cannon, American, 38, married; C. Harreral, Mexican, 37, married; Florentino Romirez, Mexican, 35, married; J. P. Roy, Negro, married.

"Babe" Booth, the only one found living, was brought to the bottom of the main shaft and later to the surface. He died at 11 p.m. on Monday, without regaining consciousness. Examination showed one lung burned away. With his death went all chance of explanation of the accident. There were 167 men working in the mine at the time of the disaster.

Gas Explosion at Carswell, W. Va.

Investigation shows that the explosion at the Carswell mine of the Houston Collieries Co., Carswell, near Kimball, McDowell County, W. Va., was confined to an extremely small area, where the air was charged with methane. The explosion occurred between 7 and 8 o'clock on Friday morning, July 18. There was a report in circulation that at least 30 miners had been killed and many others injured. There were only 50 men at work at the time of the explosion, and all but six of those in the mine when the explosion occurred were soon accounted for.

A rescue party was organized and succeeded in penetrating to the remote part of the mine in which the explosion happened. Five of the six bodies were recovered early in the afternoon, and the sixth body before nightfall. While the explosion was limited to the one room, in which the men were working, it was, of course, felt in all other parts of the mine, though it inflicted no injuries and did no damage at any other points in the workings.

The theory was first advanced and has since been confirmed by the Chief of the Department of Mines, W. J. Heatherman, that the explosion was caused by a local accumulation of gas in the room where the six men were working. The men who were killed as a result of this explosion are: M. T. Roberts, mine foreman, John Teens, John Tollay, Charles Chapman, Elbert Smith and Richard Kennedy, all miners, the last two named being colored men.

While the Carswell mine has a capacity of about 500 tons of coal a day and employs as many as 200 men when working at full strength, only 50 men were actually employed at the time of the accident. The Carswell mine is approached by a shaft and is one of the few mines of that character in the Pocahontas district. It operates in the No. 4 seam of the Pocahontas series.

This same mine was the scene of an explosion on May 27, 1916, when four men were instantly killed in an explosion at the face of the first entry, caused by a door being left open. The air current was thus diverted permitting methane to accumulate.

Advise Use of Plain Concrete

Some consulting engineers are advising the use of plain concrete in cases where reinforcing can as well be eliminated as not. Cases have been cited in recent bridge construction, for example, in which reinforcing was specified, where the bulk of such work could have been built without steel. The idea was expressed that a difference in design would have made the steel entirely unnecessary. Steel was during the war in such demand for essential war purposes that its conservative use in other lines, than bridgework, was often suggested. May there not be instances in concrete work about coal mines where steel could be omitted?

Quack Analyses

New Scheme Resorted to by Unscrupulous Coal Men to Boost Sale of Inferior Coal—Benefits of a Government Coal Inspection Bureau

By N. H. Seaburg
Boston, Mass.

Every upright citizen who has not only his own personal safety, but also that of the community, at heart sympathizes and supports to the best of his ability the war upon the quack medical practitioner wherever found. and it is the same in every profession or trade where quackery of one kind or another attaches itself barnacle-like to a sound and necessary activity in the world's economic structure.

Quackery is a persistent evil and, like weeds in a garden, must forever be kept after. It chokes and stunts the healthy growth of any industry or profession, besides bringing it into bad repute. While the most popular illustration of the undesirability and danger of quackery is in the medical profession, the countless industries of the country are also burdened with this leprous affliction. None is entirely immune, as its guises are innumerable.

Coal Industry Has Its Fakirs

The coal industry has its quacks, but up to the last few years it has managed exceedingly well in its weeding out of this deplorable element. However, since the general upheaval caused by the war, the industry has been over-run with a swarm of "get-rich-quick" enthusiasts whose sole ambition has been to make money while the sun of big profits was at the zenith. Like leeches, as soon as they have had their fill and the carcass becomes barren, they will hie themselves elsewhere unless they are compelled to do so sooner by the effective swishing of a long tail. The legitimate members of the trade should organize and put into use such a tail and keep it in continual action swatting this harmful kind of fly.

During the past several months the sledding of the quacks has been difficult, inasmuch as the buying public has refused to consider the stocking of coal at high price. Sales of coal have been confined almost exclusively to the best grade, but with the usual fertility of invention the quack found a way to circumvent this barrier. It was a simple matter. All that was necessary was to furnish the prospective customer with an alluring analysis of the coal to be delivered.

And such analyses as have been circulated! The plague has taken the form of the promotion literature which is today sweeping the country describing the opportunities in oil investments. The same flamboyant misstatements have been made, and in an equally reckless manner. The victims have been many. Curiously, too, there are those who have become firm converts to this method of buying coal. There are small consumers who never before realized what an analysis was. They had simply bought a certain kind of coal because the price was low and it burned as well as any they had purchased before. But now, since the quack has sown his seeds of misinformation, every Tom, Dick and Harry must have a coal running about 3 per cent. in ash and containing 15,000 B.t.u. Nothing else will be considered. Coals not having analyses similar to this requirement are tabooed as inferior and not worthy of notice.

While this attitude may appeal to the humor of the conversant coal man, it is far from a ridiculous situation. There is danger in it. If quacks are permitted to flood the trade with impossible and false analyses, it will not be long before they have created an impossible state of mind in the purchasing public. Unless the truth is told and the buyer convinced that he has been having a pipe-dream, there will be a demand for a grade of goods that cannot be delivered.

Honest Dealers Find Competition Hard

What opportunity and reception may a coal man with an honest analysis in his hand expect in competition with a quack? He may have one of the best coals in the country and yet the quack can always alter his analysis to suit the moment. The buyer will never know that the quack will ship a coal much inferior to that which would have been supplied by the honest coal man. as there are comparatively few buyers who resort to laboratory tests at their own expense. Of course, the quack is too canny to approach large consumers, knowing full well that he would soon be exposed. His prey is the small and less informed buyer where the chances of exposure are slight.

Every one knows how rapidly a palatable evil spreads, and the only hope of checking it lies in doing so before it has had too wide a circulation. Buying coal on the analysis basis is a somewhat new experience with most consumers today, and great danger exists in permitting the public to receive the usual infantile over-dose. Buyers do not realize that true analyses should be subjected to close study. A particularly attractive set of figures may not be suitable at all for a certain grade of work. and yet the uninformed buyer may think it represents the ideal fuel. Consumers must therefore be educated to a correct understanding of this method of buying, and the first and most essential thing to do is to protect them against the mischief of false analyses. This may be accomplished in two ways: either through individual action or through coöperation with the Government.

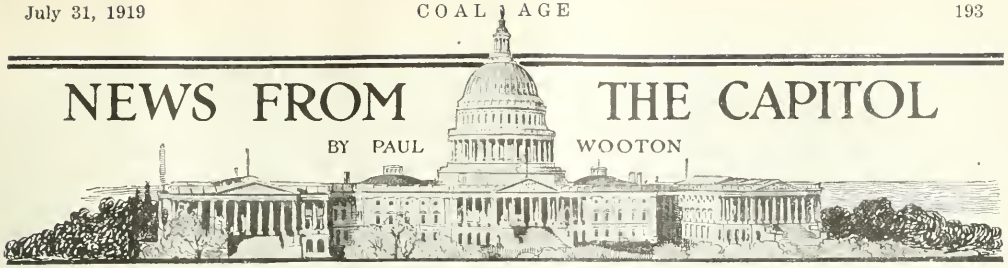
Bill Would Prevent Dishonesty

The bill which is soon to be introduced in the Senate and House providing for the establishment of a fuel inspection system through the Bureau of Mines should be thoughtfully considered. There is little doubt but that its provisions would be beneficial to the trade. There is everywhere evidence of the favor and confidence with which the consumers regard all coals classified in the present Navy standard list. The proposed bill is an extension of this system, except that the Government would certify different standards and see to it that they were maintained. The consumer would then have his choice and could depend upon securing at all times the quality of fuel that he purchased so long as the Government certified that the standard was being maintained by the mining company.

The reputable coal man who maintains a certain high standard for his coal is entitled to protection and recognition of his product. It is a distinct business asset to him, as well as an assurance to his customers of good coal. Under this Government fuel-inspection system both parties would be protected, and quack analyses would find difficult competition. In fact it is justifiable to suppose that it would mean the end of misleading analyses, a goal which all should desire.

NEWS FROM THE CAPITOL

BY PAUL WOOTON



Investigation of Coal Industry May Be Postponed for the Present

After sifting out some of the outstanding facts in the coal situation, the Committee on Rules of the House of Representatives apparently is more than willing to forego any detailed investigation of the industry. The committee recognizes that it is too late to attempt to save the situation this winter, even if there should be a situation to save. The committee also is of the opinion that if anything had been done in violation of the anti-trust laws, it is better at this time that the Department of Justice do the investigating and take such steps as are indicated by existing statutes.

While the committee apparently is of the opinion that present prices of coal are not radically out of line with the prices of other commodities, there is every reason to believe that any decided increase in prices would precipitate a complete investigation of the situation. The developments on the House side are having a bearing on the Senate probe, and it is probable that the proposed investigation will be postponed for the present.

Alleges Propaganda To Frighten Coal Users

One of the resolutions considered by the Rules Committee was that of Representative Huddleston, which alleges an organized propaganda to frighten consumers into the purchase at present prices. Mr. Huddleston is regarded by most members of the House as being extremely radical in many of his views, and no great importance is attached to his proposal. In fact, he advocates "a thoroughgoing system of price fixing, which would include not merely raw materials but all of the common necessaries of life."

The principal expert testimony given at the hearing was furnished by George H. Cushing, manager and director of the American Wholesale Coal Association, and E. W. Parker, representing the anthracite operators. Mr. Cushing attempted to show the committee that it was not possible to expect a successful combination of bituminous interests. He gave figures showing that supplies of undeveloped bituminous coal in the United States are too extensive and too widespread to permit of domination by any combination, especially when the Elkins amendment to the act to control commerce compels railroads to furnish cars and trackage. Any effort to buy up all the coal lands is made impossible by the cost of carrying them.

The committee had been told that prices of coal are now in excess of those fixed by the Fuel Administrator. Mr. Cushing gave figures showing that the greatest disparity of prices exists. In St. Louis, for instance, the same grade of coal is being sold at prices varying from $1.15 to $2.65. He showed that the railroad bids on the same grade of coal varied from $1.65 to $2.50.

Reorganization Plan of Bureau of Mines Calls for Two Main Branches

Taking advantage of the lessons in administrative organization which were taught by the war, Director Manning has put into effect a new form of organization in the Bureau of Mines. The Bureau is divided into two branches, one the investigations branch and the other the operations branch. F. G. Cottrell, who has been chief metallurgist of the Bureau, has been promoted to the position of assistant director and will be in charge of the investigations branch. F. J. Bailey, who has been chief clerk of the Bureau, has been placed in charge of the operations branch with the title of assistant to the director.

All research and technical control will be exercised through the investigations branch, while the non-technical work, administrative duties and dissemination of the results of the Bureau's activities will be handled by the operations branch.

Under the investigations branch comes the division of mineral technology, in charge of Dr. C. L. Parsons; the division of fuels, under the chief mechanical engineer, O. P. Hood; the division of mining, under the direction of George S. Rice, the chief mining engineer; the division of petroleum and natural gas, under the direction of J. O. Lewis, the chief petroleum technologist, and the division of experiment stations, under the direction of D. A. Lyon.

The operations branch has as its subdivisions the office of the chief clerk, which will be presided over by H. E. Meyer; the division of education and information, with T. T. Read in charge; government fuel yards and coal purchases, with C. S. Pope in charge; mine rescue cars and stations, with D. J. Parker in charge.

One of the important divisions is that of experiment stations. The stations under the direct charge of Mr. Lyon, with their respective directors, are as follows: Pittsburgh station, H. A. Holbrook; Urbana station, C. A. Herbert; Columbus station, R. T. Stull; Bartlesville station, W. P. Dykema; Minneapolis station, C. E. Julihn; Fairbanks station, J. A. Davis; Golden station, R. B. Moore; Salt Lake City station, Thomas Barley; Tucson station, C. E. Van Barneveld; San Francisco station, L. H. Duschak; Seattle station, F. K. Ovitz. A. E. Wells has been made assistant supervisor of stations.

F. G. Cottrell, chief metallurgist of the Bureau of Mines, will return to Washington from Europe the middle of August.

G. F. Tryon, who has been engaged in the statistical section of the General Staff during the war, has been appointed assistant to C. E. Lesher and will take charge of the compilation of certain coal statistics.

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IN THE troubles of the British mine operators, and in those of Canada, we of America can not find anything in which to rejoice but rather much that we may deplore and dread. When Germany drifted toward bolshevism, the authorities of our nation pointed out the danger that this spirit of hatred, this high-handedness and peculiar admixture of covetousness and idealism, would spread to America.

Much more have we to fear that the insanities of the British workingmen will spread to the United States and wreck our prosperity in just the same way as it bids fair to destroy that of the British Isles. Much sail spread to the winds may help us in our race with Great Britain, but the wind of an unruly Trades Unionism, while it may help us for a while may ultimately wreck our own craft as well as those against which we are racing.

* * *

The treasonable thought has entered into the mind of the British mine worker that in the strike he has a weapon that is more potent than the vote. He cares not who rules the duly appointed councils of the whole nation so that he rules the labor union. He feels that a few laboring men controlling the union can so disturb the economic status of the nation as to compel the majority to cravenly submit and obey. With utter disdain the miner casts aside the ballot box. Universal suffrage is to him a despised and broken thing, for he argues that he who fills the coal bin rules the world.

He is using his power not merely to secure wage increases which he might conceivably be considered justified in thinking were his due, but to enforce nationalization of his own and other industries, to shift part of the costs of industrial production onto the taxpayer, to secure the repeal of the Military Service Bill, to prohibit the use of the military in the maintenance of order and to compel the withdrawal of troops from Siberia.

* * *

MINORITIES are, it must be conceded, often right in their contentions, but even when that is true, and it certainly is not true of the British miner, that fact does not give the minority the right to refuse in concert to perform its economic duties and thus force the majority to its knees.

Unfortunately, Premier Lloyd George and Andrew Bonar Law know of but one cure for the demands of such minorities—compromise. The bandit is to be bought off with concessions. Like all bandits, he will return as before with the hope of new and larger booty. Tribute is the prolific mother of brigandage.

And yet, strange to say, the sop thrown to the mine worker, and the one which quieted him, was, after all, money and not a political concession. The miner who works by the ton is to get more pay per unit of product on the ground that he cannot mine as many tons in seven hours as he can in eight.

STRANGE to say, in the United States, in opposition to this claim that shorter time means shortage of product, the union avers that seven hours' work is as productive as a full working day; in fact six hours' work is said to be as effective as ten hours, and five days as fruitful as six. The British miner declares that this is not so

But Great Britain is not the United States, and we are obliged to admit that there is reason for contending that in Great Britain even two hours might be as effective as a full eight-hour day, for the British mine workers only average 0.89 of a ton per day where the average mine worker in the United States produces five tons. Surely the British miner could, therefore, speed up his work, especially as it seems that the contract miner even in the United States could readily produce more coal than he is doing; and he, at the present time, is hardly averaging six hours a day.

As for the mine worker of the United States who is paid by the day, it seems unlikely that he could or would do much more per hour than he is doing, but the dataller and especially the miner in Great Britain, could easily put his meager eight hours of work into less time if he would.

* * *

THERE was no purpose, therefore, in raising the British miner's tonnage rate when shortening his time, for mines could be shown in the United States where 20 tons a day is an ordinary day's loading and where 25 tons is not unusual. In these mines no machines are in use for assisting in the work of loading the coal. In Great Britain, however, there are an immense number of such loading devices; but the spirit of endeavor is lacking or large tonnages would result.

Let us assume that the mine worker of Great Britain is appeased for a while. Even the Tripolitan pirates, in the early part of the last century, were satisfied for a season with the tribute paid them by the British and French governments. Granted the mine workers are similarly pacified, the increase in the cost of coal, larger now than ever, will unsettle prices everywhere and the mine worker and all other industrial workers will be made restless by the greater cost of what they buy. Other strikes will then follow.

* * *

BRITISH mine workers are to receive considerably more than a day's work from other workers in return for each day's work the mine workers perform. This is bound to cause discontent. The other workmen of the United Kingdom will seek to redress the balance, and when others get larger wages the mine worker will again feel aggrieved. The craven solution of the British cabinet is no solution at all. It is a further step on the long and narrow road that leads to bankruptcy. Let us hope that the British people may find a way out of it and that we may not also be compelled to travel along that difficult highway.

"Get all you can" may be all right as a matter for the individual doing business with competitive conditions. Sometimes even that right has been questioned; but it certainly is not a good principle to be followed by a trust created in restraint of trade, whether that trust be an association of manufacturers or producers or a trade union.

Western Mining Villages

A TRIP to the Rocky Mountains from Wyoming down into Arizona would reveal that what we have been pleased to call "mining camps" are in most cases places of comfort and frequently places of beauty. The energy and resourcefulness of the Westerner is not readily subdued by the aridity of the climate, and his pretty villages bear tribute to his initiative and skill.

Everywhere there are good schools, far better than are provided in the Eastern mining sections. Good schooling is having its effect on the people, the quality of any one being largely determined by the early training he receives.

Earnings being large in Western villages, the automobile craze has swept them like an epidemic. In the towns of the Colorado Fuel and Iron Co., the corporation has already provided stalls for 250 automobiles. The company is about to build 39 more stalls, but that will not house all the cars, for the demand for accommodation continually grows. These stalls are occupied by the motor cars of miners. They do not use these automobiles to go to work, for the villages are close to the shafts and slopes of the company. They are purchased solely for pleasure.

At a mine in the heart of the Rockies, one man earned last year as a miner $5800. Several others paid taxes on $4000 and must have earned, therefore, about $5000. There is no lack of comfort in these towns, with their spacious amusement halls, large comfortable bathhouses, lawns, private and public baths, bowling alleys, pool tables, classrooms, reading rooms, ladies' parlors and what not.

Above all, there is the democratic Western spirit that breathes the air of friendship into the brick and stucco walls of these institutions. When asked if the average Western mine village does not excel the ordinary mine village in the East, it is better for the Easterner to look wise and say nothing, for there is nothing wise—and at the same time truthful—that he can say.

The demand of the day is that all things shall sell for less than the cost of production. American miners want to rent houses at a loss to the landlord and buy powder and coal below the expense of producing them. British miners want still more. They would have all coal sold below cost. Wheat is already sold to them and others at a loss to the state. The slogan remains to be written, but it may well run, "Let the children feast lustily on the savings of their ancestors."

Some Dangerous Conditions

NOBODY nowadays needs to be told that carelessness is the worst enemy with which the miner has to contend. Of all the mishaps, accidents and disasters that befall mines and miners, carelessness in one form or another is responsible for the vast majority.

It would seem that such a costly disaster as that occurring in the Baltimore Tunnel early in June would forcibly direct the attention of mining men to the dangers of "fooling with" powder or of handling it roughly, no matter how substantial may be its container. Familiarity may breed contempt, but a contempt of danger is by no means synonymous with bravery. It is rather the unmistakable mark—the brand—of one form of imbecility.

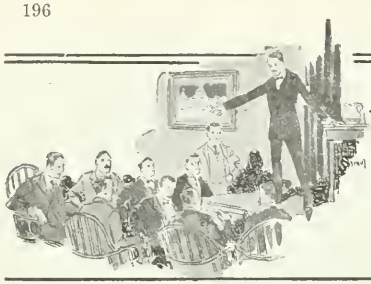
Coal Age is in receipt of an anonymous (probably it would be more correct to say an unsigned) letter from a mining town in one of the Southern states, telling of certain irregularities in the management of one particular operation. Of course, it is usually assumed that the communication to which the writer is afraid or unwilling to sign his name is unworthy of attention. On the other hand, a man may well heed the closed gate at a railroad crossing even though that gate does not display the name of the road that it guards, or he would do well to think at least twice before swallowing the contents of a vial bearing the red skull and crossbones, even though the label did not give the name or chemical symbol of the poison within the bottle. Similarly, may it not be wise to heed the warning of any man who gives notice of danger, even though for reasons all his own, which are possibly abundantly sufficient, he chooses to completely shroud his identity?

The letter in question tells of the resignation of a certified mine foreman and of the operation of the mine by an illiterate general foreman who, it says, was not a practical coal digger. It relates that this man and his brother, also a general foreman, attempted to take the examination but failed and came "back on duty, as usual, full of liquor." One of these men, a few days later, took a mule from the company stable and rode away to an illicit still in the mountains, returning with a supply of "moonshine," which he shared with the mine superintendent, who is a particular friend of his. While on this trip he left another uncertified man in charge to perform his duties, but this man passes at least as an up-to-date miner.

Now, 20 to 35 kegs of powder are daily handled in this mine by a motorman and triprider. This is thrown out of a car and piled up from 6 inches to 2 feet from the rail. Not infrequently the electric locomotive strikes and pushes aside or scatters one of these piles with possible spillage of the contents of some of the cans.

No comments on such management or methods of powder distribution are needed from *Coal Age* or any other source. We cannot vouch for the authenticity of the statements made but have no reason to doubt them. It matters little just what is the exact location of the mine in question. Drunken and incompetent officials and careless means and practices in handling explosives are not abnormal curiosities in the coal industry. Every practical mining man has seen both at some time or other. The fact remains that both should be eradicated, so far as possible. As our nameless friend puts it: "The miners here should thank their Almighty God that they still live. Every coal-mining man remembers the Wilkes-Barre explosion. He may soon hear of another at ———."

All evidence in the last four years has shown that Governmental control does not assure steady operation of industry. It has been seen that the public collectively is more spasmodic in buying than the public individually. The indecision of the herd may not extend to all individuals. Hence, with private ownership, some will always show a degree of activity in purchasing and building; but where, as in Government ownership, the judgment of the herd controls all action, no one can exercise his individuality.



WHAT THE ENGINEERING SOCIETIES ARE DOING

Rocky Mountain Institute Meets in Salt Lake City

By R. Dawson Hall

MOST vigorous among all the offshoots of the institute movement is one of the youngest of those institutions—that which has its home in the Rocky Mountains. Unlike the members in institutes held elsewhere, its constituents when they meet do not have anything to say about the difficulties of travel in the confines of the particular state in which they gather. As if it were the most natural thing to do, they assemble in numbers from many states. You meet them from Colorado, Wyoming, Utah and New Mexico. Perhaps some state has been overlooked, but if so the representation of that state was small or else it was not from the ranks of the mine executives.

The Utahans attended only the Salt Lake City session, but even most of these had a half day's ride to take, for there are no coal mines anywhere near the city. But distance does not deter a Westerner if he would foregather with his friends. However, as they come such distances, the gathering is naturally one of the leading men in the industry. All those present are the dominating factors in the fields from which they came; scattered fields they are, for the Rocky Mountain coal areas are not continuous like those of Pennsylvania, West Virginia, Illinois and Indiana. In the matter of magnificent distances between fields the Rocky Mountains resemble Kentucky more than any other institute area.

See Many Busy Mines in Rock Springs Basin

The members who left Denver for Salt Lake City on July 7 at 6 p.m. about filled a special car. They arrived in Cheynne, (pronounced Shi-Ann) Wyo., late in the evening and had some hours in which to explore the town. Late that night the train moved on over the Laramie range, arriving at Rock Springs, Wyo., about 8 a.m. There the members were met by a large deputation of mining men, for Rock Springs is one of the important mining centers of the West, the largest of the operating companies being the Union Pacific Coal Co., which has mines at Rock Springs, Reliance and Superior, not to mention many others in distant fields.

In the Rock Springs basin there are some 53 coal seams of which 12 or 13 run 5 ft. thick and over. The Cretaceous measures are remarkably productive, especially (at least at Rock Springs) the Mesa Verde formation. The party was loaded into automobiles, many of the members visiting the Rock Springs and Reliance plants of the Union Pacific, both producers of many years standing. The former, however, has recently had some important improvements which much interested the visitors. It was pleasing to note that at the Rock Springs plant the Union Pacific has two young women rewinding armatures. They are doing excellent work, which is really not remarkable, for is not the greater part of the winding of armatures at the electrical-machinery plants done by women?

Either directly, or by way of the plants mentioned, all the party finally arrived at the Winton colliery of the Megeath (pronounced Me-gahth) Coal Co., P. O. Megeath. It is a new plant opened under the direction of D. G. Thomas, long a general superintendent of the Union Pacific Coal Co. at Rock Springs, and a man well known and much liked in the Rocky Mountain district. There are at least four workable seams at this plant: No. 3 seam, which is 8 ft. thick; No. 1, which is also 8 ft.; a seam known as No. 7½, which is 6½ ft. thick; and No. 7, which is of the same thickness. This latter seam is unknown in Rock Springs and Superior.

Tunnel Driven in Rock by Coal Cutter

The coal dips from 12 to 16 per cent., and the main slope—the one opposite the tipple—is on the No. 7½ seam. A 500-hp. Ottumwa hoist operated by a General Electric motor-generator set pulls the cars up a 100 ft. slope. From an entry at that point a nearly level rock tunnel 400 ft. long has been driven back to cross the No. 7 seam. This tunnel, which is in sandy shale, was undercut by a Sullivan machine and drilled by a Spry electric drill. It is something new to undermine a rock heading with a coal cutter, and somewhat hard on the machine even though it be of a type rugged enough to make good headway through the resistant Utah coal, but the Sullivan machine showed itself equal to the work, and Mr. Thomas declares that the methods adopted explain why the excavation was done, in these days of high prices, for something under $27 per yard. A new electric 350-hp. hoist is to be installed to handle the tonnage from No. 7 seam, and one of 52-hp. is already being used to wind up the cars in the mine opened in seam No. 3.

An unusual feature, the outcome of circumstances beyond the control of the management, is the use of two gages for cars dumped at one and the same tipple. The cars going to the two upper beds, one only of which is now being worked, have a 30-in. gage, while those to the lower bed have a 42-in. gage. A Goodman 6-ton electric locomotive on a 3½ per cent. grade brings down the cars from No. 3 mine to the tipple. It will soon be replaced by a 10-ton cab locomotive of the same type.

An ingenious shoe engaging two wheels of one of the cars serves as a brake on the steep and crooked track leading to No. 3 mine. The road has curves as sharp as 25-ft. radius, and the shoe negotiates these curves without difficulty and keeps the trip under control at all

times, though the resistance has sometimes to be increased by putting sand on the rail. The shoe is laid on the track, and the car is drawn up onto it by the locomotive.

The tipple is of the Marcus type, supplied by the Roberts & Schaefer Co. Under the tipple are five tracks, a track for lump coal and one for egg. Both of these are equipped with box-car loaders. There are tracks also for loading nut, slack and run-of-mine. The box cars are loaded by Manierre equipment, which handles with care the most fragile of coal. The coal cars are unloaded on a one-car rotary dump, operated by compressed air for which a compressor is specially provided.

A No. 12 Sirocco double-compartment fan furnishes 125,000 cu.ft. of air per minute for the ventilation of the mine. So far no water has been taken from any of the openings. The mine has to be supplied with water, so as to keep it always safe for operation, the air of the surrounding country being so free from moisture that the ventilating current soaks up the water in the mine like a sponge, especially in cold weather.

The coal does not fire readily when exposed in piles. Piled 30 ft. high in the form of run-of-mine a pile was started in July and finished about Christmas of the same year. It had in all about 10,000 tons of coal. Yet it showed no sign of firing and was all shoveled out by steam shovel early in the present year. Some coal, put out in the spring, however, did take fire.

The company purchases power from the Union Pacific Coal Co., the current being generated at Rock Springs and transmitted, at 33,000 volts, a distance of about 14 miles. It is stepped down at the substation to 2200 volts and converted for use in the mine to 250 volts by a rotary converter. R. S. Robbins is the chief engineer.

Manufactures Ice for Use in Mine Village

The village is provided with an excellent store which has an up-to-date ice plant manufacturing 1000 lb. of ice per day, using for that purpose the refrigerating machinery and equipment of the Baker Ice Machine Co., of Omaha, Neb. The ice is sold at 2c. per lb. There are 100 well-built houses in the village of Winton, and 11 more are building. The company runs every morning a motor-truck service into Rock Springs, 14 $\frac{3}{10}$ miles each way. This truck makes the store in a degree independent of the railroad and provides the town with many luxuries, such as ice cream. Nowadays no mining town, however far from the city, can do without such delicacies.

The management of the Megeath mine furnished the visitors with a bountiful meal, after which several explored the underground workings. Returning to the automobiles the party was driven to town and beyond, to a point south of Rock Springs, where a recently reopened mine—the old Sweetwater colliery—is being operated by P. J. Quealy, the plans for the tipple being provided by Lindrooth & Shubart. The coal is dumped into a hopper and elevated on an apron conveyor from which it passes to the screens. The tipple is painted black with white outlines and looks quite attractive, though the effect is lost to the general public as the tipple lies far back from the main line of travel.

In the evening, entertainment was provided at the Elks club of Rock Springs and a dance at the Masonic temple. A few of the Denver party had their wives with them, but the assemblage would have been distinctly too masculine had it not been that the society of Rock Springs turned out in force to entertain the guests of the city. The welcome was patent enough, and the Rock Springs citizens reasonably judged so. They did not spoil it as some towns do, by a display of oratory.

At 2 a.m. most of the guests were snugly in the Pullmans when the train started for Salt Lake City, a number of Rock Springs citizens being of the party. Rock Springs is, by the way, the headquarters of the Union Pacific Coal Co., the offices at Cheyenne, Wyo., and Omaha, Neb., having been discontinued. This fact has enlarged in important measure the coal-mining circles of Rock Springs. Awakening in the morning the party found itself in the neighborhood of Evanston, still in Wyoming, but about to cross the Utah state line. From Curvo tunnel the line follows Echo Creek, and at Echo it enters the justly celebrated Weber Cañon, one of the show places of the West and in its low reaches the fair home of many early "Mormon" settlers. A short stop in Ogden and a change to the Oregon Short Line brought the visitors to the end of their journey.

Bathing Party Revels in Briny Salt Lake

After lunch a trip in automobiles introduced the visitors to a city young, but full of history and interest. Sight-seeing over, the institute again took to the railroad cars for a short trip along the shores of Salt Lake to Saltair, passing by the large evaporating beds where salt of great purity and some byproducts are produced. In the distance could be dimly seen the mills and smelters at which many of the great copper deposits of the State of Utah are concentrated and converted into metal.

Saltair is a bathing place on the shores of Salt Lake, a body of water that, having no outlet, has a salinity that puts the ocean to shame. A mouthful of it is almost suffocating, for every natural impulse resents the entrance of such a strong saline mixture. Consequently, though many bathe in it, none dive below the surface. After disporting themselves in the lake, the 150 persons of which the gathering now consisted had dinner at the Ship restaurant, many turning the occasion into a dinner dance. A few sets in the large public dance hall, and all were ready to return to the city.

The following day was given up to the technical sessions, several papers being read and an address being made by Governor Bamberger of Utah. The Governor is in the coal business, but that has not prevented him from advocating higher taxes for coal corporations, and he declared in his speech that in the past the impost had been too low. Into his remarks as to the excessive interest of the Government in the land and water rights of the Uintah Indians it is not necessary to enter, as they did not bear on the coal industry.

Good Papers and Interesting Discussion

Addresses were made by D. Harrington, for the Bureau of Mines, and by the genial president of the institute, John McNeil, one of Colorado's pioneers. P. F. Sharp, of Denver, in a short address then advocated raising the dues to $3 a year. Under the bylaws such a motion must go over to the next meeting, even though the sentiment seemed strongly favorable to the change. Many new members were received, R. Dawson Hall being made a life member. The name of A. D. Pierson was substituted for that of J. S. Thompson on the roster of the executive board, the latter member having died since the last meeting. Resolutions of sympathy with the president of the institute over the death of his

son, and with the family of Mr. Thompson, were then passed.

Joseph Appleton read a paper on "Storage-Battery Locomotives in Mine Work." In the discussion he said that the problem of using storage-battery locomotives in main-line haulage had so far hardly been tackled. He might say that over 90 per cent. of the storage-battery locomotives were being used for gathering and cross-entry work. Mr. Appleton said that locomotives of this type would haul one or two cars up a 17 per cent. grade. However, he would not recommend locomotives for such work, though heavy grades can be satisfactorily climbed if they are not too long. Grades of 17 per cent., 100 to 150 ft. in length, are being surmounted in regular operation with satisfaction, and there is no reason why single cars should not be hauled in rooms up a 17 per cent. grade even if the length of the haul is 300 feet.

A Few Battery Locomotives on Main-Line Runs

One of the members declared that, in some metal mines, storage-battery locomotives are being used in main-line haulage, hauling trips 4 miles on about a 0.4 per cent. grade. E. H. Weitzel, general manager of the Colorado Fuel and Iron Co., in his paper on "The Foreman in Industry," urged the importance of inducing the mine foreman to give up his arbitrary attitude in dealing with the men under him.

The superintendents and managers of modern companies have long felt that complaints should be carefully investigated and weighed by the management, and that the company should form its own judgments of the rights and wrongs of the day laborer and miner, but in many cases the foreman believes the discipline must rest with him and that his prerogatives must be respected. He is opposed to a change that will reduce his authority even though those above him have long ago consented readily to surrender some of theirs. Thomas Gibson, safety commissioner of the Union Pacific Coal Co., also made remarks commendatory of the paper.

The paper by J. B. Morrow on "Coal Washing on Concentrating Tables" was read by R. Dawson Hall in the absence of the author. Benedict Shubart, of Lindrooth & Shubart, read a paper on "Prevention of the Degradation of Coal on Screening and Loading," and C. M. Goddard one on "Modern Methods of Cutting, Drilling and Loading Coal." George B. Pryde, general superintendent of the Union Pacific Coal Co., said that by shearing the coal on one side the amount of powder used could be reduced 25 per cent. When both sides were sheared the powder bill could be cut in half, and 10 per cent. more large coal could be obtained.

Asked whether the Union Pacific was putting this experience into practice, he said that since the company had ceased to cater for commercial trade it was indifferent as to the size of the coal, but that if the company were again to enter the commercial field it would without question make use of the facts it has secured relative to the advantage obtained from careful shearing of the ribs.

President McNeil declared he would like to see an end of the use of powder, saying that it was observed in England that where large quantities of powder were used there was a great increase in the number of accidents. He would like to see an increase in the amount of shearing done and in the use of the hydraulic cartridge. It was stated in support of Mr. McNeil's expressed preference that the Germans, in the demolition of French villages and in the extraction of coal in the mines, used large quantities of liquid oxygen. This substance had practically driven out powder in German industrial service near the close of the war.

Shortly before 12 a.m. the meeting was temporarily adjourned to hear the organ recital at noon in the "Mormon" tabernacle, given on this occasion by the assistant organist, Edward P. Kimball. Exquisite music indeed was the sonata, the hymn of the nuns, a minuet, "Nearer My God to Thee" and Calkin's postlude. The wonderful vox humana stop produced most admirably, when used, the illusion of choirs singing in a distant cathedral.

In the evening a banquet was served in the Hotel Utah, reputed one of the four finest hostelries in America. P. F. Sharp was the witty toastmaster; John McNeil, the president, also made a short address, but the Rev. P. A. Simpkin (Parson Simpkin, he is affectionately termed) was the speaker of the evening. Many a tale is told of his sturdy patriotism in the stress of the struggle with Germany, his eloquence and devotion selling large quantities of Liberty Bonds. Unlike most of the clergy he had seen something of those pretty mining villages of happy homes which the West wrongfully denominates as "camps," causing us to look back to the times of the earlier settlers who lived in shacks of adobe and to think that the modern villages in which miners live are no better than those early abodes. He spoke on Bolshevism and the need that it be met, not by reaction but by real democracy, the same democracy for which we fought. We want democracy in peace as much as in war. He was followed briefly by R. M. Magraw and R. Dawson Hall.

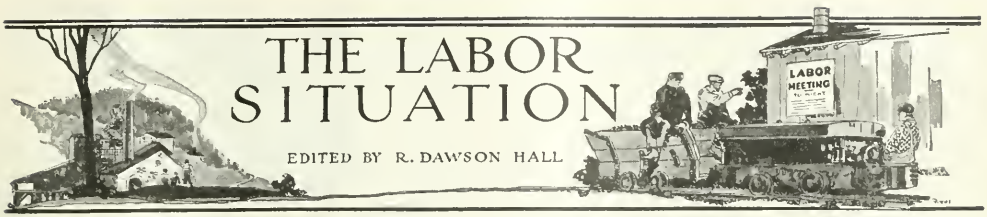
Takes Six Men, Foot to Shoulder, to Reach Roof

With the banquet the meeting practically came to an end. There were not a few who went by the Denver & Rio Grande R.R. to Castle Gate, but most of them were from Utah and some dropped off, on duty bent, by the way. Only two of the strangers were left when the time came to go into the Castle Gate mine of the Utah Fuel Co. Both had been more used to thin coal mines in which the seam was of almost pencil-mark thickness, and here was the Castle Gate seam 32 ft. thick—a symbol of the greatness and spaciousness of the West.

Some twenty odd miles away were Black Hawk, Hiawatha and Mohrland, with 26 ft. of coal. If the writer of this had space equal to his inclination he would write at length of the genial Western courtesy as he experienced it and of his trip to the model mines he has just mentioned and to the home-like villages of the Colorado Fuel and Iron Co. between Walsen and Primero, which he was privileged also to visit. But the journey to them was not a part of the institute, and he must refrain from introducing it, leaving any detailed description of the merits and equipment of these mines to those who know them better.

Coal Age Index

The indexes to *Coal Age* are furnished free to all who ask for them. The index for the first half of 1919 will shortly be ready for distribution, and a copy can be had by addressing a postcard to the Subscription Department of *Coal Age*.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

So complicated with political aims were the demands of the British mine workers that it has been hard to understand their recent strike, which, by the way, was still continuing in the Yorshire district on July 28. Apparently every section of the country had a separate idea as to what were the aims of labor. The mine workers of Great Britain seek to assume with the marine transport workers and railroad men the governance of the empire. They would have the parliament, which represents the public as a whole, give place to soviets representing certain groups of working men. They argue that the mine workers can force their will and therefore should control national affairs.

Parliamentary life in the British dominions, no longer menaced by the king as in long past history, is threatened in these later days by the triple alliance of mine workers, sailors and railroad men. As the *New York Times* well says: "To Americans this (the program of the mine workers) will seem what the British press declared it to be, an attempt to put Parliament under the rule of the workingmen's council. The strikers sought to legislate under penalty of ruin to the nation if the Government resisted." But after all, the matter dear to the heart of the miner was not so much to save his fellow workers in other industries from an increased cost of coal, nor to protect the Bolsheviki of Russia in their campaign of murder and plunder as to take care of their own private interests.

Did They Barter Political Power for Larger Pay?

What they apparently really desired was that the shortening of the working hours should not reduce the earnings of the miners working in the same indifferent way in which they had always labored. When then Lloyd George, the premier, offered a rate of compensation per ton increased 10 per cent. to correspond to the decrease in the working hours, the miners, and therefore the mine workers, were appeased. For some reason the reduction of time from eight hours to seven was regarded as equivalent to a reduction in actual working time of 47 min., or roughly 10 per cent.

The increase in the wage of the miners added to the advance granted the day worker will cause the increase in the price of coal to be more than $233,000,000 per annum as formerly announced. If the first advance in cost was so great as to make it politic, if not advisable, to put the burden on the taxpayer, the second advance will increase the clamor for such a disposition of the increased cost.

Fewer Trains, Rationing and Closed Factories

The strike caused the closing of a number of factories, especially in the neighborhood of Sheffield. It compelled the Government to forbid the export of coal. It was announced the day before settlement that the train service would be sternly curtailed after July 26, perhaps as much as 40 per cent. The coal supply to private houses was limited to 200 lb. a week. With such a condition of affairs it was a great relief when on July 25 the country learned that the strike was at an end.

Unfortunately only Robert Smillie, the Scotchman, who is president of the Miners' Federation of Great Britain, consented to the new schedule. Herbert Smith, the president of the Yorkshire Miners' Union, still sulked and refused to induce his men to return to work. So that the ending of the strike, at first declared to be general, proved to have one vital exception—the Yorkshire coal industry.

The meeting of the delegates of District No. 1, in Scranton, Penn., on July 21, enables us to take stock as to the purposes of at least that section of the anthracite mine workers. The sessions started with all manner of declarations of fraud and deceit in the conduct of the elections, though the fault does not appear to rest with the tellers. The treasury contains $51,354.18 while the membership is 28,751, so the union has district funds of less than $2 per member. The district union is shown to have more members than it has enjoyed at any other time in its history. In November, 1918, the membership roll included only 10,785. The bank balance is the smallest in many years.

Hope Last War Will Afford the Last Scale

The insurgents on the floor threatened that if John T. Dempsey were elected to the presidency they would quit the organization and form a separate union. On July 24, the delegates registered their desire for a new wage scale as follows: An increase in wage of 60 per cent., a minimum wage of $6 per day, a 6-hour working day, a 5½-day week, closed shop, time and a half for Sunday work, and for that done on holidays and payment of consideration rates when mine workers are compelled to lose any time through delay in furnishing props or other materials.

The resolution committee presented this program and it locked good to the assembly, and as those present do not have to pay the bills, why it was the easiest thing to mark O.K. on them. Surely this is meant to be the "last scale."

On July 25, it was announced that Jack Dempsey, the former president who resigned last fall, was reëlected to that office. Thus the administration candidate wins. The vice-president is John Collins Kolodziejczak. He defeated George Isaacs, the insurgent candidate, and Joseph Yannis, who has been acting as head of the district since the resignation of Thomas Lowry of Scranton, several weeks ago.

Button Strike Causes Fear of Shut Out

At Pine Ridge Colliery, as was stated last week, 100 men refused to pay their union dues and the mine stopped work. Soon, Laurel Run and the Delaware colliery, two other mines of the Hudson Coal Co., joined in the strike so that by July 20 there were no less than 4000 men and boys idle.

All this was a violation of a well-established part of the agreement between the operators and the union. Some of the minor officials of the company declared, so it is said, that the mines would be shut down for six months rather than permit of these button strikes. As a result there is much talk of extending the strike. The men are fully wedded to the "double standard." They believe that they should be permitted to strike, in violation of the most sacred agreements in their contract, in order to establish that to which they have not the least fragment of a right. But if, having violated their agreement and having quit their work, the company locks them out, a terrible offence has been committed to adjust which other men in violation of their contract will also quit working.

At the Hazelton shaft colliery of the Lehigh Valley Coal Co., 800 mine workers who complained that they were only allowed to work 6 hours instead of 8 went on strike to compel the company to provide them with a full day's stint. The company says that the scarcity of coal in the slopes is a reason for the curtailment of hours. The breaker boys at the Evans colliery, it will be remembered made a similar complaint, which was granted on July 22, the boys resuming work.

More than 300 men and boys employed at the Traders Coal Co. operation in Hudson, Luzerne County, who have been idle since last February, have adjusted their differences with the company officials and work will be resumed at the colliery. Men are engaged cleaning up the working chambers that have been idle for five months, and before Aug. 1, it is believed the miners will resume cutting coal.

The Traders Coal Co. had, for a while, supplied its men with free powder, though this is not a usual proceeding at coal mines anywhere. On February last the company decided to conform with the universal custom, and a strike resulted during which many moved away to other towns.

Strike for Union Contract in Allegheny Field

The progress of unionization has been continuous in western Pennsylvania. One of the resistant areas has been along the Allegheny River and the mouth of the Kiskiminetas, north of Pittsburgh. Gradually this area is submitting to the union and in furtherance of the campaign to wipe out the nonunion spots in this area a strike was started on July 21 at the Allegheny Steel Co.'s mine in Brackenridge. For two years the union has been steadily trying to get this mine under union control, but the wages were higher than those provided by the union scale and the men did not favor a change. A further increase of 5 per cent. was being considered, according to Mine Superintendent J. N. Adams, when the men walked out. About 100 men are affected. The mines all around are unionized except the Penn Salt Manufacturing Co.'s mine at Natrona.

At one of the Pursglove-Maher mines in Ohio, the Willow Grove colliery, the men went on strike because they would not work with a colored man, all gentlemen of color having been excluded from Ohio mines for many years.

The mines of the George M. Jones Co., of Toledo and Columbus, located at Rendville and Modoc, have been closed down for about a week because of a strike. The men have two grievances relative to working conditions from which they asked relief. The Modoc mine, known as No. 255, employs 250 men and the Rendville mine, known as No. 268, employs 280 men. Efforts to settle the strike have not proved successful.

The operators and mine workers of the New River field held another conference in Charleston, beginning on Tuesday, July 22, with a view to reaching an agreement, if possible, as to a wage contract which is to replace the one which automatically expires with the ratification of the peace treaty. Almost a month has elapsed since the scale committees representing the operators and miners adjorned *sine die*. The manner in which the check-off should be made was the rock on which the conferees split. The committees were in session for two days at that time and while able to reach a common ground on most of the questions at issue were unable to agree on the check-off.

A strike had been scheduled for July at the Eccles plant of the New River Colliery Co., the men declaring that the coal must no longer be paid for by measure. The miners at Eccles and Sun being promised that scales would be put in by Aug. 5 professed themselves satisfied. The company indicated at the same time that before the expiration of the month it would pay the same rates as prevail elsewhere on Loup Creek, the new scale to be effective July 15.

Want Their Pay by Weight and Not by Measure

A strike order had been issued by the district board and would have taken place had not the concessions named been granted. The scale difficulty is of long standing. In July, 1918, there was a strike at Eccles to enforce a demand for scales and for payment by weight. The Fuel Administration straightened out the difficulty temporarily, but, the scales not being placed, a new strike was the almost inevitable result.

Disagreement between the company headed by S. D. Brady of Fairmont and the mine workers employed by that company in Mineral County gives early promise of being adjusted, a hearing having been held during the week ending July 19 before Special Umpire Barnett of Baltimore, who is of the faculty of Johns Hopkins University.

E. S. McCullough, commissioner of the Northern West Virginia Coal Operators' Association, and S. D. Brady, one of the prominent operators of the Fairmont field, presented the company's side of the case at the hearing. The claims of the miners were presented by Frank Drumm, president, and William J. Trickett, secretary, of District 16 and by Joe Loftus, an International Board member for the same district.

Before war-time prohibition went into effect there were threats in the mining field of Illinois that the men would not work without beer. Except for isolated instances, the threat has not been carried out. The men employed at the Midland Mines, No. 7 and No. 8, near Taylorville, stuck by their motto of "No beer, no work," but gradually drifted back to work. However, the "drought" is given as one of the reasons for an hegira of foreign miners from the Illinois fields, who are returning to their homes in Europe.

It is doubted whether a sufficient number of American miners can be found to man the mines, as they will need to be manned when the demand for coal increases in the fall. Many of the mines, it is declared, have less than half of their normal quota of available miners now. Most of the foreign miners are thrifty and when they were getting high wages during the war they saved their money and are now abundantly able to buy their passages back home.

Terre Haute Also Makes Big Wage Demands

When the fourth biennial convention of District No. 11, of the United Mine Workers of America, met in Terre Haute, Ind., which includes the "bituminous," or rather "non-block" coal field of Indiana, it was soon seen that the mine workers of that state were not going to be moderate in their program. The convention demanded, in the name of the mine workers, nationalization of the mines, a 5-day week, 40 per cent. advance in the wages of all classes of labor, a minimum scale of $7 per day, a working day of six hours, time and a half for overtime and double time for Sundays and legal holidays.

Twenty-five hundred miners at the mines of the Central Coal and Coke Co., in Missouri and Kansas, struck July 17 as a result of a conference between the presidents of the two districts. The reasons for the strike seem to be the failure of the arbitration board to reach an agreement on numerous grievances in the previous few weeks, grievances that had been pending for some time. The points of difference related to comparatively minor demands which, if granted, would have established precedents prejudicial to the best interests of the industry.

No formal explanation of the strike has been made, and the company has so far taken no steps to bring about a settlement. In view of the position of the company, that the subject of the grievances had already been provided for in the contract, and that the board's consideration of them under the contract presumably disposed of the matter finally, there seemed to be nothing that the company could do to straighten up the difficulty.

Want Another Powder Now It Is No Longer Free

Early in June the Central Coal and Coke Co. announced that a change would be made from a day-wage basis to a tonnage basis at a mine the company had just opened at Keota. The company has four mines at that place and one at Fleming. All these Missouri mines except the one mentioned, No. 68, were on a tonnage basis. The miners at No. 68 demanded that when the change to a tonnage basis was made, they be provided with DuPont powder, instead of the Excelsior powder which the company had been furnishing them.

The company offered to provide the desired powder, but was unable to set a date for such supply, having plenty of the Excelsior powder, but being short of DuPont in that field. The joint board met June 11, the men demanding a definite date for the supply of the desired powder. The 40 miners at No. 68 struck, because a date was not set. On July 15 the powder the men desired was provided at Mine No. 68. On July 17 a general strike began in all the mines of the company located in Missouri and Kansas. It involved 1000 mine workers in Missouri and 1500 in Kansas.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Quality of Mine Timber

Letter No. 3—Few mine officials are as acquainted as they should be with the different qualities of the timber that they use in their mines, and I was glad to read the letter of one of my favorite correspondents, in *Coal Age*, Ostel Bullock, June 19, p. 1136.

An important point, which has already been mentioned by Mr. Bullock and is essential in securing good, sound timber for use in the mine, is the time of cutting the timber. As he has stated, the trees should be felled in the winter season when the sap has left the wood. As is well known, the sap starts to run up the tree in the early spring, producing an abundant foliage and adding a new growth to the tree. Late in the fall, most of the sap has returned to the ground. The outer wood of a large tree trunk is called the "sap wood" and is softer than the older wood at the heart of the tree, which is firm and hard and has a generally darker color than the sapwood.

In the cutting of timber, particularly white oak, experienced timbermen recognize a great difference between what is known as "second-growth" timber and the old original trees. Second-growth timber is soft and springy and does not possess the hardness or firmness of the old original timber. Again, there is a vast difference between live timber and deadwood. Only live timber should be cut for mining use, and this should be well seasoned before being taken into the mine.

Qualities of Different Woods

There are, in this locality, about forty different kinds of wood, which I will not attempt to name. Suffice it to say that the old white oak makes the best mine timber. White hemlock resists the changes from wet to dry and dry to wet quite well and, on this account, makes a good timber in the mine. Quaking ash, while hard, is so brittle that a good sized prop of this wood can be broken square off by striking it over some hard object, as a rock. Also, tracklayers say that ties made of this wood decay over night.

In working the low seams here, the props are seldom recovered and what is wanted is a strong, tough timber that will stand up under a good weight and give a cracking and snapping sound when the overburden is getting too great. This gives the miner warning and is particularly desirable in the robbing of pillars. Hard woods are always better than the softer woods, for mining use. Beech is only good for immediate use, as it will not resist change from wet to dry and dry to wet. White pine, poplar, cucumber, basswood or linn, and quaking ash are unfit to be taken into the mine.

However, when one observes good sound white-oak collars 12 x 14 in. and 16 ft. long, supported on three legs and spanning the double track at the bottom of a shaft, and finds them broken in a few years, he turns very willingly to steel timbers reinforced with concrete. Also, observing as I have at different times shafts and slopes lined with concrete, it is natural to conclude that timber for this purpose must eventually give place to concrete lining. Especially is the truth of this statement impressed on our minds by the growing scarcity of timber in central Pennsylvania and elsewhere.

Osceola Mills, Penn. S. D. HAINLEY.

A Modified Longwall System

Letter No. 4—Kindly permit me to add a word in answer to the letter of Andrew Orr Bain, *Coal Age*, June 19, p. 1133, in which he expresses a wish to know if I have "ever had any practical experience in working longwall under light cover."

My experience in longwall work has been in depths ranging from 80 to 270 fathoms, but I realize that a depth of even 80 ft. or less does not prevent the working of such seams by the longwall method, other conditions being favorable. It was my intention to say that a cover of less than 200 ft. did not make it necessary to consider adopting the longwall method to obtain the best results in working out the coal.

Let me explain, here, that there is nothing to be gained in the working of seams that lie at a great depth. Indeed, the greater the depth of the seam the more hazardous and expensive is the mining of the coal. But, the hazard and the expense does not increase as rapidly with the depth in longwall working as in any other system of mining, especially the room-and-pillar system.

Depth of Seam a Determining Factor

The impression I wanted to convey was that there was a greater advantage in working seams, lying at a depth of more than 200 ft., by the longwall method of mining than by other methods. In other words, when the depth of a seam exceeds 200 ft. it is expedient to consider whether that seam should not be worked by the longwall method, in preference to other methods.

In the majority of cases, the conclusion will be in favor of adopting the longwall method when the depth exceeds 200 ft., while a depth of 80 ft. does not present the same disadvantage in the use of the room-and-pillar system of mining, and the adoption of that method will often prove the most economical, unless it should chance that the price of land, per acre, makes it advisable to adopt the longwall method to prevent the damage to the surface that would result in the use of the room-and-pillar system.

I believe that Mr. Bain will agree with me that there is frequently a willful waste of coal, in the use of the room-and-pillar system, owing to the pillars that are left unworked, because they cannot be recovered with safety, or because they are needed to support the surface and prevent damage to buildings.

The experience of the past four or five years has certainly proven that coal is really the most important of our natural resources and the most available source of energy and emphasizes the need of eliminating wasteful methods of mining and burning coal. It was this fact that led me to state that the principles involved in Mr. Pocock's proposed method are those that must ultimately be applied to work seams lying at a greater depth than 200 ft.

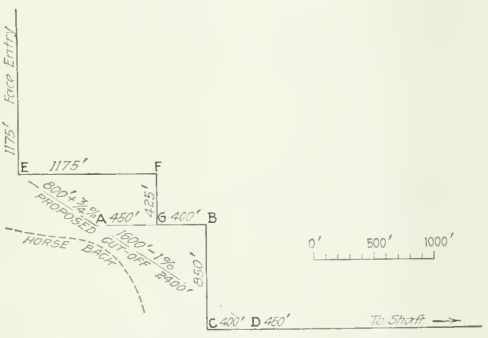
Again, where thicker seams of coal are worked by the room-and-pillar system, the amount of coal wasted in pillars that cannot be recovered or must be left in the mine is far greater than where the coal is thinner. I hope I have made my meaning clear in regard to the adaptability of the longwall method of mining.

Linton, Ind. W. H. LUXTON.

Mine-Haulage Proposition

Letter No. 4—Referring to the proposed change in the haulage road of a mine, as suggested in the letter of J. H. Dickerson, *Coal Age*, June 5, p. 1058, I feel as though the first portion of the new road from *E* to *A*, shown in his sketch, should at least be put to use, making the haulage, *EAG*, 1250 ft. and cutting out the old road, *EFG*, 1600 ft. thus saving 350 ft. of haul and eliminating two square turns in the road, at *F* and *G*.

The question of completing and equipping the remaining portion of the proposed road from *A* to *D* can only



SHOWING PROPOSED CHANGE OF ROAD

be decided by a better knowledge of the conditions and the amount of work that would be necessary, in order to open up and equip this portion of the road. The new road would obviously have many advantages over the old road. The length of haul from *A* to *D* would be shortened 500 ft.

The new road, being a single track, would not be as wide as the double-track portion of the old road and would require far less expense for upkeep. It would also cut out two more square turns, at *B* and *C*, in the old road. Curves on motor haulage roads always require much attention, and the cost for repairs is increased. The straight road would allow a greater speed of haulage and the chance of wrecks occurring would be far less than on the old road.

Estimating on 2,000,000 tons of coal in the property, as stated, and a daily output of 1200 tons, would make the life of this mine 2,000,000 ÷ 1200 = 1666 days or, say, 6 years, allowing 275 working days in a year. Considering the many advantages to be gained by opening up the new road, shortening the haul and allowing a greater speed, it would not be surprising if the daily output of the mine would be increased 20 per cent., which would mean a considerable lowering of the cost of production, per ton of coal mined.

Increasing the daily output 20 per cent., as suggested, would naturally result in shortening the life of the mine. One-fifth more coal would be put out in a day, and the time required to exhaust the coal in the mine would be five-sixths of the former estimate, making the life of the mine five years instead of six.

It is always the last few months or year of the mine that prove the most costly in operation. This fact should be taken into consideration, when judging of the advantages derived from opening up the new road.

The cost of maintaining the old road, during the final months or year of the mine, would be a large factor in the daily expense. There will, no doubt, be found many minor advantages derived from the new road that have not been mentioned and which add to the importance of carrying out the proposed change. SUPERINTENDENT.

Linton, Ind.

Letter No. 5—The inquiry of J. H. Dickerson, *Coal Age*, June 5, p. 1058, regarding a proposed change in the mine for the purpose of straightening and shortening the distance of haul, reminds me of a similar proposition in my own experience that I thought would be helpful in this connection.

About 25 years ago I had to put in a new double-track haulage road, for the purpose of cutting out an old road. The case was very similar to the one described in the inquiry to which I refer. The new road had to be opened up through a district where the settlement had taken place long since. The change, however, proved a great benefit and there was no further trouble experienced in keeping the new road in good condition, and the expense was greatly reduced.

ADVANTAGES OF SHORTENING HAUL IN A MINE

In the instance to which I refer, not only was the length of haul shortened, but the straight road decreased the wear and tear on the motor, cars and rails. The motormen were able to haul at a much greater speed on the straight road, since they did not have to slacken the speed to avoid the danger of derailment in rounding curves. There was less expense for keeping up the track and a less line drop or loss in voltage in the transmission of the current required to operate the motor. At that time, the cost of material and labor was high, and I found that the saving effected by the change, in these items alone, soon repaid the total cost of opening up the new road.

Aside from the advantage in hauling, the new road proved a great benefit to the men, by reducing the distance they must travel to reach their working places by 300 yd., or 600 yd. going and coming. This was a considerable reduction in their daily walk of five miles to and from their work and was much appreciated by every man employed in the mine, to say nothing of the time saved and the increase in the amount of coal loaded, per man per day.

As a result of the change, the motor was able to make two more trips a day, which meant an increase of 100 tons in the daily output of the mine and a saving of 7½ per cent. in the cost of production. Now, referring

to the case mentioned in this inquiry, and assuming that the output is increased to, say, 1300 tons per day, the extraction of 2,000,000 tons would require 2,000,000 ÷ 1300 = 1538 days, or a saving of, say 128 days when putting out 1200 tons a day.

Then, setting aside all other items and calculating the saving in wages paid the motorman, coupler and oiler alone, which we will estimate at $12 a day, the amount saved in the wages paid these men would be 12 × 128 = $1536. I realize, of course, that this amount would not be saved until the mine was exhausted, which would be five or six years.

However, the figures make clear the great advantage to be derived by the proposed change, and this is only one item in the saving that would result in the operation of the mine. It is my belief that when Mr. Dickerson has made the change he will only regret that he did not make it long ago. MOTORMAN.

McKeesport, Penn.

Certification and Safety

Letter No. 12—Referring to the question of certification of mine officials, I fail to see how there can be more than one side to this question. Certainly, mine officials in charge of work underground should prove by examination that they are worthy and fit to fill such positions as they desire.

Now, the fault is not with the certificate, but with the manner in which it is granted or the way in which it is obtained. The way some certified mine bosses perform their duties in the mine is quite different from what they expressed in their answers in examination. Had those answers compared with the daily practice of these men, they would not have been granted their certificates.

Personally, I feel much sympathy for the practical man who has held an official position in mining, but must step down because of his inability to answer some of the questions asked in the examination. Many a foreman of this type has had a practical experience that would carry him along all right in the mine, and has proven his value by the successful way in which he has conducted the work underground.

The miner should be given a fair opportunity to obtain a certificate, and the questions asked him in examination should be of a more practical nature so that he will be able to answer from his experience. To my mind, the examination is too often theoretical in its nature. While admitting that the theoretical and practical official will prove the most successful in the mine, I contend that every foreman must certainly have sufficient practical experience to enable him to succeed.

PRACTICE OF EXAMINING BOARDS IN INDIANA

In Indiana, only a candidate's number is known to the examiner when he marks the answers given to the questions asked. This shows a desire on the part of the examiners to be fair in the examination and not to allow personal friendship to influence the marking of the papers. Certificates are only given to those men whose answers prove them to be worthy and capable.

In order to expedite the work of examining papers, so that candidates will know their standing earlier, it seems to me that this work should be distributed among the examiners. My opinion is that each paper should be examined by the same person, which would seem to give a more uniform judgment than when the answers are marked by different members of the board.

Of course, it is natural for an unsuccessful candidate to think that some member of the board knew his number; or that these who were more successful had, in some way, obtained a knowledge of the questions. This, however, is an unfair judgment of examining boards, most of whom have a desire to be fair to all candidates.

Let me say, in closing, that the certification of mine officials is essential and even the practical miner loses nothing when he is required to spend some time in studying to obtain a certificate. OLD TIMER.

Linton, Ind.

Welding Split Gears to Axle

Letter No. 1—I was much interested in the inquiry of "Mine Mechanic," regarding the welding of a split-gear wheel to the axle, which he states was a trifle too small for the bore of the wheel. The inquiry states, *Coal Age*, July 10, p. 73, that the gear is to be mounted on the axle of an electric locomotive.

Having been up against just such a proposition myself, let me suggest and advise that the electric arc be used to build up the bore in each half of the wheel. When this has been done, and any projecting metal been removed, the two halves must be securely bolted together, as when in use. It is now possible to bore out the center of the wheel to the exact size required to fit the axle.

Let me add the suggestion that it would be bad practice to weld the gear to the axle. Not only would it be difficult to truly center the gear on the axle, which is most essential in the operation of the machine, but other difficulties would be encountered, and it would be impossible to again remove the gear should it require to be machined at any time. C. G.

Pittsburgh, Penn.

Letter No. 2—Referring to the inquiry that appeared in *Coal Age*, July 10, p. 73, allow me to say that the simplest way to make the bore fit the axle is to add a little metal to the gear by means of electric-arc welding, and then bore it out to the proper size. If it is a very small amount to add and the gear is high in carbon it may be advisable to enlarge the bore and then add the welded metal. In this way it will be easier to machine and true up the work.

Pure iron should be used for welding rods. Any kind of electric-arc welding equipment can be used. The one mentioned on pages 52 and 53, in the issue of *Coal Age* for July 10 is especially suitable for mine conditions.

JOHN G. KJELLGREN, Chief Engineer,
The Electric Railway Improvement Co.

Cleveland, Ohio.

Reducing Ventilation at Firing Time

Letter No. 9—Referring to the claims of Alexander McAllister presented in his letter, *Coal Age*, June 5, p. 1054, it is my belief that his statements should not be taken as the last word in respect to the matter of reducing ventilation at the time of firing shots in the mine. Notwithstanding the alleged success of his ex-

periments, I contend that he has not proved to the satisfaction of mining men, in general, that his theory is sound or his method a safe one to adopt as a means of lessening the chance of an explosion.

Laxity of Mining Laws Charged

Certain it is that the practice he has suggested does not agree with the generally understood principles of mining. The question resolves itself into a choice between creating an extinctive atmosphere in the mine, during firing time, or adopting the more reasonable course of removing all dangerous accumulations of gas and dust from the workings. While I am not acquainted with the requirements of the state mining laws in Kansas, it appears to me that they must be far below the standard if they permit such practice in the firing of shots. In British Columbia, such a method would be a violation of the mining law.

The instance mentioned, when the foreman ordered a shot to be fired and Mr. McAllister complied with the order and fired the shot, knowing it to be unsafe, is proof to me of the laxity of the state mining law in this respect. Other matters, regarded lightly by our friend but strictly prohibited in British Columbia, are the firing of shots in explosive mixtures of gas or dust, the use of blasting powder in place of a permitted explosive, shooting on the solid and the firing of more than one shot at a time in any one place. Our mining law further requires that every mine shall be thoroughly ventilated by an adequate supply of pure air and makes other stipulations designed to lessen the dangers of shotfiring.

In order to reduce the chance of an explosion occurring in a mine, it is necessary to remove the causes of such an occurrence: namely, the presence of a combustible mixture of gas and dust, existing in the mine atmosphere in such proportion as to be inflammable or explosive, and the danger of its ignition by open lights or by the flame of blasting. But it would appear that the theory of Mr. McAllister is opposed to taking such precautions. If I understand correctly he allows the gas and dust to remain in the mine, uses an open light and depends for safety on reducing the ventilation when firing shots.

Factors That Contribute to an Explosion

Now, there is no doubt but that a high velocity of the air current tends to extend an explosion in a mine and increase its violence, should an explosion occur. But, our efforts should be exerted to prevent the explosion from taking place; and it is certain that reducing the ventilation will not help to diffuse and render harmless explosive mixtures. There should be, therefore, greater safety in maintaining the ventilation at firing time, and thereby preventing explosive conditions.

While the explosive limits of methane and air are given as ranging from a ratio of gas to air of 1 : 5 to 1:13, these limits are not absolutely defined, but vary with the purity of the gas and other conditions. Then, in order to avoid ignition and explosion, it would seem that the oxygen content in the mine air should be reduced to the extinctive point; but that would support neither combustion nor life.

These conditions, however, are not to be realized by reducing the ventilation in the mine. If the mine is sealed off entirely when firing, there is still sufficient oxygen in the air to make possible the explosion of a dangerous mixture. It is quite evident that Mr. McAllister creates neither an extinctive nor a fatal atmosphere by his method, as the one would extinguish his light and the other would make it impossible for him to live in the mine.

It is stated that our friend fired 300 shots in 2½ hours, lighting as many as 40 shots at a time. This would require $300 \div 40 = 7.5$ visits to the working places, and each visit would consume $(2\frac{1}{2} \times 60) \div 7.5 = 20$ min. Conditions in the mine must be most favorable to permit such rapid work, and one must conclude there is an utter disregard for everything save the blasting of the coal in the shortest time possible.

It may also be observed that the chance of ignition is decreased, either by a decrease in temperature or an increase of pressure. But, the effect of reducing the ventilation in a mine is directly opposite to this, increasing the temperature and decreasing the pressure, which would tend to increase the chance of ignition of an explosive mixture. The use of black powder, moreover, increases the danger, by producing a larger volume when a blast is fired. This is all common knowledge and causes one to stand aghast and ask for what purpose is education in mining when men are permitted to ignore its first principles in practice.

Allow me to suggest, in closing, that this alleged practice can never become general in coal mining. I would recommend anyone who is favorably disposed to such a practice to study carefully the mining laws of British Columbia, which to my mind, are standards in respect to safety in mining.

Wm. Wesnedge.

Ladysmith, B. C., Canada.

Efficiency of Mine Workers

Letter No. 4—There are many phases of the miner's work that, if given the proper consideration, will be found to modify his efficiency by the effect they produce on his health and safety. We speak of miners having a knack for mining, loading or shooting, because of the skill displayed in their performing such work with ease. In reality, however, the fact is the miner has, through long experience and practice, so systematized his work as to produce results that mark him as efficient.

No set rules can be laid down that will enable a miner to become efficient. He must achieve skill in the performance of his work, through a close study of the conditions that surround him when at work in the mine. Many miners have no regular plan or system for conducting their work. Some will begin shooting almost the first thing after entering their place in the morning, and continue to shoot until the coal blasted has fairly blocked their place and made the work of loading their cars more difficult. It is not strange that such ones become exhausted long before they have done a day's work.

Again, it is not uncommon to find men mining coal in a manner that makes every ounce of the fallen coal represent a tremendous waste of energy. Some use poor tools both in mining the coal and in timbering their places, which makes the work doubly hard to perform. There are right methods and wrong methods of mining and loading coal. They represent the two extremes, in which the work is performed either with ease or with difficulty, and mark the man as efficient or inefficient, according to the results he achieves.

Reference has been made, in previous letters on this subject, to the alleged need of a six-hour day for coal miners. I fail to see in this suggestion a solution of the present depression that exists in the coal industry. Indeed, it is my belief that a six-hour day would complicate the present situation to an extent that the work of reconstruction would be fraught with perils equal to those of the war. The adoption of a six-hour day, at the present time, would be a grave mistake.

In my opinion, the present industrial depression is but temporary and the logical outcome of the adjustment of affairs to peace conditions throughout the country. Let us hope, then, that the signing of the peace treaty by all the powers concerned will be followed by a prompt readjustment of business conditions throughout the world.

A Glance into the Future

In looking forward to the much longed for normal conditions of peace, is it not clear that the industrial world will need the usual eight hours of labor to meet the extraordinary demand for the production of material products that will be required to replace the great waste and destruction of the war? There must be no backward step at this time when Bolshevism is terrorizing Russia and menacing other countries with its propaganda.

Let me ask, Can the farmer supply the world with foodstuffs in a six-hour day? Can the workers in our factories and mills supply the material demand of this and other countries by shortening the hours of labor at a time when the demand for products of every kind has increased a hundred-fold? Can the miners keep the fires of industry burning by working six hours of the twenty-four?

The Natural Division of a 24-Hr. Day

There is a natural division of time that nature ordained for the promotion of health, enjoyment, and the needs of mankind. The twenty-four hour day is divided into three equal periods, eight hours being given to rest of the body, another eight hours to recreation and enjoyment, and the remaining eight hours to labor. Too much sleep induces sloth and laziness; too much play gives rise to indolence, and too much labor overtaxes the body and breaks down the health. It is easy to imagine the results that would follow robbing the hours allotted to labor in order to increase the time devoted to recreation and enjoyment. Production of many necessities would fail and the price of living be increased.

While the present slack condition in the coal industry presents an argument in favor of the six-hour day, it must be remembered that we are passing through a crisis in the readjustment of the world's business. The future has a promise of untold prosperity. Let every worker, then, look forward with hope to the time when normal conditions will again prevail and American labor reap the reward for which so large a number of its fellow workers have fought and sacrificed on the battle fields of Europe.

W. H. Noone.

Thomas, W. Va.

Letter No. 5—Kindly permit me to refer to the statement of "Equality" made in his letter, *Coal Age*, June 19, p. 1136, regarding conditions in the mines of Great Britain. Having worked a considerable time in the mines of South Wales and England, besides visiting many mines in Scotland, England, South Wales and Belgium, under the guidance of the Educational Department and for the purpose of studying mining conditions, I am inclined to disagree with the suggestion that the coal mines in Great Britain are "poorly ventilated."

Owing to the generally gassy condition of many of those mines, the mine law is strictly adhered to in regard to ventilation. When a miner fires a shot he does not have to sit down on his box and wait a long time for the smoke and gases produced by the blast to clear away. There is sufficient air traveling in the working places to keep them clear of all accumulation of smoke and gas, so that the miner can return to the face a few minutes after firing a shot.

It is my opinion that the miners of Great Britain suffer less from that disease known as "miner's asthma" than the miners of this country. As is well known, that disease is contracted by continued work in places that are poorly ventilated and where the miner must either breathe the smoke and gases produced in blasting or lose much time waiting for the place to clear when a shot is fired.

Studying the Ventilation of English Mines

In our visits to the several mines for the purpose of studying conditions and work underground, it was the custom to divide the party into different groups. While one group would be investigating the haulage system employed in the mine, another group would be studying the mechanical equipment, and still another group the ventilation of the mine. It so happened that, on several different occasions, it was my fortune to be classed with the men studying the ventilation of the mine; and this fact has caused me to be well informed on that subject, in its relation to English mines.

Referring to the question of a six-hour day, let me say that naturally any man is willing to work shorter hours, provided the standard of wages is increased so that he will be able to earn the same amount as when working the full day, which is generally done, and the efficiency of the system so arranged as to enable the same quantity of work to be performed in the shorter time allotted for each shift.

It seldom happens that any change is made in the working hours when the operator does not get on the job and make arrangements to put out the same amount of coal and the miner, also, works to load the same number of cars as before.

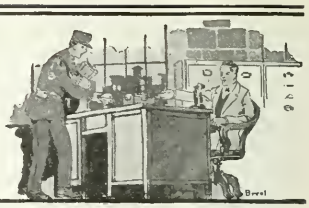
I have worked as a miner on a ten-hour, nine-hour and eight-hour shift, and have found from experience that I could produce as much coal in eight hours as I formerly loaded in ten hours. The reason for this is that I knew my time was limited when working the shorter shift, and made every effort to perform the work in that time. Also, arrangements in the mine were expedited so that each miner was given his full turn of cars. All this required a little more energy on the part of each man employed in the mine.

In regard to the equalizing of the work in summer and winter, because of the varying demand for coal in those seasons, I know little, but think that some plan could be effected that would regulate the work in the mines according to the demand for coal in the market, and this would certainly prove a benefit.

Forty Fort, Penn. Robert Thomas.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Storage-Battery Locomotive to Operate Pump

Recently, our mine which has been idle for several months received orders to start up again. During the period of idleness, much water had accumulated in the mine and considerable pumping was necessary to be done before work could be resumed. Ordinarily, on such an occasion, it would be necessary to run the power house continuously three 8-hour shifts, each day, which would mean expense for attendance and other incidentals during the entire 24 hours.

As a means of reducing this expense, however, it occurred to me that we could utilize the storage-battery locomotive in our equipment to operate the pump a portion of this time, which would allow of shutting down the power house during that time and still maintaining continuous pumping in the mine.

Following up this idea, we operated the pump from the power house during two 8-hour shifts and, at the same time, charged the batteries of the locomotive. Then, during the third shift the power house was shut down and the locomotive used to operate the pump. By this method, we get three shifts of pumping and are only at the expense of running the power house two of those shifts.

The batteries of the locomotive show that only about two-thirds of their power is exhausted at the end of its shift. There is no trouble, therefore, to run the locomotive out of the mine to the power plant where it is recharged during the next two shifts.

The question I would like to ask is whether this use of the locomotive is injurious to it; if not, it appears to me that we have hit upon a pretty good wrinkle for cutting down expense, at a time when every penny is needed. FOREMAN.

———, W. Va.

We quite agree with this correspondent that the method he has adopted is a good one. No possible injury can result from the use of the motor of a storage-battery locomotive for the purpose of operating a pump, any more than for the operation of the locomotive, itself, provided the operation of the pump does not overload the batteries, which is not the case apparently in this instance.

There is, of course, no saving of power by the adoption of this method, but there is a saving of expense in the production of that power. For example, assuming a 10-hp. pump, its operation during 24 hours will mean a power consumption of $10(24 \times 0.746) = 179$ kw.-hr., whether this power is developed in two shifts or three shifts. The only appreciable difference is the saving in attendance at the power plant during one 8-hour shift, when the fires are banked and the pumping is maintained by the storage batteries of the locomotive.

The saving effected is slightly diminished, however, by an amount determined by the efficiency of the motors operated by the batteries and the coal consumed by the banked fires at the power house. The fact that the batteries are only two-thirds exhausted at the end of their shift indicates that there is no overload and the operation of the pump probably imposes no greater duty on the motor than the running of the locomotive in the daily operation of the mine.

Position of Primer in Blasting

Kindly state, in the columns of *Coal Age*, what is the safest practice in the blasting of rock with dynamite. Where should the primer be placed, at the top, in the middle or at the bottom of the charge? We have had some argument on this point, and while the majority seem to prefer to place the primer at the top of the charge, there are those who claim it should be placed at the bottom, while others say that better results are accomplished when the primer is placed at the middle of the charge. STUDENT.

Delagua, Colo.

In blasting with dynamite, the explosion of the entire charge is practically instantaneous, which is not the case in blasting with black powder. In the former case, the explosive wave is transmitted by shock, the action being known as "detonation"; in the latter case, the explosion is transmitted throughout the mass of the powder by burning, each grain or particle of the powder igniting the one next to it, which action is known as "deflagration."

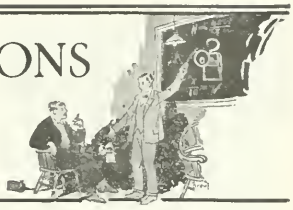
The detonation of dynamite being practically instantaneous, it would make no particular difference, as far as the explosion of the charge is concerned, whether the primer containing the cap was placed at the top, middle or bottom of the hole, just so it is in direct contact with the balance of the charge. The explosion of the primer cartridge is accompanied simultaneously with the explosion of the entire charge.

However, if the blast is to be fired by fuse, there are good reasons why the primer should not be placed at the bottom, or even the middle of the charge, but should be in the last cartridge inserted in the hole. The first and most important reason is that the burning of the fuse may ignite the dynamite before it reaches and explodes the cap in the primer. The dynamite ignited in this way may deflagrate or burn quietly without exploding, until the cap is detonated, in which case the force of the blast will be much decreased. Also, not only is a longer length of fuse required but there is greater danger of the fuse being injured when charging and tamping the hole.

The safest method, therefore, to pursue when blasting rock with dynamite is to place the primer cartridge at the top of the charge, which is common practice.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD



Miscellaneous Questions

(Answered by Request)

[The following questions have been taken from those sent us by different candidates in examination, asking for their solution. All of them are difficult questions to be answered in the short time allotted to examination. Some of them can only be solved by trial, without resorting to higher mathematics with which few candidates in mining examinations are familiar, and some require data not commonly found in mining textbooks.—Editor.]

Ques.—Two airways, starting from the bottom of the shaft, are driven the full height of a 6-ft. seam of coal and 8 ft. in width; one of the airways is 900 ft. long and the other 3600 ft. long. How much should the longer airway be widened to cause it to pass the same quantity of air as the shorter airway under the same pressure?

Ans.—The solution of this question develops the formula

$$0.006863w^3 = 6 + w$$

in which w = the required width of the longer airway to cause it to pass the same quantity of air as the shorter airway under the same pressure.

Explanation—The first step in the solution of this question is to write the formula for unit pressure in terms of the quantity and cancel the constant factors p, k, q, leaving the expression $lo\ a^3$, which has the same value for the short and the long airway, after the latter is widened to a width w.

For the first airway, $l = 900$, $o = 2(6 + 8) = 28$, $a = 6 \times 8 = 48$; and for the second airway, after widening, $l = 3600$, $o = 2(6 + w)$, $a = 6w$. Hence we write

$$\frac{900 \times 28}{48^3} = \frac{3600 \times 2(6 + w)}{(6w)^3}$$

Then, by cancelation and transposition, we obtain the formula shown above and which is most readily and quickly solved by trial, namely,

$$0.006863\ w^3 = 6 + w$$

By trial, we find the value, $w = 14.4$; and the longer airway must therefore be widened 14.4—8 = 6.4 ft., in order to pass the same quantity of air as the shorter airway, under the same pressure.

Proof—Assume a unit pressure of $p = 10$ lb. per sq. ft. and find the quantity of air this pressure will circulate in each of the two following airways:

Short airway,

6×8 ft., 900 ft. long;

Long airway,

6×14.4 ft., 3600 ft. long.

For the first or shorter airway, we have

$$Q_1 = 48\sqrt{\frac{10 \times 48}{0.00000002 \times 900 \times 28}} = 46{,}850\ cu.ft.\ per\ min.$$

For the second or longer airway we find

$$Q_2 = 86.4\sqrt{\frac{10 \times 86.4}{0.00000002 \times 3600 \times 40.8}} = 46{,}850\ cu.ft.\ per\ min.$$

Ques.—There are two airways in a mine, one 6 x 12 ft. and the other 4 x 9 ft., passing equal volumes of air under equal pressures. If the first airway is 1000 ft. long, what is the length of the other?

Ans.—The first step in this solution is to write the equation for unit pressure in terms of the quantity and dimensions of the mine thus;

$$p = \frac{klo q^2}{a^3}$$

Then cancel all the constant factors p, k, q, leaving the expression lo/a^3, which shows that the length varies directly as the cube of the sectional area and inversely as the perimeter of the airway. In other words, the length ratio is equal to the product of the cube of the area ratio and the inverse perimeter ratio; thus,

$$\frac{l}{1000} = \left(\frac{36}{72}\right)^3 \times \frac{36}{26} = \frac{1}{8} \times \frac{18}{13} = 0.173$$

$$l = 1000 \times 0.173 = 173\ ft.$$

which is the length of the second airway that will pass the same quantity of air under the same pressure as the first airway.

Ques.—A mine having two shafts, one a downcast and the other an upcast, is passing 100,000 cu.ft. per min. Each shaft is 500 ft. deep and 15 ft. in diameter. The downcast shaft has an average temperature of 60 deg. F., and the circulation is produced by a furnace. Assuming an average barometric pressure in the downcast shaft of 30 in., find the average temperature of the upcast shaft, required to overcome a mine resistance of 8 lb. per sq.ft.

Ans.—The weight of 1 cu.ft. of air in the downcast shaft is

$$w = \frac{1.3273 \times B}{460 + t} = \frac{1.3273 \times 30}{460 + 60} = 0.0766\ lb.$$

The height of motive column of downcast air, corresponding to a unit pressure of 8 lb. per sq.ft., is, then,

$$M = \frac{p}{w} = \frac{8}{0.0766} = 104.4\ ft.$$

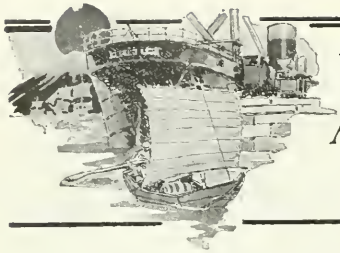
The next step is to write the formula for motive collumn, in terms of downcast air, which is as follows:

$$M = D\frac{T - t}{460 + T}$$

Finally, substituting the known values $M = 104.4$, $D = 500$, $t = 60$, the value of T is found by trial to be $T = 197.2$ deg. F.

Ques.—If a cubic foot of gas should explode, how many cubic feet of flame would it make?

Ans.—The theoretical flame temperature of methane or marsh gas, mixed with air and exploded in a free atmosphere offering no resistance to its expansion, is about 4173 deg. F., corresponding to an absolute temperature of 4173 + 460 = 4633 deg. F. The flame volume is, therefore, 4633 ÷ 460 = say 10 vol. That is to say the volume of flame produced by the explosion of a firedamp mixture, in free air, the firedamp being at its most explosive point, is practically ten times the volume of the firedamp.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Australia Commandeers Coal Supply

Prime Minister Is Authorized Not Only to Acquire and Dispose of All the Coal Mined in Australia, But to Fix Wages and Selling Prices

At a special session on May 1, reports Trade Commissioner A. W. Ferrin, of Melbourne, Australia, the Federal Council passed regulations under the War Precautions Act authorizing the Commonwealth Prime Minister to acquire and dispose of all the coal mined in Australia. The Prime Minister was also authorized to fix wages and conditions of employment in the coal-mining industry and to fix the prices at which coal shall be sold to the public and to abrogate existing contracts. The regulations as gazetted after the special session are as follows:

Whereas any serious interference with the supply of coal throughout the Commonwealth is likely to affect prejudicially the return, demobilization and repatriation of the military forces, to disorganize industry, and to interfere with the supply of goods and services needed in connection with the war:

Now, therefore, I, the Governor General in and over the Commonwealth of Australia, acting with the advice of the Federal Executive Council, hereby make the following regulation under the War Precautions Act, 1914-1915, to come into operation forthwith:

1. The Prime Minister may, if in his opinion the supply of coal is endangered or likely to be endangered, by order authorize the acquisition of coal on behalf of the Commonwealth.

2. Any such order may relate to any or all (a) coal stacked in any part of Australia, and (b) coal won from time to time or within any specified period or periods from any particular coal mine, or from some or all of the coal mines in any particular district or part of Australia, or from all the coal mines in Australia.

Giving of Notice—Compensation

3. Notice of the making of any order may be given to the owner of the stack or mine to which it relates, either (a) by the publication of a copy of the order in the Gazette or (b) by the service of a copy of the order upon the owner or person in charge of the stack or mine.

4. Upon notice of the making of the order being given, the owner of the stack or mine shall comply as soon as reasonably practicable, or from time to time, as the case may be, with all directions given by any person (in this regulation referred to as "an authorized person") thereto authorized in writing by the Prime Minister or by the Controller of Shipping appointed under the War Precautions (Shipping) Regulations 1918.

5. The method of acquisition shall be as specified in any directions given by an authorized person to the owner of the stack or mine.

6. The Prime Minister or the Controller of Shipping may appoint such agents as he thinks fit to sell or distribute coal acquired by the Commonwealth under this regulation.

7. Each agent so appointed shall keep such books of account as the Prime Minister or the Controller of Shipping directs.

8. The Prime Minister may, if he thinks fit, give directions as to the rate of wages and conditions of employment of persons employed in the production of coal acquired or to be acquired by the Commonwealth under this regulation.

9. The compensation payable to any person from whom coal has been acquired and the remuneration to any agent appointed for the purposes of this regulation shall be determined in such manner and upon such basis as the Prime Minister directs.

10. The selling price of coal acquired by the Commonwealth shall be such price as is fixed by the Prime Minister. The price may vary in different parts of the Commonwealth and as regards different qualities of coal.

11. Any person who fails to comply with any direction given under or for the purposes of this regulation, or who obstructs an agent, an authorized person, or any other person in the carrying out of this regulation or in the acquisition or sale of coal by the Commonwealth, shall be guilty of an offense.

12. The Prime Minister may, by order in writing, cancel or suspend any contract or agreement for the supply of coal.

13. Notice of the cancellation or suspension may be given (a) by the publication of a copy of the order in the Gazette or (b) by the service of a copy of the order upon each party to the contract or agreement.

Regulations Apply Only to New South Wales

In commenting on this action the local press said:

From today the Commonwealth Government takes, to all intents and purposes, control of the coal industry in New South Wales. Last week regulations were gazetted empowering the Commonwealth to exercise control over the sale and distribution of coal, as well as over its acquisition, and over the rates of wages to be paid in the mines. The object was to insure that the industry would be continuously carried on and a disastrous strike averted. The acting Prime Minister indicated that action under the regulations would apply only to the New South Wales mines at present; that from today it was intended to commandeer the New South Wales coal output and to put into agreement the terms of the Melbourne agreement, which provides, among other things, for increased wages for the miners and for improved machinery to deal with local stoppages. This agreement has been approved by the great majority of the miners.

On Saturday the first forward step under the regulations was taken by the Federal Government. In a special *Commonwealth Gazette* that was issued during the morning the Acting Prime Minister authorized the acquisition on behalf of the Commonwealth of "all coal won from time to time from all coal mines in the State of New South Wales." The Commonwealth Government, in other words, now controls all the coal output. The detailed administration of the scheme is in the hands of Rear Admiral Sir William Clarkson, who will carry out the acquisition of the coal for the Government and will appoint a committee in New South Wales to act under his instructions. From today the terms of the Melbourne agreement will be in force in the coal fields of New South Wales, and this will, of course, imply increases in the price of coal. It has already been stated that these increases at the pit mouth will work out at about 2s. 9d. (67 cents) per ton in the northern mines, 2s. 6d. (61 cents) in the southern mines, and 2s. 3d. (55 cents) in the western mines.

Order Empowers Prime Minister to Fix Prices

Further regulations relating to the price of coal acquired by the Federal Government under the recent war precautions order were issued on May 16. They empower the Prime Minister to fix the price at which a person may sell coal which he has purchased from the stocks acquired by the Commonwealth and make it an offense to sell at any higher price than that so fixed. Such fixed price may vary in different parts of the Commonwealth, and as to different qualities of coal, and shall have effect notwithstanding the terms of any contract relating to the sale of coal by a person who has purchased coal from the Commonwealth. Any such contract by force of this regulation shall be deemed to be varied in respect of all coal delivered under the contract on or after May 5 and during the continuance of the regulation. It is also provided that certain coal may be exempted from the application of the price-fixing order, in which case the regulation relating to the varying of contracts shall not apply.

Another important addition to the regulation related to the price of gas and coke. Where the price of coal fixed by the Prime Minister is in excess of the price hitherto prevailing the Prime Minister may, by order, declare (1) that any increase in the price of gas charged by a company producing gas from coal to which increased prices apply shall not be taken to be an increase in the price of gas within the meaning of any state act which provides for a sliding scale in the relation of the dividend payable by the company producing the gas to the price charged by it, and (2) that any company producing smelting coke or gas from coal for which increased prices are payable may in existing contracts for the sale of such coke or gas increase the contract price by an amount not exceeding that specified in the Prime Minister's order.

Ocean Freight Rates

W. W. Battle & Co. report that they have chartered a number of steamers for export coal, and that the situation on July 21 was as follows:

European Coal—Numerous orders in the market, on which shippers are offering the rates quoted below. Demand for tonnage exceeds the supply.

South American Coal—Rates have declined materially, as can be seen from the table below.

West Indian Coal—While tonnage can be secured at the rates quoted, only an occasional steamer can be obtained at lower figures.

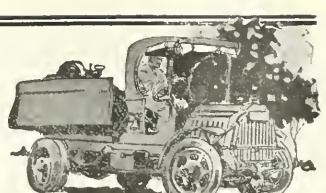
Freight rates by steam on July 21 were as follows:

Genoa-Leghorn, $26.50, 1000 dis.; Spezia-Savena, $26.50, 1000 dis.; Piraeus, $28.50-$30.50, 1000 dis.; Trieste-Venice, $31, 800 dis.; Algiers, $26, 800 dis.; Cadiz, $23.50, 1000 dis.; Bilbao-Barcelona, $26, 1000 dis.; Antwerp-Rotterdam, $22.50, 1000 dis.; Lisbon, $22.50, 1000 dis.; Gothenburg, $26.50, 800 dis.

Fernambuco $15 net, 500 dis.; Bahia, $15 net, 500 dis.; Rio, $16 net, 1000 dis.; Santos, $17.50 net, 600 dis; Buenos Aires or La Plata, $14 net, 1000 dis.; Montevideo, $14 net, 750 dis; Rosario, $16 net, 750 dis.; Bahia Blanca, $15.50 net, 1000 dis.; (charters for the foregoing business may be arranged on gross form of charter at $1 over the rates quoted.) To Nitrate Range, $14.50 gross prepaid.

Havana, $7.50, 600 dis.; Cardenas or Sagua, $9, 300 dis.; Cienfuegos, $9, 500 dis.; Caibarien, $9.50, 300 dis.; Guantanamo, $8.50, 500 dis; $9, 400 dis.; Manzanillo, $9.50, 300 dis.; Bermuda, $9.50, and Bermuda port charges and discharge free, 300 dis.; Kingston, $9.50, 400 dis; St. Thomas, $10, 500 dis.; St. Lucia, $11, 500 dis.; Barbados, $11, 500 dis.; Santiago, $8.50, 500 dis; $9, 400 dis.; Port of Spain, Trinidad, $11, 500 dis.; Curacao, $10.50, free port charges; Curacao, 600 dis.; Demerara, $13, 400 dis.

COAL AND COKE NEWS



Harrisburg, Penn.

Important "boundary pillar" decision is handed down. Attorney General of Pennsylvania states question should be settled by State Chief of the Department of Mines. Interesting case of M. N. Ayers and Lehigh & Wilkes-Barre Coal Co.

It is the duty of a mine inspector to hold hearings and decide in regard to the details of boundary pillars between anthracite mining properties, according to a decision handed down on July 22 by the Attorney General of Pennsylvania to Seward E. Button, State Chief of Department of Mines. The decision settles a question of jurisdiction which has arisen several times.

The question was whether a barrier pillar can be demanded between the property of Mary N. Ayers and a certain property of the Lehigh & Wilkes-Barre Coal Co., pursuant to the act of June 2, 1891, P. L. 176, providing for the safety of persons employed in anthracite mines. Mary N. Ayers is the owner of 4½ acres of coal located in the southern end of Wilkes-Barre, which is surrounded by the workings of the Lehigh & Wilkes-Barre Coal Co. (South Wikes-Barre No. 5 colliery). The Wilkes-Barre company advised Mine Inspector Thomas J. Williams, of the Eleventh (Wilkes-Barre) district, that it felt no obligation to act in the matter for the reason that the statute providing for barrier pillars was passed as a protection to men working in adjacent mines. There is no mine on Mrs. Ayers' property, nor is it possible to open a mine on a tract less than five acres in extent and on which the upper seam is 500 ft. or more below the surface.

In passing on the question of leaving barrier pillars, Deputy Attorney General Collins cites an opinion of the late Attorney General Elkin, dated April 15, 1897, and Attorney General Collins states further:

"The language of this section is mandatory and requires the owners of adjoining coal properties to leave or cause to be left a pillar of coal in each seam of coal worked by them along the line of the adjoining property. This mandate of the law must be obeyed whether the coal in the adjoining property is worked at the same time or at a later date. As the inspector of the district you are required, under the provisions of the law, to aid in the determination of the width of the pillars left for the mutual protection of the adjoining property owners.

"The question as to who is charged with the duty to determine the necessity for a barrier pillar between adjoining coal properties has been the subject of judicial construction in many cases and may now be regarded as definitely settled.

"The attorney general is not vested with any authority to decide whether a barrier pillar in any given case is needed, the determination of that question resting with the tribunal created by law for that purpose. It was the evident intention that its members, composed of experts, after due consideration and with full knowledge of the physical situation of the property and all relevant facts in connection therewith, are best fitted to reach the right conclusion.

"In the case of Sterrick Creek Coal Co. vs. the Dolph Coal Co., Ltd., it was held that the duty of enforcing the provisions of the mine law relating to barrier pillars rests in the first instance upon the mine inspector of the proper district; but if the mine inspector fails, for one reason or another, to proceed in the premises as provided by the act of assembly, either adjacent mine owner may appeal to a court of equity for relief.

"Inasmuch as one of the above named owners of adjoining coal land has requested that steps be taken to establish a barrier pillar between her property and that of the adjoining owner, it will be proper for your department to institute the proceedings contemplated by the act to ascertain the necessity for such a pillar.

"You are, therefore, advised that the inspector of the district should give notice to the respective owners of the aforesaid properties of a meeting to be held, at some appointed time and place, by him with the engineers for the owners of the properties, to determine whether a barrier pillar is necessary and, if so, the proper width thereof."

Governor Sproul on July 24 approved the amendments to the workmen's compensation insurance acts passed in the closing days of the Legislature, and hereafter no system or schedule of merit rating can be applied to such insurance premiums except through a rating bureau approved by the Insurance Commissioner. The bill, which caused considerable discussion in the Legislature, also provides that copies of such insurance policies and endorsements thereon must be filed with the rating bureau.

Governor Sproul has vetoed the legislative resolution making an appropriation of $100,000 for the relief of sufferers by the disaster at the Baltimore Tunnel in Wilkes-Barre, in which 92 lives were lost. He states that the Department of Health has sufficient funds to take care of such emergencies.

Charleston, W. Va.

Increased production in central southern West Virginia. Causes preventing full production of high volatile coal. Smokeless mines unable to supply demand.

The strike of marine workers restricted the shipment of West Virginia coal, particularly gas coal, during the week ended July 19; the embargo which had been in effect against coal from the high volatile fields since July 7 not, however, retarding in the least the shipment of smokeless. During this period, however, there was unquestionably an increased production in most fields in central southern West Virginia, production being stimulated by the development of a further demand for steam mine-run, slack in turn benefitting by such a demand. The bulk of steam coal was sold in the open market rather than through contracts, but there is not the demand for such coal in the West that there is in the East. In the high-volatile fields there is not a full production, many concerns waiting for higher mine-run prices; a shortage of labor was another important factor preventing a full production, however, a large quantity of coal was mined in both high-volatile and smokeless fields during the third week of July. It has been found impossible to cover the shortage of smokeless fuel at tidewater existing since early in June and consequently smokeless was not embargoed. Even under favorable transportation and labor conditions the smokeless fields were unable to supply the demand during the week ended July 19. A heavy proportion of smokeless coal was being shipped to tidewater points for export and for bunkering.

The mines of the New River region were unable to supply the demand for the product of that field during the week ended July 19; though such mines were successful in materially increasing the tonnage of coal mined during this period largely because miners were applying themselves more assidously and also because of a continuance of an excellent car supply and the prompt movement of coal. The fact that there were not enough miners in the field was largely responsible for restricting production to about 80 per cent., although that represented fully a 15 per cent. increase in the space of a week. Strange as it may seem, the more smokeless coal there is produced, the more difficult it seems to be to obtain it, that condition being due, it is believed, to the fact that the navy is taking over quite a large tonnage.

Several factors combined to hold coal production down to about 65 or 70 per cent. in the Kanawha field during the week ended July 19, the principal factor being a growing shortage of labor in the district; though with more men at work than during the previous week there was an increase in production, facilitated by a continuance of an adequate car supply. It is probable that the embargo debarring the shipment of gas coal to tidewater held back production. Still another factor was the inclination of smaller producers to wait until mine-run reached such a price that they could afford to produce it at a fair profit, having no screening equipment. Of course with a steadier demand for mine-run, due to increased buying of steam coal in the East, slack is also reaping the benefit of such improvement.

Fairmont, W. Va.

Production in northern West Virginia crippled by car shortage, embargo on tidewater shipments and adverse freight rates as to Lake shipments.

After having enjoyed several weeks of excellent car service, production was crippled in northern West Virginia fields throughout almost the entire week ended July 19 because of a shortage of cars; causing the shipment of coal in the Fairmont region, for instance, to decline to the extent of about 300 cars a day as compared with earlier weeks of the month, as well as forcing, at odd times during the week, a suspension at several mines. It was found difficult to secure enough miners to man all the mines which were able to operate. A greater number of mines could have operated under more favorable conditions indicating a growing demand for the various coals produced in the northern part of the state. Shipments to tidewater, particularly to Curtis Bay (the principal tidewater point for northern West Virginia coal) were stopped during the week to a large extent by the embargo which was imposed on July 14; Curtis Bay shipments being only about a fourth as large as shipments during the earlier part of the month. There was also a decrease during the weekly period of shipments to Lake points as compared with previous weeks of the month. The decision of the Interstate Commerce Commission denying the application of West Virginia, Ohio and Pennsylvania mines for either a reduction in freight rates to northwestern points, or an increase in the rates from Illinois and Indiana, was received in northern West Virginia during the week and was rather discouraging; the small volume of Lake shipments so far this season having been attributed to adverse freight rates.

Birmingham, Ala.

Prominent operators protest against tonnage tax on Alabama coal. H. T. De Bardeleben makes complete statement as to cost of production. Market for Alabama coal discussed.

Coal operators of the Birmingham district have been waging an energetic fight recently against the proposed five-cent tonnage tax on coal and iron ore, which the state Budget Commission's general revenue bill would levy in Alabama. As the result of this battle, it was reported that the tax would be decreased to from one to two cents per ton.

In a discussion of the coal tonnage tax before the Ways, Means and Appropriation Committee of the Alabama House of Representatives, the coal operators' side of the controversy was presented (among others) by Henry T. De Bardeleben, one of the best informed and most successful coal operators of the state. Both Mr. Bush and Mr. De Bardeleben proved by their cost sheets, which were prepared under regulations of the United States Fuel Adminis-

tration, that the net profit per ton of coal is almost negligible.

Mr. De Bardeleben went into the details of production, showing the cost of labor, materials, supplies, transportation and every other item of expense. The conclusion drawn from his statements is that coal operators in Alabama will not be a large contributor to the income and excess profits tax fund. "Of all the coal mined in the United States," said Mr. De Bardeleben, "only 3 per cent. is washed, and one-half of that is mined in Alabama. The special tax applies to the rock, slate and dirt as well as the coal, and when that is taken out the tax will be six cents, instead of five. Sixty-five per cent. of Alabama coal is sold outside of the state, where competition is strong and the operators could not pass the tax on to the consumers; and for that reason the 35 per cent. sold in the state would have to bear the whole tax, or about 15c. a ton to Alabama consumers. It has been a struggle for markets with Alabama ever since the first mine opened. The market is confined to small territory, as the small increase in production shows, and our lines are being pushed in on all sides; Tennessee, Kentucky and Virginia coal on the north and east; Kentucky, Tennessee and Illinois coal on the north and west, and Mexican and Texas Oil on the south and west."

Mr. De Bardeleben said, "Alabama had lost tonnage in the last year amounting to 2,500,000 tons. With this tax bill put into effect, 3,000,000 tons will be lost. It would be the survival of the fittest, and with Alabama's narrow territory, not many operators could exist. There are few coal companies in Alabama of any great age that have not been in bankruptcy or verging on it during the last two or three years."

Dallas, Tex.

Coal men of Texas discuss coal shortage situation. President of National Coal Association addresses state meeting at Dallas. People urged to buy coal at once.

Texas bituminous and lignite dealers held a meeting in Dallas last week for the purpose of discussing plans for educating the people of the state as to methods for preventing serious coal shortage and famine this fall and winter. Harry N. Taylor, of Kansas City, president of the National Coal Association; J. D. A. Morrow, of Washington, and William Henderson, of Pittsburgh, Penn., also other officers of the national organization, were present.

"The production of coal in the first six months of this year," Mr. Taylor told the coal men present, "is 80,000,000 tons short of the production of the mines at the same time last year. This condition has been brought about by the cessation of the war and the lack of interest on the part of the buying public. While there is a good supply of coal on hand at the present time, and cars to move the coal can be had, yet if everybody continues to hold off to the last minute before buying their winter supply of coal, a shortage is inevitable. If the people attempt to make up the shortage in the six months of the cold weather, they will face an impossible situation and an inevitable shortage.

"The railroads will be called upon to move the biggest crop ever raised in the country. They will, consequently, be taxed to the lack of motive power and by the shortage of cars. The only possible outcome of the situation would be a shortage and a scramble for coal with high prices.

"The National Coal Association has assumed the responsibility of educating the public that the association may not be blamed for the shortage and the high price of coal which will result from the present policy. At this time there are plenty of cars and coal. If the public does not heed the warning and lay in the winter's coal supply, nobody can be blamed but themselves.

"In the East the coal shortage is already being felt, because of the large quantities used for industrial purposes. It is moving west and will be in full tilt by the first of September. We are trying to prevent a repetition of the situation of 1917."

Mr. Taylor told the Texas coal men that the National Coal Association represents an output of 600,000,000 tons of bituminous products and employs 750,000 men. All the bituminous and lignite interests in Texas were represented at the meeting, and promised to carry the problems to their people and conduct campaigns in an effort to induce the people to buy coal now for their winter's needs.

Ottawa, Ont.

Coal situation in Canada similar to that in United States. Necessity of placing orders for coal at once. Shortage of Pennsylvania anthracite noted.

Sir George E. Foster, Canadian Minister of Trade and Commerce, has issued a statement on the Canadian coal situation. He points out that with the signing of the Peace Treaty the United States Fuel Administration has automatically ceased to exist, and the production and distribution of coal is now governed solely by the law of supply and demand. All war-time regulations, restrictions and embargoes have been cancelled. The Canadian fuel control was disbanded on March 31. The coal supply, therefore, now depends on the individual efforts of the coal trade and the co-operation it receives from consumers in placing orders at once. The information at hand indicates that coal is not coming into the country in the same quantities as last year; this is especially true in the maritime provinces. For the first six months of the year, the Pennsylvania anthracite mines (on which central Canada depends for a large part of her domestic coal) had produced only 38,800,000 tons of coal, as compared with 49,100,000 tons during the same period last year, making a shortage to date of over 10,000,000 tons. Nor is there much hope that the shortage will be made up, owing to the scarcity of mine labor caused by the departure of many thousands of miners for Europe. With the strong demand for coal and the lessened production, there is little reason to hope that the prices of anthracite at the mines will fall for many months, in fact the indications are that it will continue to advance as fall and winter approach. It is not possible to forecast what the labor situation at the mines will be, or what success the railroads will have contending against possible adverse climatic conditions this coming winter. The Government, therefore, urges all consumers to protect their fuel requirements by placing their orders at once. If it is impossible to secure full requirements of anthracite it is suggested that bituminous coal or other substitutes be acquired for use in the late fall and spring.

PENNSYLVANIA

Anthracite

Wilkes-Barre—A. F. Wolf, president of the Wolf Collieries Co., Inc., and the Central Coal Co. of this city, has acquired the J. B. McCreary coal lands in Fraley and Porter townships, in Schuykhill County, near Tremont, said to contain about 25,000,000 tons of coal. The new operation will be known as the Lykens Valley Coal Co.

Pittston—The No. 14 washery of the Pennsylvania Coal Co., at Port Griffith, which was destroyed by fire a number of weeks ago, is being reconstructed. This washery, which was one of the most modern in the anthracite field, was burned to the ground a few days before it was to begin operations, not a ton of coal having been sent through the new plant.

Kingston—In a decision handed down by Surrogate Cohalan in New York, on July 24, the entire income from coal lands in Kingston, Penn., was awarded to the Maltby heirs. These lands were leased to the Lehigh Valley Coal Co. for 99 years, dating from 1882. The lease in question calls for 154,000 tons of coal to be mined from the property as a yearly minimum, on a royalty of 25c. a ton.

Shamokin—The Susquehanna Collieries Co., operating the Richards, Pennsylvania, Scott, Hickory Ridge, Luke Fidler and Cameron collieries near here, has announced the adoption of improvements involving an expenditure of $4,000,000. A big steel and concrete breaker will be constructed at Green Ridge and a six-compartment shaft will be sunk to a depth of 900 ft. The coal from the Pennsylvania and Richards workings will be hoisted through the new shaft; several long tunnels will be driven to connect these workings with the shaft. Another feature of the proposed improvements will be a central electrical power plant to operate the mines in this section.

Bituminous

Springdale—A $6,000,000 power plant is under construction at this place by the West Penn Power Co. This company will mine its own coal for power purposes; the plant and hoisting shaft will be on one side of the Allegheny River, here, while the main body of the coal is on the other side. It is expected that the plant will be completed in about a year and will supply a large territory with power.

Waynesburg—A deed has been placed on record here for the interest of James R. Barnes, of Uniontown, on the coal underlying 127 tracts of land in Franklin, Center and Washington townships, Greene County. The transfer is to John W. Donnan of Washington for a consideration of $252,000. The coal is located in what is known as the Boileau block and consists of 1,500 acres.

Pittsburgh—Hillman officials confirm the report of a deal whereby the Hillman Coal and Coke Co. has acquired a controlling interest in the Diamond Coal and Coke Co. It is said that an expenditure of $1,500,000 is involved. Both concerns have large holdings in western Pennsylvania and operate fleets of towboats on the Allegheny, Monongahela and Ohio rivers. It was said that the Hillman company's desire to acquire holdings on the Allegheney River in addition to its mines on the Monongahela prompted the deal. A. R. Budd is general manager of the Diamond company.

Punxsutawney—The Penn Public Service Co. is constructing a transmission power line from Rossiter to the mines of the Juneau Coal Mining Company, at Juneau. This is the first step taken to connect the two trunk power lines of the company. A distance of about ten miles will be needed to connect at Marion Center where the other trunk lines serve coal operations. Several operations between Juneau and Marion Center are working to get the lines connected and thus give power to the operations along the Buffalo, Rochester & Pittsburgh R.R. in this valley.

WEST VIRGINIA

Kilsyth—The Big Creek Coal Co. has been incorporated with a capital of $30,000, to operate near Kilsyth. This concern, composed of local men entirely, consisting of G. W. Card, president; W. A. W. Carden, vice president; W. A. Higginbotham, secretary-treasurer. Another director of the company is Dr. U. S. Carden.

Locust—The Locust colliery is installing an electric haulage system in its mines here. For some time electric machines have been doing the undercutting but on account of difficulty in getting materials of all kinds the haulage project has been held up. It is expected that with the new transportation the tonnage will be greatly increased.

Charleston—As showing the extent to which government built steel hopper cars are not being used, and the side track space in West Virginia taken up by such cars, E. E. Winters, Chief Railway Inspector, has reported that there are 2068 of such Government cars on various railroads in West Virginia and adjacent states not being utilized. The Public Service Commission detailed Inspector Winters to make the investigation after protest had been made to the commission by the West Virginia Coal Association that not only were there a large number of idle government cars but that such cars were making operations difficult because of the side track space they occupied. In connection with the effort to induce the government to put the cars built under its orders in service, Assistant Director General of Railroads has given assurance that arrangements are being made to put such cars in service shortly and he has also promised a 100 per cent. car supply for West Virginia.

OHIO

Fredericksburg—The Mt. Cherry Coal Co., with headquarters in Columbus, has completed the erection of a fire clay grinding plant and a hollow building block manufacturing plant on its coal property near this place. The cost of the two plants was $200,000. Additional machinery is to be installed. The company of which Warren H. Ferris is president and general manager is operating two mines on its property.

Hamilton—The plant of the Hamilton Otto Coke Co., north of this place, is to be sold at public auction on September 17 at 2 p.m. The liabilities of the company are about $400,000, one half of which are unsecured. The assets are listed at over $700,000 (chief of which is the plant), including the real estate north of Hamilton. Personal property is listed at over $100,000. This plant is said to be one of the largest coke industries in Ohio. Higher production costs compared with coke plants more favorably situated, is stated to be the chief reason for its financial difficulties.

ILLINOIS

Valier—The Valier Coal Co. expects to get its main hoist in operation by the early part of ugust. The motor is 1350 hp. direct current, operated through a flywheel motor generator set. This is said to be the largest electric hoist in Illinois, and is of more than ordinary interest on account of the control being semi-automatic, having a push-button starter from the bottom of the shaft and an automatic stop.

Dowell—The Union Collieries Co. has recently put its main hoist in operation; it is driven by a 600-K.W. motor geared to the drum. The hoist is operated on purchased power through a flywheel motor generator set. The coal is hoisted in skips which have a capacity of ten tons. The time of hoisting, including loading, is about 30 sec. per trip. The entire plant is operated by electricity.

Herrin—Correction. The statement relative to the Big Muddy Coal and Iron Co. which appeared on page 126 of the July 17, 1919, issue of Coal Age was incorrect. The power plant referred to does not supply No. 7 mine and neither No. 7 nor No. 8 mine ever used Public Service power.

The Hofer Washed Coal Co. has decided to rebuild its plant recently burned and is now dismantling a steel tipple in Indiana, which will be erected at its Herrin mine.

West Frankfort—The West Frankfort Coal Co. is having a steel rescreening plant erected. This company has recently completed the installation of a 350-K.W., direct connected, direct current generator.

The Old Ben Coal Corporation is sinking a new air shaft at its No. 8 mine for the purpose of improving the ventilation. This concern will also install a large motor generator set at this point to give better power distribution. The company has a 33,000-volt power line running from its power plant at the No. 11 mine to all its plants except the recently acquired one at Lesser, Ill.

Sesser—At a luncheon given by Clarence Hutson, attended by Benton, Champaign and Chicago capitalists, plans were made for the organization of a big coal mining company to take over the operation of the Modern Oil Co. at Sesser, the West Frankfort Coal Co. at West Frankfort and the Crown Coal Mining Co., at Winkle. The new corporation, it is announced, will be capitalized at several million dollars, will have a large acreage of high-grade coal lands in Franklin and Perry counties and will be called the Little Gem Coal Co. Plans were recently perfected for the sinking of another new mine in Goode Township near Sesser, Franklin County; the company also expects to sink a shaft at Waltonville, in Jefferson County.

KENTUCKY

Stone—The Tierney Mining Co.'s plant, located here, has recently resumed operations after an idleness of almost six months. In 30 days' time the output has returned to normal and it is planned by the management to be producing 1200 to 1400 tons daily at this mine. G. C. Wood is general manager.

Lynch—The United States Steel Corporation is developing at this place what may be one of the largest coal operations in the state. The town adjacent to this plant now has a population of 6000 inhabitants, all houses being on company owned land. The company has about completed here, a hotel, moving picture theater, bank, department and other stores; furthermore, the town will have good fire protection and a fine water supply. This town is in Harlan County, near the Kentucky-Virginia-West Virginia line. A portion of the coal from this plant is made into coke in beehive ovens. A concrete road is being constructed from Lynch to Norton, Virginia.

ALABAMA

Birmingham—At a meeting of the Alabama Safety Association held here recently, James D. Hillhouse, former chief mine inspector, gave an address on "Reminiscences of a Chief Mine Insoector of 25 Years Ago." C. H. Nesbitt, Chief Mine Inspector, gave the association the benefit of considerable data which he obtained at the meetings of the Mine Inspectors' Institute, at Indianapolis, Ind. Hugh Lynch, a district mine inspector, read a paper on "Safety in Transporting and Handling Explosives in Coal Mines." At the meeting it was decided to hold a field meet in Birmingham this fall in first-aid and safety-first work.

TEXAS

Waco—Plans for a lignite carbonizing plant at Waco, Texas, were discussed at a meeting of the Lignite Operator's Association of Texas, at this place recently. J. C. McKay, of Dallas, secretary of the association, said the Government would spend $100,000 on such a plant, while the lignite operators of the state would spend $50,000 more, making $150,000 for the erection of the plant.

The plant will experiment extensively with Texas lignite. It is believed that the carbonized lignite can be used successfully for domestic use and in smelters. As the iron beds of east Texas are now being developed, a cheap local fuel will mean much for the future iron industry of the state. It is said that the carbonizing plant will be built by the Bureau of Mines and the Texas Lignite Operators' Association jointly. It is expected that the University of Texas will also put in a plant in connection with its school of engineering. Tar and gas are the chief byproducts; a market for the latter can be found in Waco which was one of the chief considerations in selecting that city for the plant. It is believed that similar plants will be established in Dallas, Fort Worth, San Antonio, Houston and other Texas cities of sufficient size to afford a market for the gas produced in such a plant. The plant to be erected at Waco will have a capacity of 300 tons of carbonized lignite daily. A recently developed use for Texas lignite is for burning gumbo ballast for the railroads; it has been found that lignite may be used more successfully than slack coal and is much cheaper. The Missouri, Kansas & Texas Lines has just let contract for 75,000 tons of lignite to be so used. When other railroads learn that lignite may be so employed, it is estimated that a demand for at least 400,000 tons of lignite annually will have been created.

IOWA

Knoxville—The Rex Fuel Co's. Mine No. 2, southeast of here, has stopped producing coal after operating for 15 years.

one time it was one of the prominent plants of the state; the seam worked was 12 ft. thick in places with an average thickness of six feet. When the mine was working to full capacity, there were from 200 to 250 men employed; but of late years the company has opened up new mines and Mine No. 2 has gradually decreased shipments.

Des Moines—New coal mines are being developed in the vicinity of this place as follows: The Norwood White company is sinking a shaft to reach a 7-ft. seam at a depth of 300 ft.; this company is also developing a new mine near Norwoodville, to be known as Mine No. 6. Another new plant which has been in operation a short time is the "XL" mine southeast of the city. This operation will have an increased output the coming season. Other new mines just getting under way are operated by the Urbandale and Liberty companies northwest of the city, and the Interurban Coal Co., northeast of here.

Personals

Edward Law, son of the late Ernest Law, recently was admitted to the firm of Ernest Law & Co.—coal and coke—as a partner.

Henry M. Payne has been spending July on professional business in Idaho and Washington and will return to New York early in August.

C. M. Weld, consulting mining engineer, has returned from war work in Washington and resumed practice with offices at 66 Broadway, New York City.

Edward M. Wagner, general superintendent of the Orinoco Mining Co., at Orinoco, Ky., married Miss Gladys Smith, of the same place, on July 23.

E. O. Floyd has been appointed general sales manager of the Rossendale-Reddaway Belting and Hose Co., Newark, N. J., the appointment to take effect Aug. 1.

G. W. L. Hall has resigned his position as cashier of the Merrimac Anthracite Coal Corporation, at Merrimac Mines, Va., to accept a position of auditor with the Austen Coal and Coke Co., of Austen, W. Va., to take effect August 1.

John A. Duglas, formerly general mine foreman at the Ida May mine of the Consolidation Coal Co., in northern West Virginia, has been appointed superintendent at the Page plant of the Loup Creek Colliery Co. on the Virginian Ry.

George C. Breckenridge recently tendered his resignation to the Bell & Zoller Mining Co., as superintendent of Zeigler, Ill. No. 2 mine. Mr. Breckenridge has been with the Bell & Zoller people about two years. At the present time his position has not been filled.

Ralph T. Fuller has recently become associated with the Producers Fuel Co., of Pittsburgh, Penn., as vice president of the company. For the past ten years Mr. Fuller has been affiliated with the sales department of M. A. Hanna & Co., in Cleveland, Ohio.

P. H. MacDonald has been reappointed superintendent at Mine No. 55 of the Consolidation Coal Co., at Madowbrook. Mr. MacDonald was superintendent at this place before going overseas and it is the policy of the Consolidation company to restore employees to their former positions as fast as they return from foreign service.

C. D. McClary has been made sales manager of the Pittsburgh office of the Western Electric Co., Inc. Mr. McClary was first connected with the Philadelphia office and was transferred to Pittsburgh in 1910. In 1916 he joined the sales force and two years later was promoted to be assistant sales manager which position he held until his present advancement.

Industrial News

Mayking, Ky.—Plans are being arranged by the Mayking Coal Co. for the construction of a new power plant at its operation here.

Welch, W. Va.—The Houston Collieries Co. has completed arrangements for the development of a coal property near here. Jacob Henry is construction engineer in charge of the proposed work.

Chicago, Ill.—The Export Coal Co 112 West Adams Street has been incorporated with a capital of $3,500,000 to engage in the export of coal. E. J. King, Fred E. Lang, and Albert G. Ziesk are the incorporators.

Uz, Ky.—H. G. Funk is understood to have completed arrangements for the leasing of local coal properties, and plans are now in process of formation for early development. Electrical equipment will be installed throughout the operation.

Pottsville, Penn.—It is interesting to note that the Philadelphia & Reading R.R. furnished a total of 1200 empty coal cars to bituminous coal districts on July 13, being the largest number of empties sent for some time past in a single day to such fields.

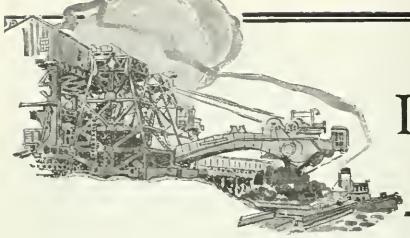
Lost Creek, W. Va.—The Eastern Utilities Coal Co has recently completed the installation of new weighing scales at its local mine, for the purpose of paying the miners according to the amount of coal mined by tons instead of by cars, as heretofore.

St. Louis, Mo—The Dozaw Valley Coal Co., with offices in the Wainwright Building, has been consolidated with the John T. Hesser Coal Co., Rialto Building. John Shaw head of the Dozaw Valley comoany, will be identified with the consolidated company.

Detroit, Mich. — The Cutler-Hammer Manufacturing Co., of Milwaukee, Wis., has recently opened an office at this place. The office here is, in reality, a branch of the Chicago office and bears the same relation to it as the Cincinnati office. H. S. Kinley, who is in charge at Detroit has taken with him from the Chicago office, Messrs. C. W. Greenman and M. Dugliss.

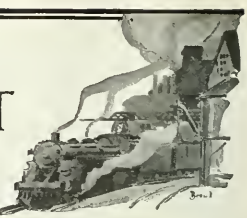
New York, N. Y.—Trade Commissioner Lundquist at Johannesburg, South Africa, has forwarded to the New York district office of the Bureau of Foreign and Domestic Commerce two samples of lamps in demand in South Africa for the use of miners. The lamps in demand must be strong. It is reported that one company will take 15,000 of these lamps per year. The samples can be examined at the New York district office.

Washington, D. C.—Coal cars piling up everywhere awaiting repairs while the country faces a fuel shortage and the Railroad Administration and the car owners argue over the damages were pictured to the House Rules Committee today by George H. Cushing managing director of the American Wholesale Coal Association. The committee was considering congressional investigation of the possibility of a coal shortage this winter. Meanwhile in the Senate Senator Frelinghuysen, of New Jersey, introduced a resolution for investigation.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Publicity of Soft Coal Operators Causes Confusion in Minds of Readers—Analysis of the Bituminous and Anthracite Markets—Hard Coal Shipments Well Up to Those of Normal Years—Bituminous Will Be Short

TO the public in general, coal is coal. Therefore, the advertisements of the National Coal Association, warning of a coal shortage this winter unless consumers order their coal now, is confusing. The user of anthracite, particularly the domestic sizes of anthracite, wonders what all the ado is about. He has ordered his coal, put in his request weeks ago, in fact, and has not as yet received delivery. "Why," he questions, "all this insistence on buying coal now, when the dealer tells me he cannot deliver for a month to come?"

And his plaint is one worthy of notice. The National Coal Association numbers in its membership 90 per cent. of the bituminous operators of the country. Its interest lies solely with the producing and marketing of soft coal. All its advertisements and publicity work refer to this kind of coal. It has absolutely nothing whatever to do with anthracite, and it has failed to make this fact clear to the public. The result is that coal consumers are completely mystified and do not know what to believe.

Boiled down, the situation is this: In order to meet the estimated demand for bituminous coal, the mines must produce 537,500,000 net tons of soft coal during the present coal year, which began April 1, 1919, and runs to March 31, 1920. It is always assumed that all of the coal produced prior to April 1 of any year—except in case of stocking for emergency use—goes immediately into consumption. The actual production of soft coal during the first three months of the coal year—April, May, and June—totalled only 99,367,000 net tons. At this rate of production the indicated output for the next nine months of the coal year would total 298,101,000 net tons, or 397,468,000 net tons for the year. This means a shortage of 140,032,000 net tons by March 31, 1920.

If the soft coal mines of the country could be stimulated to produce to their full potential capacity, they could readily mine more than 600 million net tons of coal a year. The actual output in 1918 amounted to 585,833,000 net tons. Favorable mining and transportation conditions no longer exist, however, and the only way in which a radical shortage can be averted this fall and winter is for consumers of soft coal to put in their orders and keep the mines busy at work filling them.

Much of the shortage in soft coal will have to be met by the product of the Middle West mines, which at the present time are working at about 50 per cent. of capacity. The low volatile coals produced in the eastern section of the country are scarce already. Every ton of high-grade coal that will be mined during the coming year has been contracted for. It will be foolish for consumers, who are not covered by contracts to persist in their attitude of discrimination. True, at this moment soft coal may be picked up at low prices, but this condition will not continue for long. The market is tightening from day to day.

It can readily be seen, therefore, that the warnings of a shortage in soft coal are well founded. Buyers would do well to heed them.

Let us now turn to the anthracite situation: Contrary to the general impression, the anthracite outlook is not so gloomy as it has been pictured. The estimated demands for the present coal year call for the production of 95,000 000 net tons of hard coal. Of this 57,500,000 net tons go for household use, the remainder for steam-making, or industrial purposes. During the first quarter of the present coal year the actual output of hard coal amounted to 21,261,000 net tons. Production has been stimulated about 10 per cent. since the early spring, and the estimated output of anthracite for the rest of the coal year can therefore conservatively be placed at 70,161,000 net tons, or a total production for the year of 91,422,000 net tons. Based on the present rate of output, there will therefore be a shortage of 3,578,000 net tons of anthracite by the end of the coal year. Whether this shortage will materialize depends much on labor and transportation conditions in the future, and the kind of weather we will experience this winter. The fact remains, however, that distribution of hard coal so far this season was never so great before, with the exception of 1917 and 1918.

WEEKLY COAL PRODUCTION

The new production level for bituminous coal, reached in the week of July 12, when production increased from an average in the preceding two months of around 8,500,000 tons to 10,220,000 tons, was sustained in the third week of July. Production in the week ended July 19 is estimated at 9,953,000 net tons, or but 3 per cent. below that of the week previous. It will be recalled that production in the week of July 13, 1918, was the highest recorded in a year of record-breaking production. An average of 10,000,000 tons a week will not be exceeded until buying increases in the Middle West.

The production of anthracite decreased slightly in the week of July 19. The market for domestic sizes is now generally good, and with no shortage of transportation it is evident that capacity to produce this summer is 10 per cent. lower than a year ago. Production in the week of July 19 is estimated at 1,823,000 tons, compared with 1,874,000 tons in the week of July 12 and 2,097,000 tons in the corresponding week of July, 1918.

As was indicated by the increase in production in the week of July 12, reported in last week's *Coal Age*, the demand for bituminous coal made a notable increase. Throughout the east the improvement in buying in the past several weeks has been marked, except in the Fairmont, Somerset and Cumberland-Piedmont fields. In Alabama and Virginia the market has not recovered to the extent that it has in the fields farther north. The Middle West, drawing coal from Illinois, Indiana and Western Kentucky, reports but slight improvement over previous weeks. Excepting Iowa, where half-time is being worked because of lack of market, the Missouri valley and far western fields record improved market conditions. The transportation situation appears to be well in hand, the losses of operating time because of car shortage having been small in all districts except Somerset, Pennsylvania and Hazard, Ky., the average for the country being less than 3 per cent.

The estimated production of beehive coke in the week of July 19 was 343,800 tons, compared with 325,000 tons the previous week and 631,700 tons in the corresponding week of 1918. The largest gains were in Pennsylvania and the far west. For the calendar year to date production is estimated at 10,541,000 tons, a decrease of nearly 6,500,000 tons compared with last year.

Shipments of coal to the lakes continue to decline, dumpings at lower lake ports for the week of July 12 being reported as 876,275 tons, compared with 923,939 tons the week of July 5. The decrease, however, is mainly attributed to the low production in the holiday week preceding. The total for the year is now about 1,400,000 tons ahead of last year.

BUSINESS OPINIONS

The Iron Age—The possibility of a strike at iron and steel works has loomed up in the past week, but it has not slowed down buying, and new business in a number of important products is still going on the books at a rate considerably exceeding current output of the mills. The present outlook is that if a strike is voted it will not be general or serious. At the same time some producers are recognizing a new hazard in planning for the last quarter of the year.

Dry Goods Economist—In the textile industries the demand for goods of all classes is insistent and is growing steadily. Stocks in the hands of wholesalers and producers are insufficient to meet current needs. Retailers are unusually busy for mid-July despite unfavorable weather, and are in great need of new goods for fall. The arrival of 526 buyers of dry goods and department stores in New York in one day this week and of upward of 500 on at least two other recent days testifies eloquently as to the need of stores for new fall stocks.

Marshall Field & Co.—Current wholesale distribution of dry goods was considerably in excess of the large figures of the same week last year. The total of orders from road salesmen for both immediate and future delivery was also larger than for the corresponding week of 1918. More merchants were in the market than during the same week a year ago. All report excellent business. Collections are satisfactory.

American Wool and Cotton Reporter.—In the Boston wool market the conditions are practically the same, with the price of wool strong and advancing. This is especially true of fleeces. Fine staple combing wools continue to be in demand, but the supply is becoming exhausted so rapidly that the trade is turning more and more to medium wools. The latter have gone up in price quite a little and it is expected that they will go still higher. The cotton market has again fluctuated rather widely, but such changes must be expected As compared with the past the speculative buying of cotton is relatively small, and once any large speculation develops, prices may be very much higher.

Atlantic Seaboard

BOSTON

Market grows steadily firmer. Short car supply makes deliveries undependable. Higher grades hard to buy. Demand increases for coals of medium quality. Buying confined largely to spot coal. Hampton

Roads shippers decline further business in New England. Strike of marine workers apparently ended. Anthracite deliveries slow. Independent prices firm. Much criticism of statements that public is slow in buying.

Bituminous—There can be no doubt that the current market shows steady improvement from week to week. There is a better tone to prices, and the trade is obliged to be conservative in granting options. "Subject to prior sale," is again heard, for the first time practically in nearly two years, and a fairly active demand is counted on for September, if not for August. Where for several months steam coals have stood but one commission in the open market, it is now evident that two commissions are frequently being paid by purchasers in the effort to get coal forward promptly. There is still a good deal of discrimination as to quality, however, and many instances the low-ash low volatiles are commanding up to 50c. more than medium grades.

Certainly the better grades are hard to secure for buyers in this territory. There is such demand now for low volatiles, for bunker and export use, that prices have been bid up at least 25c on certain Cambria coals the past week. Shippers who have undertaken more contracts than they seem able to fill are buying these grades wherever possible, and even "D" vein coals are commanding higher prices today than the medium South Forks could realize a fortnight ago.

One result is the improving market for the medium grades from sections like Clearfield and Indiana Counties. Through middle houses there have already been sales of only fair grades from around Phillipsburg at $2.75 and $2.85, certain of the Moshannon coals having sold as high as $3.15. Attracted by better prices there is a good deal of this coal being offered, but so far only the more favorably known coals are being picked up in any quantity.

With an insistent export market and an interruption of nearly a fortnight in sailings for New England, the Hampton Roads agencies have all the business they can handle without looking to the trade here for further tonnage. During the past week some of the local factors have flatly declined spot orders for delivery at this end, and possible customers are being referred to the all-rail distributors. No change is reported in prices for export, $6.25 f.o.b. Hampton Roads being still the accepted figure.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.35@2.80	$2.80@3.60
F.o.b. Philadelphia, gross tons	4.49@5.00	5.00@5.80
F.o.b. New York, gross tons	4.85@5.35	5.35@6.15
Alongside Boston (water coal), gross tons	6.35@7.05	6.85@7.65

Georges Creek is still quoted at $3.70 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $6.00@6.25 per gross ton f.o.b. Norfolk and Newport News, Va., in response to export demand. There are practically no spot sales for coastwise shipment.

Anthracite—While every effort is being made to secure better shipments for New England, receipts continue on a disappointing basis. Certain of the companies have been able to make deliveries slightly ahead of 1918, but the latter was not a normal year and there will be genuine cases of distress if coal does not come forward in better volume. The retail dealers are doing everything in their power to keep coal coming, both all-rail and by water, but there is just so much that can be spared from other markets.

We have yet to hear of a town or city in New England where the public has not put in its orders far in excess of the dealers' ability to make deliveries, and yet in spite of this there seems to be an organized propaganda to make the public feel that cars and men are idle in the anthracite regions because of the lack of orders! It has been said that certain independent operators, not satisfied with the spring price, determined not to mine coal until more remunerative figures should prevail, but these represent only a small proportion of the total tonnage.

The Boston retail dealers advanced prices 50c. on egg, stove and chestnut, effective July 22, the new figure being $12.50 for sidewalk delivery. Fifty cents is now charged for housing. Broken was advanced only 25c., and pea remains at the old figure, namely $10.50 per net ton.

NEW YORK

Domestic coals short of requirements, but dealers hope to obviate considerable trouble next winter if supply continues at present basis balance of the year. The marine strike interrupts coastwise shipments slightly. Bunkering demand picks up at ending of the strike. Bituminous in good demand, with prices steady.

Anthracite—Movement of anthracite shows some improvement and the situation looks a trifle brighter, with plenty of room for further betterment. There was an increase in shipments reported from the mines and dealers say they received a fair share of their requirement. Demand, however, continues active and dealers in most cases have plenty of orders on their books to keep them busy for the next two months.

Chestnut coal continues to be in larger supply than either egg or stove, while pea coal, which never did command a large local market, is more in evidence. Some shippers are sold far ahead for the two larger sizes and in some instances are said to have refused new orders.

Not so much was heard last week regarding premium coals, although it was rumored that many retail dealers were willing to pay increased prices if they could be assured of shipments. Local retail dealers, it was said, were not paying more than 75c. premiums for egg and stove, while line dealers and dealers in Canada were, it was said, willing to pay from $1 to $1.35 per ton.

The steam coal situation was kept in good check last week because there was comparatively little washery coal being produced, and producers are able to either sell or store those coals obtained by the ordinary production of coal.

Another increase of 10c. per ton for egg, stove, chestnut and pea coals goes into effect tomorrow (Aug. 1), and at the same time it is reported that the retail dealers of Manhattan and the Bronx will increase their delivery prices as much as 35c., in some instances, due to the paying of premiums for independent coals.

Quotations for company white ash coals, per gross ton at the mines and f.o.b. New York tidewater lower ports, during August, follow:

	Mine	Tidewater
Broken	$5.95	$7.80
Egg	6.25	8.10
Stove	6.50	8.35
Chestnut	6.60	8.45
Pea	5.20	6.95
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

That there is a tendency on the part of bituminous coal shippers to seek line trade and get away from tidewater as much as possible, in order to avoid the present demurrage charges, was one of the statements made by Wilbur A. Marshall, president of W. A. Marshall & Co., 1 Broadway, New York, at the hearing conducted by the Interstate Commerce Commission into the charges of the Wholesale Coal Trade Association of New York, Inc., against the United States Railroad Administration. The hearing began on July 21 and continued all week at the Waldorf-Astoria, being conducted the first four days by Walter N. Brown, one of the commission's examiners, and then by Commissioner McChord. Many witnesses were examined during the week and all of them claimed the present demurrage charges of $2 per diem and five days' free time (averaged over one month) were unreasonable.

The demurrage rules at the Lakes, it was brought out, are five days' free time averaged over four months and $1 a day. Mr. Marshall was asked that, assuming the foregoing is a reasonable time at the Lakes, what would he say would be an equivalent liberal arrangement at tidewater. His reply was: "Well, I would say as a mere mathematical calculation that the equivalent of five days averaged over four months, if applied to a period of one month, would be four times as much, or twenty days."

Mr. Marshall said that all conditions being equal as between tidewater ports and the Lake ports as to demand, price, freight rate, etc., the shipper would send his coal to the Lakes because he would eliminate the risk of losses on account of the heavy demurrage charges at tidewater. He also stated that as a result of the existing demurrage charges on tidewater coal a large number of individual shippers of anthracite shipped only to the line points and eliminated shipments entirely to the New York tidewater ports until recently. They were brought back as shippers to tidewater by the offering of dealers of premiums of from 50 cents to as high as $1 per ton, which was due to the shortage of coal created by the failure of the operators to send coal to New York in fear of this same demurrage.

Mr. Marshall said that, comparing a four or six months' period for the Lakes and tidewater, tidewater should have at least seven days at tidewater, against the five on the Lakes, due to the irregularity of movement and the irregularity of character of the coal and the uncertainty of water movement. If we are to have a 30-day average at tidewater and the Lakes are to have a four or six months average, we should have, to be on an equal basis, at least ten days average, he said.

Mr. Marshall gave it as his opinion that there is approximately $1,000,000 involved in the present case. The defense began the presentation of its case late on Friday, July 25. The hearings are expected to continue three or four days this week.

Bituminous—While there is a firmness about the bituminous market here, there has not been so much urgency for deliveries as there was a week ago. Not that demand has not been continuous, because it has, but consumers have apparently felt they could get coal when they wanted it. Some of this attitude might have been the result of the marine strike, which ended on June 26.

All the urging to buy coal has failed to remove the discrimination of buyers against the poorer grades of coal. They insist upon receiving the best grades and are just as particular about the prices. There are many inquiries and spot orders running not more than three months are frequently booked. Some buyers are anxious even now to close contracts for the balance of the coal year, but they find few willing victims. Producers are careful about obligating themselves for any additional tonnages at this time.

The ending of the marine strike immediately revived the demand for bunker coals, and by the middle of the week these stocks were considerably smaller. Exporters report many new inquiries and a heavy demand from foreign countries for American coals. With freight rates reasonable they see a growing market for American coals.

Shippers do not expect any let-up in orders. Instead they look for an active market the balance of the year with good prices. Car supply does not improve and with the time for grain shipments close at hand operators look for much trouble from that source.

There has been an improvement in the average mine price of coal quoted for the various grades, but the range of prices shows little change from last week.

Producers of New River coals complain of the lack of labor, which they believe will increase during the month of August because of the return of many workers to their native country.

The railroad administration reports 5716 cars of bituminous dumped the week of July 25 as compared with 5127 cars the week previous.

Quotations for the various grades of coal, at the mines range about as follows:

	Spot
South Fork (Best)	$2.95@3.25
Cambria (Best)	2.95@3.10
Cambria (Ordinary)	2.45@2.60
Clearfield (Best)	2.95@3.10
Clearfield (Ordinary)	2.45@2.60
Reynoldsville	2.50@2.75
Quemahoning	2.85@3.00
Somerset (Best)	2.85@3.00
Somerset (Poor)	2.35@2.60
Western Maryland	2.35@2.60
Fairmont	1.90@2.25
Latrobe	2.20@2.35
Greensburg	2.35@2.50
Westmoreland ¾ in	2.75@2.90
Westmoreland run-of-mine	2.50@2.60

PHILADELPHIA

Anthracite production cut by floods at mines. Dealers face August with light stocks. Outside market favored. Heavy shipments from Port Richmond. Retail ordering goes on. Consumers anxious. No greatly increased tonnage expected. Car supply normal. Dealers in strong financial position. Stove and egg much-wanted sizes. Chestnut moderate, and pea in excess. Buckwheat stronger; rice and barley very free. Bituminous in strong demand. Good coals hard to get. Prices firm. Tide trade good.

Anthracite—The retail trade is becoming sorely anxious as to its ability to give its trade the size of coal it has obligated itself

for. A survey of the yards throughout the city discloses that with the exception of pea most retail dealers are bare of the much-wanted sizes. Occasionally there are yards which seem to be well supplied with all sizes, but these are the yards of concerns who even through war times for some unexplained reason seemed to be able to command full stocks. Outside of this class the larger domestic sizes are scarce and the retailers are now beginning to display more concern as to when their shippers are going to take care of them.

At the shipping offices the statement is made to the dealers that they are doing the best they can, but for the time being they are unable to divert a larger tonnage to this market. It is known that the independent shippers are receiving good premiums in New England and Canada, and in some instances in the West, and for that reason their shipments to this market are very light. It is claimed that for stove coal the average premium is about $1, while for egg they are getting at times 75c. and for nut 50c. more than company circular, and at the same time insisting that their customers take a fair share of pea coal. That explains the fact that while the big producers have almost glutted their trade here with pea coal, the smaller concerns are having no trouble at all with this size.

The clearances from Port Richmond of the domestic sizes of anthracite for all New England points, from the sound ports to Eastport, continue very heavy. From reports here it would appear that the New England district is intent upon stocking up strongly on all sizes, as it is not to be supposed that the tonnage they are getting is going into consumers' cellars. An interesting feature of this situation is the willingness lately of some dealers there to take full consignments of pea coal. While this is only occasional, it discloses that the dealers there have confidence of their ability to induce consumers to use this size when the pinch comes.

The dealers at last seem converted to the fact that lack of orders from their customers is going to be the cause of their troubles for the remainder of the summer. Some of them felt sure they would clean up before the middle of summer, but they have been receiving gradual but constant additions to their list, as the more wide-awake consumers have become aware of the fact that in addition to a possible shortage of fuel the coming winter they are also most certain to be confronted with a more than usual increase in price.

There can be no denying the fact that the heads of the operating companies here see little prospect of increasing the production much beyond what has been maintained all summer. Some of the best labor continues to leave the mines for overseas and the immigration at times here such as to lend little encouragement of an increase in the number of men for the rougher labor about the mines.

In the face of all of the foregoing conditions the local retail price situation, which has always been a source of much unrest at this time of year, is on an almost firm basis. The so-called price cutters are maintaining a schedule that closely approximates the average prices of the other dealers. The dealers also continue their endeavors to conduct their sales on as near a cash basis as they can, although this is not possible to the same extent that it was last summer. While the business is not as profitable as it was in the past, still the dealers are in good financial shape and it is believed that the shippers have less slow accounts now than at any time this summer.

So far there has been little or no difficulty with the car supply at the mines, the only criticism to make being on the part of dealers who are compelled to take equipment that at times most inconvenient to unload, such as flat-bottom cars on trestles, which happens occasionally and is likely to be of greater frequency as the season advances. Small cars of 25 to 30 tons capacity are entirely out of the trade, due to the continued enforcement of the rules of the administration against the use of these cars in the coal trade. One road has upward of 3000 of this class of equipment stored along its lines. It can be said that their release will be acceptable to the shippers at least by fall, for in this way it will enable them to spread their production around a little better by splitting the tonnage of one big car into two small ones and thus occasionally gladden the hearts of two dealers instead of one.

Due to lessened production there was a noticeable trend of betterment in the buckwheat situation this week. Even the larger companies produced just about enough to meet current orders, and it seems also that the industrial plants are beginning to store this size in better volume. There was no noticeable change in rice and barley, and these sizes continue to in excess supply. Among small shippers sales have been made of rice around $2 and barley at $1.50, yet even at these figures none of the independents are willing to take on obligations for a definite period.

Bituminous—There is a good demand for bituminous coal and every evidence that this will increase. Reports from some of the outside markets are that the best coals are being more closely covered than they have been for some time. Certain it is that the high-grade coals are almost unobtainable for prompt delivery, and even the medium grade fuels are beginning to move more freely. As a consequence prices have been well maintained the past week, with an occasional shifting to a slightly higher level. The question of car supply continues to inject itself into the situation, and some shippers in southern fields report themselves considerably hampered on this account.

The heavy movement of high-grade coals all-rail continues into the New England territory and makes these coals scarce locally, even at good prices prevailing for spot coals. Manufacturers holding contracts are pressing shippers just a trifle harder lately for increased consignments, as the tendency of the really progressive concerns is to take in stock.

Business at the piers continues good, both for bunkering and coastwise, although the overseas business is still handicapped by lack of bottoms. All export houses continue to receive numerous inquiries for quotations, much of which cannot be taken.

The price range during the week is well represented by the following table:

Georges Creek Big Vein	$3.05 @ $3.15
South Fork Miller Vein	3.05 @ 3.15
Clearfield (ordinary)	2.70 @ 2.80
Somerset (ordinary)	2.60 @ 2.70
Fairmont lump	2.50 @ 2.60
Fairmont mine-run	2.35 @ 2.50
Fairmont slack	1.90 @ 2.05
Fairmont lump (ordinary)	2.25 @ 2.35
Fairmont mine-run (ordinary)	2.00 @ 2.15
Fairmont slack (ordinary)	1.65 @ 1.75

BALTIMORE

Seamen's strike fails to halt movement of export coal. Car shortage beginning to be felt. Arranging new anthracite price schedule.

Bituminous—Another week has been recorded in which the American shipping strike has failed to halt the export movement from this port. Foreign ships took on a total of 38,890 tons of cargo and 2433 tons of bunker coal for export account for the week ended July 19, while the total foreign loading for the month of July to that date had run to 163,964 tons. The current week's figures will run to more than 40,000 tons, so that the final figures of the month are confidently expected to reach the high record of about 230,000 tons, despite the shipping strike, which undoubtedly held up an additional 150,000 tons or more. Because of a two weeks' embargo against the export pier here, some 210,000 tons of coal piled up, or was at line points routed here for foreign account. Some of this surplus has gone out this week, but there is still an oversupply at the two export piers.

From the mining sections of western Maryland and West Virginia, in particular come complaints of lack of empties for prompt loading. This is apparently due to the jam of freight of all kinds, including coal, at some eastern points resulting from the watermen's strike.

The local market continues brisk and prices are well sustained. An indication of the growing tightness of the soft-coal market is had in the complaints of some towns close to the mining regions that prices are being advanced for coal used there for domestic purposes.

Anthracite—The coming week the local retail hard-coal handlers will take up the matter of an increase in prices for the month of August. The Baltimore Coal Exchange will meet and discuss the general subject of possible freight-rate increases, premium paying, the proportion of company and independent coal coming through, etc., in its relation to fixing a new schedule for the month. That there will be some increase seems the general opinion, as quite a few dealers claim to be paying premiums on a good deal of the coal they are receiving. Not much coal is coming through, as there is a shortage even on premium coal. Stove and egg sizes remain particularly scarce.

Lake Markets

PITTSBURGH

Demand for steam coal slightly improved. Good byproduct coal brings premium.

While there has been a little improvement in the demand for steam coal, operators still insist that consumers are not stocking up to the extent that is necessary if a severe shortage next winter is to be avoided.

Demand for byproduct coal has increased and some difficulty is experienced in securing coal of suitable analysis, particularly with respect to sulphur. Purchases at $2.40 for mine-run are now quite common, lower priced coal proving unsatisfactory. Operators are selling only for early deliveries, as they regard contracting now as quite out of the question. For byproduct purposes both Pittsburgh district and Connellsville coal are moving freely. There has been a material increase in blast furnace operations, and the byproduct coking plants are operating full with scarcely an exception.

Lake shipments continue heavy, and the season total is such that operators expect the pace to decline within a few weeks. They insist that there will be no easier market at that time, however, and urge buyers not to defer laying in stocks.

Nothing definite seems to be known as to the attitude of miners or union officials as to whether any action should be taken when peace is declared, whereupon a move by either party for a modification of the present wage scale would be permissible. Emigration continues, involving chiefly the common labor at mines, but thus far working forces are maintained without a great deal of difficulty. There is no contract market and the market for prompt lots is quotable as follows: Steam slack, $1.50@1.70; gas slack, $1.80@2; steam mine-run, $2.25@2.50; gas mine-run, $2.35@2.50; 3-in. gas, $2.60@2.75; byproduct, mine-run, $2.40, per net ton at mine, Pittsburgh district.

BUFFALO

Steady but rather slow increase in bituminous demand. Firmer reports from Pittsburgh. Fair car supply. Jobbers active, but cautious. Anthracite in much demand. Lake shipments good.

Bituminous—The situation does not change much. Jobbers feel obliged to handle the trade carefully, for they realize that there are possibilities not favorable to strong prices as yet. They are doing much better than they were awhile ago, but are far from satisfied yet, for consumers do not come forward as they should. They are ready to make contracts at going prices, but that would not be satisfactory to either operators or jobbers.

Locally the situation does not change much. The consumers want coal, but the supply has been fair right along and beyond the scarcity of certain medium sizes the trade flows pretty smoothly.

The conditions improve steadily, but not fast enough to satisfy the trade. Prices are about stationary at $1.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for three-quarter, $4.20 for mine-run and $3.70 for all slack, with Pennsylvania smokeless $4.60 and smithing $5.70, all per net ton, f.o.b. Buffalo.

Anthracite—The market is in an uneasy state. There are many reports of a shortage that the consumer is asking for much more coal than can be supplied. Shipping agents are refusing orders right and left, and if it does not turn out that consumption has been very light all summer it is hard to see how consumers are going to get what they need. Canadian authorities are advising early buying and the addition of bituminous for mild weather.

Lake shipments of anthracite continue heavy, being for the week 149,200 net tons of which 63,100 tons were for Duluth and Superior, 50,800 tons for Chicago, 14,800 tons for Sheboygan, 14,000 tons for Milwaukee, 5300 tons for Fort William and 1200 tons for Sheboygan.

The prices of anthracite continue unchanged as follows:

	f.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8 55	$10 20
Egg	8 65	10 50
Stove	8 95	10 70
Chestnut	9 00	10 80
Pea	7 20	9 [illegible]
Buckwheat	5 70	7 7[illegible]

Independent operators are asking from 75c. to $1.50 premium over these prices in some cases.

CLEVELAND

Labor in the Ohio coal fields appears restive and production has not shown the expected and needed pick-up following the July Fourth holidays. Demand for steam coal continues good. Lake shipments of bituminous coal continue to fall off.

Bituminous—Labor unrest appears to be the outstanding factor in the Ohio coal situation. Individual efficiency has suffered severely in the past week. One operator reports his labor not more than 60 per cent. efficient. All this, quite naturally, runs cost figures up and tends toward higher prices.

Northern Ohio steam-coal users are actively seeking supplies. One interest estimates it could dispose of 20 per cent. more fuel were it available for spot delivery. Consumers appear the least bit more willing to contract, while operators have receded in about like degree from wanting to do so. In general, operators are able to dispose of all their production for spot shipment. Demand for slack has increased somewhat more than that for mine-run and prepared sizes.

Consumption of coal in northern Ohio increases weekly, as industrial operations are growing. Every indication points to increased activity, and operators see the demand for fuel rising constantly.

Dealers have advanced their prices on No. 6 and No. 8 slack, No. 6 and No. 8 mine-run, and No. 8 ¾ in. 10c. a ton each. On Youghiogheny slack the advance is reported to be 5c. a ton. The price tendency in every grade is decidedly toward firmness.

Pocahontas and Anthracite—The situation remains much the same in both grades, demand from domestic consumers running far ahead of the supply. The outlook is that a large part of the winter's supply will have been put in by Oct. 1, thus to an extent duplicating the situation of last winter. Prices are unchanged but firm on all grades with the exception of lump Pocahontas, which some dealers have advanced to $8.75, while others are holding at $8.50.

Lake Trade—Lake shipments of bituminous coal are decreasing. Production at the mines has fallen off, being reflected in smaller shipments to Lake Erie ports. At the same time coal is moving rather slowly off the upper lake docks, while the unsettled prices of coal already forwarded contribute to the decrease. Final figures for the season to July 1 show shipments of bituminous coal, excluding vessel fuel, to have been 8,812,862 tons, a gain of 1,546,604 tons over 1918 shipments to July 1. July shipments will show a decrease of 500,000 tons over last year, it is feared. Last year at this time the lake trade was just beginning to show life. Including 391,640 tons of vessel fuel, Great Lakes freighters handled a grand total of 9,204,502 tons of bituminous coal to July 1.

DETROIT

Consumers of steam coal are not buying in the quantity necessary to make sure of adequate supply.

Bituminous—While Detroit wholesalers and jobbers maintain an optimistic attitude, the volume of business developing in the local market seems to show little increase. There is a feeling among the jobbers however, that the improved demand which is reported from eastern markets will have a tendency to divert in that direction coal which otherwise might be pressing for sale in Detroit, with resultant weakening of the market.

Consumers of steam coal are evincing little indication of interest in stocking up. Some are buying, but in many instances the orders are apparently to cover only current needs and are for small tonnages and irregular in appearance. Despite frequent warnings of the probability of a deficient supply for those who delay, a considerable number are holding back. Their attitude indicates to the jobbers that they are expecting to benefit by purchasing coal at prices lower than those now quoted.

At present little bituminous is being sent into Detroit except on orders calling for direct delivery. There is not very much coal on tracks and prices are reported holding quite steady. Hocking lump is firm at the equivalent of $2.75 net ton f.o.b. mines. For Hocking mine-run, the quotation is $2, while slack is held at about $1.50.

Three-quarter lump from the Pittsburgh No. 8 district is offered at $1.75, with mine-run at $2 and slack about $1.75. Splint or gas lump from West Virginia is quoted at $3.25 to $3.50 for the four-inch and $3 for two-inch coal. Mine-run is about $2.20 to $2.50 and slack remains at about $1.85. For smokeless mine-run, which is scarce, the quotation is $2.75 to $3.

Anthracite—Dealers report the outlook in the anthracite trade is not reassuring. Buying is not particularly active. Considerable delay attends movement of shipments from the mines and dealers say there are indications of a shortage in supply when household consumers start stocking up generally.

Lake Trade—Coal is not moving freely to loading docks and the supply of cargoes falls far short of the tonnage offered for lading, with the result that a number of vessels are obliged to make the upbound trip without cargo. Shortage of cars and insufficient supply of labor at the mines are two of the principal reasons assigned for the light shipments.

COLUMBUS

More strength in domestic grades is apparent on all sides. Retailers are buying better, and the campaign to "Buy Now" is showing results. Steam sizes are still slow. Lake trade is moving along steadily.

The Ohio coal trade shows marked improvement, more especially in domestic sizes. Buying on the part of retailers is steadily increasing, as householders are placing orders both for immediate and deferred delivery. The feeling in domestic circles has improved during the past fortnight, and producers as well as shippers believe that the slump is now definitely over. Retail stocks are not large in any section, and considerable buying is expected in the near future. While consumers have been holding off on buying, the campaign fostered by the National Coal Association and carried along by local organizations is bearing fruit and buying has taken a spurt. The better grades, such as Pocahontas and West Virginia splints, are in the best demand. Some buying of Hocking and Pomeroy grades is reported. The outlook in the domestic trade is much better than formerly, and dealers are beginning to see an active trade. Retail prices have been advanced and are pretty well maintained at the new levels.

The steam trade is still rather slow, although some signs of activity have appeared. Railroads are now taking a larger tonnage on their contracts as freight movement has increased. Manufacturing plants are placing fuel contracts now and shipments have started on many of these agreements. Manufacturing appears to be expanding slowly under the influence of easier money conditions. The worst feature of the steam trade is the weakness of screenings. The prices on screenings show a wide range. Mine-run is fairly steady, and prices are not so low as formerly. Taking it all in all, the steam trade has shown some improvement recently.

Lake trade is steady although the tonnage moving to the Northwest does not show an increase. Comparatively few producers in Ohio fields are sharing in the lake trade. Vessel movement is steady and there are plenty of bottoms. The lake trade is expected to continue steady for the remainder of the season.

Production in Ohio fields is holding up pretty well between 65 and 75 per cent. of capacity. In the Hocking Valley the output is estimated at 65 per cent and possibly more. Eastern Ohio is credited with 70 to 75 per cent. Pomeroy Bend is showing an increase in output and the same is true of Cambridge and Massillon fields.

Prices at the mines for Ohio coal follows:

Hocking lump	$2.75
Hocking mine-run	2 50
Hocking three-quarter inch	2 60
Pomeroy lump	3 00
Pomeroy three-quarter inch	2 85
Pomeroy mine-run	2 75

CINCINNATI

Many orders, but stocks are inadequate to meet demand. Prices steady.

Orders for coal are multiplying with the local dealers, but the stocks are hard to get. The supply is growing scarce and indications are that many persons are going to be disappointed. Conditions at the mines, especially in the West Virginia fields, this week have been anything but good, the car supply being exceedingly bad.

Prices this week have remained steady, but the outlook is that there will be a general upward trend in the near future. Many large consumers who have been holding off against what they believed were too high prices are finding that dealers are slow to take contracts for their coming year's requirements, owing to the constantly growing scarcity. The best they can do is to secure week-to-week shipments.

LOUISVILLE

Steam movement somewhat better, with block coal demand strong. Byproduct and gas coal in light demand. Eastern Kentucky shipping considerable steam coal to southern markets.

There has been a considerable improvement in the demand for eastern Kentucky steam coal during the past few days with the result that operators are having far less trouble in disposing of their screenings. A good deal of steam coal is now moving into the southern markets, with cotton mills and textile plants buying a three to four months' supply. Some coal is still moving into the Northwest and Lake region, but southern prices are better than northern, and southern business is eagerly sought.

Due to a weak demand for gas and byproduct coal the northeastern section of Kentucky, from which Elkhorn coal is mined, is invading the Louisville and other domestic as well as steam markets, and has started screening coal in order to compete for business. Heretofore most of the Elkhorn coal was shipped on a mine-run basis, and was hardly known in this market, as it went principally north and east.

Retailers are not stocking much steam coal and are unable to secure enough block coal to stock, even if they cared to stock at high prices. Producers are still maintaining strong prices on eastern Kentucky block in spite of better demand and prices for steam, and are not anxious to sell, refusing additional business in many instances and holding such coal at $4 a ton, which represents a 25-cent advance.

River movements are equal to all demand of Falls City companies with facilities for handling river coal, there being a good boating stage. This has increased demand for river lump to some extent, as the river coal companies are managing to supply demand better than the rail companies.

Production in eastern Kentucky is about 70 to 80 per cent. of full-time operation, although short of normal due to the scarcity of labor. Production would be greater except for car shortage.

Western Kentucky is operating only about two days a week, with plenty of labor and only a fair car supply. Lack of demand for western Kentucky has been experienced all year due to competition from eastern Kentucky grades, which were zoned out last year, but which have recovered their popularity. There is a better demand for western Kentucky block coal.

Quotations are: Eastern Kentucky block, $3.75@4; mine-run, $2.50@2.75; nut and slack, $2@2.15; western Kentucky lump, $2.25@2.30; mine-run, $1.85@2; nut and slack, $1.50@1.75; fine screenings, $1.35@1.50.

BIRMINGHAM

Trade easy, with tendency toward firmer and strength in steam demand. Lump strong, no increase being noted in supply. Prices remain about stationary. Output up slightly over previous week. Car shortage reported on Southern and Louisville & Nashville.

While there has been nothing approaching a rush of orders for coal during the past week, an improvement in tone and inquiry is reported, and also a slight increase in both contract and spot business. With contracts closed by the principal rail lines for fuel for the next year, it is now expected that industrial demand will be better and an increased production will be warranted. The Louisville & Nashville closed contracts the past week for approximately 1,000,000 tons of Alabama coal, ranging in quality from unwashed Big Seam mine run at $2.45 to Cahaba washed at $3.86 per net ton mines, government prices being paid for the respective grades so far as can be learned. There is some inquiry now coming in from oil mills and other industrial sources, and it is expected that considerable tonnage will be booked by the commercial mines in the near future from consumers who have been holding off from the market. Inquiry is also being received from Georgia territory, which has recently been using considerable coal from Kentucky and Tennessee mines.

There are no new developments in the domestic situation, the market being featured by a continued strong demand for lump, with no relief noted in the way of increased production as yet.

Mines on the Southern and Louisville & Nashville railroads reported slight interruptions from car shortage, though little, if any tonnage was lost from this cause. Production for the week ending July 12, as reported to the Alabama Coal Operators' Association, was 265,838 tons, as compared with 187,173 for the previous week. Labor is short at some operations, and is causing a loss in output on the days operated.

Coke

CONNELLSVILLE

Flat price furnace coke contract. Free coke meets light demand. Foundry coke demand good. Production increasing.

Sharpsville furnace, in the Shenango Valley, will be blown in Aug. 10, a contract having just been made for furnace coke to the end of the year, at a flat price of about $4.25. Previous flat price contracts for the half year have been within the limits of $4.25 to $4.50, and from this it would appear that the market is not advancing; but, as a matter of fact, there are few operators willing to contract at flat prices, the majority feeling that they would do better to hold their coke, or to count upon high prices being obtainable for coal later in the year. Some sellers could probably still be found at less than $4.50, however.

The spot market shows no improvement. There is no demand to speak of, and there is considerable free coke, which producers are holding rather stiffly at $4.

Demand for foundry coke continues very good. There are limited supplies at $4.75, of indifferent brands, while best brands range up to $5.50, and there is moderately heavy call for even the highest priced coke. Car shortages are beginning to make an appearance, suggesting to some operators that shipping conditions are likely to be very unsatisfactory when bad weather sets in. Some bad order cars are also noticed, but the railroads are doing much more by way of car repair work than a couple of months ago. The market is quotable at $4 for spot and prompt furnace coke and at $4.75@5.50 for spot and prompt foundry coke, per net ton at ovens.

The Courier reports production in the Connellsville and Lower Connellsville region in the week ended July 19 at 164,220 tons, an increase of 6382 tons.

Buffalo—The market is pretty firm, as the furnaces are running more actively than they were, with prospect of continuing. Iron ore is moving more freely than it was, so that the lake fleet is getting about all the business needed. Jobbers quote 72-hour foundry at $7.60, 48-hour furnace at $7.25 and off grades at $7, with domestic sizes $6.75 and breeze $5.25, per net ton, f.o.b. Buffalo.

Middle West

GENERAL REVIEW

Improved production. Shortage of prepared coals. Car supply already inadequate. Labor scarcity.

There has been a decided improvement in coal production, this week, from mines in this territory. This improvement in tonnage is especially noticed in southern Illinois. That this extra tonnage was not warranted is shown by the fact that the market for steam coals is weaker than ever. In fact, several districts that have been maintaining their screening prices slumped badly during the last few days. The demand for prepared coals is such, on the other hand (and it may be said without fear of exaggeration), that today there is a coal shortage on lump, egg and nut sizes. This applies not only to the mines in Franklin County, but also to practically all of the mines in Indiana and Illinois producing a good grade of coal, with average preparation. Some operators have advanced prices on prepared sizes to around $3.05, as they wish to make up on their prepared coal what they lose on their screenings. There is no denying the fact that screenings have been selling at below cost prices for some time.

More mines have been reporting difficulty in obtaining enough cars. If under a very small demand there are not enough cars to accommodate the mines, it can be easily imagined what the situation will be later on when the buying public awakens to the peril of the situation and jumps into the coal market. Indiana suffered more from the car shortage than did Illinois. This is probably because Indiana mines are served by railroads having an outlet in the east. It is generally understood that the Railroad Administration, as well as the government, is doing everything it can to assist eastern operators to export their coal. Eastern mines are consequently being supplied with coal-carrying equipment at the expense of the less fortunate coal operators in the west.

Retailers throughout the northwest are having great difficulty in obtaining labor to unload their coal. This, coupled with the fact that the public are not buying very much, has kept down the demand for prepared sizes, although the present demand is already greater than the available supply. Retailers say that farmers are offering from $5 per day up to transient labor, and as farming appeals to this type of labor more than unloading coal, it is necessary for the retailers to do considerable of their own unloading. The writer came in contact with a retailer in Michigan who had spent the last four days in unloading coal from the cars into his bins.

CHICAGO

Domestic demand continues. Insufficient labor for unloading coal. Eastern coal hard to get.

The coal trade in Chicago is just about as demoralized as any spot in the Middle West. Of course, the demand for domestic coal continues, although this demand is less than in some districts because of the difficulty in obtaining labor to unload the coal. The situation on screenings and steam sizes is if anything, worse than last week. Illinois and Indiana operators have been doing every thing possible to maintain prices on their screenings, and about $1.40 per ton has been the minimum price. A number of operators in the Hocking district of Ohio have taken advantage of this situation, and we understand that over 500 cars of Ohio slack coal have been shipped into Chicago at prices as low as 75c. per ton f.o.b. mines. Most of this coal has gone to the large public utility corporations or to the packers.

Eastern coal is becoming increasingly difficult to obtain. Pocahontas or New River prepared coals are being sold from $5 to $5.25, and strange to say, the demand for this kind of coal is strong. Hitchgrade Kentucky coals are selling at from $3.50 to $4 f.o.b mines, for prepared sizes. As a matter of fact, but little eastern coal is coming into this territory, as a great many of the operators in West Virginia and other eastern coal-producing districts are sending their coal to the seaboard for export.

MILWAUKEE

Coal moving out slowly, while stocks on the docks pile up. Popular grades of anthracite continue scarce. Coke in poor demand.

The coal market continues dull, despite every effort to stimulate the outward movement and thus make room for continued supplies on the docks. Some of the yards are loaded to capacity at present. Stove and nut sizes of anthracite continue scarce, but dockmen promise relief from this situation in about two weeks. All other grades of hard coal are in good supply, as are also Pocahontas and steam coal. The coke market is stagnant and stock piles are looming higher every day. Prices of coke and coal continue unchanged. Receipts by lake are still ahead of last year. Thus far 297,574 tons of anthracite and 1,487,997 tons of soft coal have been received, the gain over last year being 66,320 tons of the former and 250,262 tons of the latter.

ST. LOUIS

Unusual demand for high-grade domestic coal that cannot be met. Future dubious on this coal, causing considerable worry. Domestic demand on lower grades easy. Steam condition extremely bad and promises no immediate betterment. Car shortage prevailing; much unrest among miners.

The local situation is extremely bad at present, occasioned by the unusual demand that came about suddenly for Carterville coal for domestic purposes. Both city and country are clamoring for this grade of coal. The efforts of the dealer to divert business to inferior grades has not been successful. There is a decreasing call for the steam sizes, with the result that nearly all mines are loaded down with steam coal, and are unable to work. When they do work in the Williamson and Franklin County field, it is usually with a shortage of equipment. Some mines have been idle two days a week because they could not get equipment. In this field the miners continue to leave, especially the foreigners.

Mines that started up recently, after being idle for some time, have been unable to get men except by taking them away from other operations. The field will not show a large increase in tonnage on this account.

Mines that formerly produced 3000 tons a day are finding it hard to get out 1500 tons a day now. There is much unrest among the miners in this field as well as in the other fields. They do not understand why peace has not been officially declared, and they insist that some immediate action be taken to enable them to realize their demands on the operators

The railroad tonnage is good out of this district at the present time. Stoker coal for railroads is relieving the screenings situation to some extent. Conditions in the Du Quoin field are somewhat similar to those in the Carterville district. In the Mt. Olive district conditions are more normal than in the other fields. The mines are getting better working time generally, and the movement of coal is good.

In the Standard field there is all kinds of trouble, shortage of equipment and shortage of labor. Failure to move screenings keeps the mines idle for several days, and other mines in the same district may be idle because they cannot sell their lump coal.

Coal is selling far below cost at many mines. This is an effort of the operators to keep their organizations together, anticipating better selling conditions shortly. There is, however, much dissatisfaction among the men in this district. This coal is hardest to move in all sizes, but especially in the steam. Railroad coal from this district showed up somewhat better the past week. In St. Louis proper screenings from this district went down to $1.10, and there has been a general decline off and on for this coal. The country call for it is very light. The demand for anthracite is fairly good in St. Louis, with practically nothing coming in. No smokeless coal is booked for the St. Louis market at this time, and nothing from Arkansas. There is a plentiful supply of gashouse and byproduct coke that is not moving so fast as it should.

Coal and Coke Securities

New York Stock Exchange Closing Quotations July 28, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com.	(BB)	155	157
Burns Brothers, Pfd.	(BB)	110	115
Central Coak & Coke, Com.	(CK)	55	....
Central Coal & Coke, Pfd.	(CK)	63	....
Colorado Fuel & Iron, Com.	(CF)	52	53
Colorado Fuel & Iron, Pfd.	(CF)	120	125
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com.	(EH)	41½	42
Elk Horn Coal, Pfd.	(EH)	46	48½
Island Creek Coal, Com.	(ICR)	39	....
Island Creek Coal, Pfd.	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd.	(JF)	63	....
New Central Coal of West Va.	(NCC)	5	....
Pittsburgh Coal, Com.	(PC)	72¾	73
Pittsburgh Coal, Pfd.	(PC)	95	96½
Pond Creek Coal	(PD)	21½	21¾
Virginia Iron, Coal & Coke	(VK)	65	67

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	97	....
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	75½	....
Colorado Fuel & Iron, Gen. 5s, 1943	90½	92
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	76½	79½
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	88
Jefferson & Clearfield Coal & Iron, Ser. Mort, 5s, 1926	96	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99½	100
Lehigh Valley Coal, Gtd. Int. Red. to 4½, 1913	79¾	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F., 5s, 1928	80½	....
Pochantas Coal & Coke, Joint 4s, 1941	83½	85
Pocahontas Con. Collieries, 1st S. F 5s, 1957	84½	87
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	95	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	....	80½
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	92½	92½
Utah Fuel, 1st Sinking Fund 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85½	85½

COAL AGE

Volume 16 New York, August 7, 1919 Number 6

Aftermath

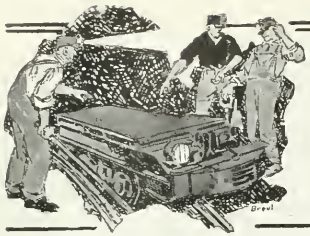
By Rufus T. Strohm

OF old, when Monday rolled around,
As Mondays always do,
With drab monotony we found
But half a working crew;
And some of those were thick of head
And bleary as to eye,
But, happily, such days are fled,
For Miningville is dry.

EACH party, wake, or like affair
Once ended in a fray;
But stabbing is becoming rare
And murder is passé;
For folks go calmly to their beds,
Nor seem to want to shy
Beer-bottles at each other's heads
Since Miningville went dry.

THE children looked as though they had
Scarce half enough to eat;
The womenfolk were coarsely clad,
And all were bare of feet;
But chubby kids are everywhere,
New dresses multiply,
And there are shoes enough to spare
Since Miningville went dry.

A MIGHTY wave of civic pride
Has risen in the town,
And dirt and rubbish swept aside
Have brought the death-rate down;
The grocer toils with all his might,
The butcher's boy is spry,
The baker hustles day and night—
For Miningville is dry.



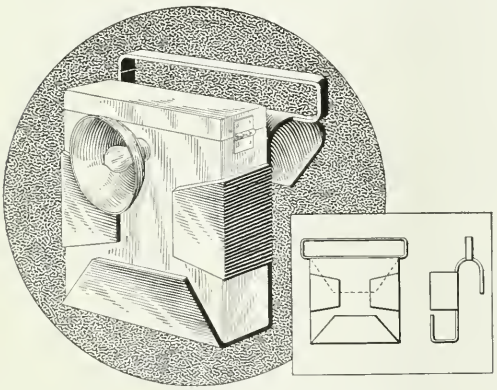
IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Holder for Edison Battery Tail Light

By Ralph W. Mayer
California, Penn.

The state law of Pennsylvania requires tail lights on haulage trips. The Edison battery lamp, with the incandescent globe fastened close to the battery, is usually used for this purpose in gassy mines, the long rubber covered wire being discarded. The Pittsburgh Coal Co.'s Crescent mine, for hanging this battery to the



DETAILS OF A BATTERY HOLDER

end of the last car in the trip, uses a holder which any mine blacksmith or machinist can make.

A piece of sheet iron ¼ in. thick is used. This is cut to the required size. The bottom is bent up for the bottom of the battery to rest upon, the sides bent in to hold the battery from falling out, and the top bent over to the side opposite the battery, to act as a hook for hanging upon the top of the car.

An iron rod is riveted to the portion bent over to act as a hook. This rod is formed into a loop, and both of its ends are riveted fast. This serves as a handle wherewith to carry the case and battery when these are not hanging on the car. The sides of the case, or those portions bent over, are cut to a V-shape as it is not necessary that the battery be completely covered. These merely act as clips to prevent the battery from falling out of the case. This construction also makes the case lighter to handle. The piece which is reflexed to the side opposite the battery to permit hanging the case to the car should be sufficiently long to form a hook that can not be jarred off the car.

An objection to the use of powdered coal as fuel is that none of the byproducts is saved in this method of combustion. Some processes which include a saving of part of the volatile matter before the fuel is pulverized for use in that form would have conservation advantages.

To Return a Motor to the Track

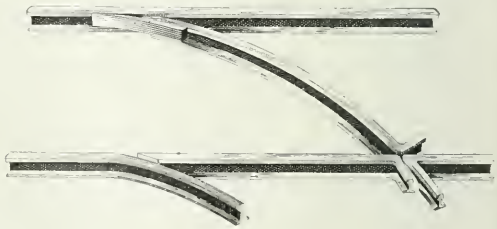
By Joe Povich
Ziegler, Ill.

When a locomotive gets off the track in the mine, a tie placed against the rib and against a spoke of one of the locomotive driving wheels will force the machine into place upon the rails. Of course, this method of procedure is only applicable to locomotives with outside spoked drivers. With such machines, however, this expedient often obviates sending for another locomotive to pull the stalled one into place, thus saving time, output and inconvenience. The requisite tie can usually be found without difficulty.

Aid to Slewing a Mining Machine Into Switches

By Machine Runner
Sullivan, Ind.

In my experience in operating a coal cutter I have found the device described below helpful at times when the mine is equipped with slew switches leading into the rooms. I carry a small piece of flat iron about the size of a fish plate. This is flattened out to a thin point on one end. Just before the machine reaches the point of the switch I wish to enter, I stop the machine and lay this piece of iron so that it will overlap the point of the lead rail and extend along the side of the



DEVICE SLEWS COAL CUTTER ONTO SWITCH

main track with the thin edge toward machine. I then turn on the power and the iron forces the machine onto the switch without the assistance of the helper. This allows the helper to remain with the cable at all times and thus prevents its being hung up on a spike, switch point or some other obstacle with which it may come in contact.

The use of the device will bring with it many advantages. It serves not only to lengthen the life of the cable, but it is not at all far-fetched to say that it may also be the means of saving the life of a driver who might run a load over the cable during the absence of the helper should his services be required to help slew the machine into the switch.

Laying Out Short-Radius Curves

By John Faber Hanst
Pittsburgh, Penn.

Short-radius curves such as are used for the turning of headings off main entries can readily be aligned by the method described in this article. It has the advantage of being so simple that the miners themselves can apply it. Its utilization requires no calculation, and the results are sufficiently accurate for all ordinary work.

A curve templet of a required radius is laid out on a level floor, or on level ground, by the engineer, using a steel tape of sufficient length. To do this, a center point is marked, and, with the tape lengthened to the

This Intersection to coincide with corresponding one on long Templete or with PC
This Edge planed true
Accurately sawed to curve
These Edges must be true and parallel
This Edge need not be true
These Intersections to be placed under PC, according to Direction of Curve
Any convenient Length
10-12 ft
about 5 ft.
3'-0"
True Edge
This Intersection to coincide with corresponding one on long Templete
T-Square Section of Curve Template
(One Inch Plank 8-12 Inches wide)
Radius of Curve
This Intersection to coincide with PC
Curve Side of short Templete coincides with this Point
Edge accurately sawed on Curve
This Edge need not be a true one
about 10 ft.
Short Section of Curve Templete
(One Inch Plank wide enough) to accomodate Curve
Long Section of Curve Templete
(One Inch Plank wide enough) to accomodate Curve
Set this Edge exactly on Line
PC
C. Line of Curve
Line Pt.
A
B
C
D
E
Method of Use
1 Set T-Square as at A
2 Set long Section as at B
3 Set short Section as at C
4 Take long Section from B, leave T-Square at A, set long Section as at D
5 Take short Section from C, set in position E, and continue around Curve, using long and short Section alternately
6 From L.H. Curve turn all Sections over and proceed in same Manner

METHOD OF LAYING OUT SHORT-RADIUS CURVES

exact radius, an arc is struck off on a piece of 1-in. plank of any convenient length, 10 ft. being about right. The same is done with another plank half the length of the first. Similar cross-pieces are marked at each end of the curve planks, taking care to nail them exactly at 90 deg. to the curve. This is easily done, provided the curve planks are held firmly in position when the arc is struck off and that the end points are marked. The edge of the tape itself will serve to strike off the correct line on which to nail the cross-pieces. A T-square piece is also constructed about 8 or 10 ft. in length.

The templets being constructed, proceed as follows: At the *point of curve* (*P.C.*) of the curve set a plug or place a nail in the cap. On the tangent, and in a direction opposite to the curve, set another point at such a distance that it will fall within the length of the T-square section of the templet. Where the points are placed by the engineer in the roof, points on the floor or ties can be secured, of course, by suspending plumb-bobs from the line plugs. The T-square can then be set so that the true edge is along the line of the tangent. This square being held firmly in place to T-head of the first curved section can be placed against the T-head of the T-square. Thus the curve edge of the section can be used to align the curve.

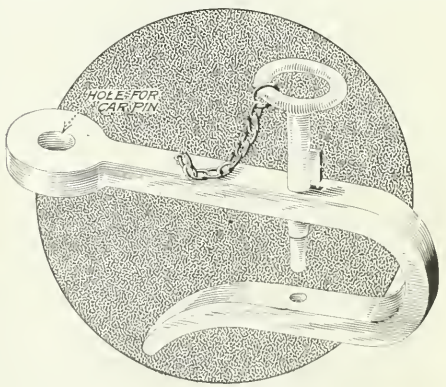
To reverse the direction of curve, simply turn the templet over, thus using the same templet for right or left curves. Now hold the curve templet and bring the shorter templet to position, carrying one ahead of the other as far as necessary. In this manner, with one setting of line plugs by the engineer, the miners can check up their drift after each blast, or as often as desired. The short and long sections enable the true line to be carried right into the breast at all times without difficulty.

Of course, when the *P.T.* is approached, it will be necessary for the engineer to run a survey around the curve and spot the exact *P.T.*, giving lines for the tangent at the same time. Most of this work, however, can be done in the office, especially if the survey points are figured on a coördinate system. This, by the way, is the only logical and systematic way of surveying a mine, and with a good accurate map on a scale of 50 ft. to the inch it is possible to determine the position of a point with great accuracy.

For the benefit of those to whom this method of laying out a curve is new, sketches of the templet and the manner of application are given. The method is in general use in many of the mines of the Lake Superior iron ranges, and, so far as I know, was developed by the engineers of the Cleveland-Cliffs Iron Company.—*Engineering and Mining Journal.*

Self-Uncoupling Hook for Use in Hoisting and Haulage

In slope hoisting and certain other forms of rope haulage, it is advantageous to employ a connection between car and rope that may be disengaged easily at the will of the triprider. The accompanying illustration shows a hook that may be coupled, jaw down, to the regular



COUPLING HOOK THAT MAY BE DISENGAGED QUICKLY

drawbar of the leading car of a trip, say on a slope. To this hook the clevis or tow-chain on the end of the cable is attached and the feathered pin inserted through both parts of the hook.

It will readily be perceived that as long as the feathered pin remains in place the tow-chain, or clevis, and the hook will not part company. When the trip, however, passes over the knuckle at the top of the slope and the pin is withdrawn by the triprider, the tow-chain will slip off of the jaw as soon as sufficient slack has been secured. After the trip has been brought to rest the hook may be uncoupled from the loaded trip, coupled to the empties, and the cable clevis or tow-chain attached ready for lowering.

Modern Housing Standards at Dawson, New Mexico

By Charles F. Willis*
Bisbee, Ariz.

So many towns, like Topsy, "just grow" indefinitely, that it is unusual to find one, after it is well grown, that decides to get away from the old habit of "just growing" and set about to develop in a systematic way. Today the more progressive companies, after an intensive study of the situation, develop standards based on the fact that the house is a place in which to live, not merely a roof over the head.

When it is considered that the home is the sixteen-hour-a-day workshop for the housewife, it is inconceivable why the efficiency and conveniences that surround our factories and mines have not been brought uniformly to the home. Why should not the houses always have been built with due regard to sanitation and health, with some thought of the problem of the fatigue of the housewife, with standards of ventilation and light? An intelligent conception of what a house is used for should make it possible to put it to the greatest use.

The old familiar colliery "patch" of red houses, arranged in long rows, is fast disappearing. In its stead we now see around the mines of progressive coal operators villages of homes, with shade trees along the streets or in the fenced-in yards of the dwellings. More than one experiment of this kind years ago showed the beneficial results attending efforts to give employees homes instead of mere houses. This article deals with a modern housing development adapted to the hot climate of the Southwest.

Up to three years ago, Dawson, New Mexico—the coal and coke camp of the Phelps Dodge Corporation—was a "just growed" town. The houses were good, even excellent as coal camps go, but they were merely houses. Nothing was thought of building rows of wooden houses, all alike, with a monotonous skyline, making it necessary for the workman to count from the end to find his own house. It gave him a feeling that his neighbor's house was the same as his in every nook and corner. There was little idea of adequate open areas, and yet they were good houses at that time.

Three years ago, however, the construction division of the Phelps Dodge company attacked the problem with a vision of the future needs of the workman; recognizing that he really wanted something better, that he had an individuality which might be expressed in a home; that it really did make a difference if the housewife had to move a bed out from the wall every time she used it, and that an irregular skyline was much more satisfying to look at and little if any more expensive. With all of these things in view, it was a question of building such a house that could be rented at a reasonable rate.

Obviously houses with individual design were preferable, but this added a cost that meant higher rent. So the problem was to incorporate in the design the best ideas as to convenience and sanitation, without requiring payment for æsthetic features, which the usual occupant of the houses did not appreciate. It was a matter of evolving certain standards of housing, living up to those standards and removing, as fast as circumstances would permit, the type of house that did not so conform.

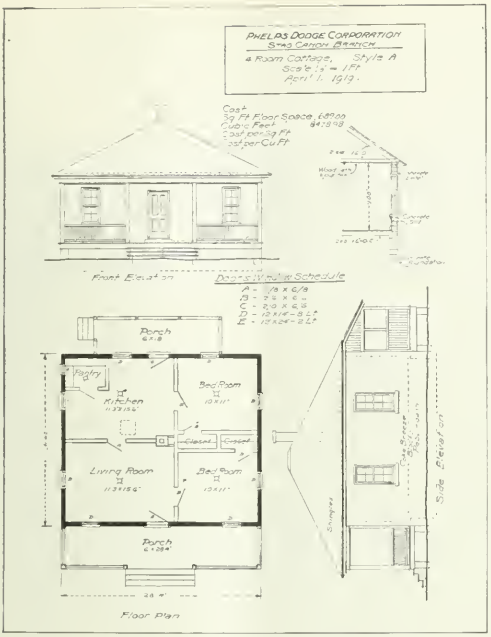
The study of the situation made by the Phelps Dodge engineers resulted in their designing 14 types of houses, of various room combinations and size to accommodate different families. Four of these types were shortly abandoned because of their similarity to other types; but ten of these types have remained, and are now in their third successful year.

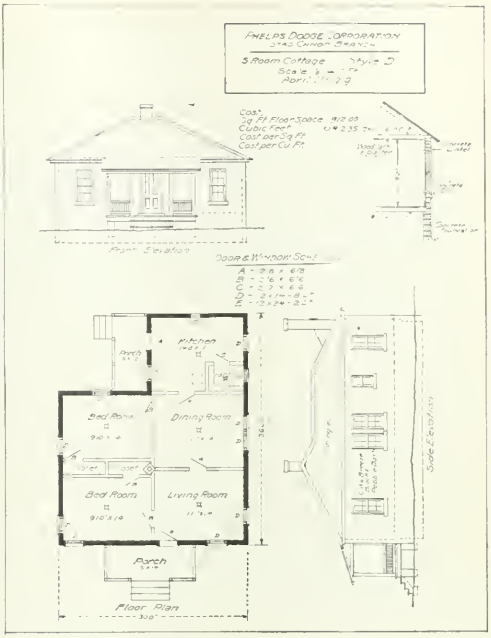
As early as the latter part of 1916, certain requisites were set down which are now recognized by industrial home planners as being minimum requirements. These requisites include the elimination of the tenement type; no hallways or narrow courts; the complete utilization of space; plenty of room at the front, back and side of each building; preferably 90 ft. between the backs of houses (never less than 45 ft.); no basement or cellar, thus removing the likelihood of such space being used as living quarters by those to whom good housing as yet means little; finally, cross ventilation, either through windows on both sides of the room, or by means of windows and a transom over the door.

If the Dawson houses are lacking in anything that makes for good homes, the kind desired by the American workman today, it is probably in outside appearance. Every type of house has a railed front porch and a screened rear porch; but there is a certain monotony of appearance in the pebble dash finish used on all of the new houses. This monotony is increased by the uniform slate gray color of the concrete finish, although this is somewhat offset by the various colors of the roofs. The simplicity of design was adopted with a purpose in view, however, for elaborate exteriors would have added to the expense and consequently to the rent. A definite amount of money can be spent on a house to permit of charging a rental of $2 a room per month, and it was considered that the renter would rather have the money expended on the inside where he lived than on the outside of the house. Experiments are being made at the present time, however, in cement coloring and spray painting, which promise to relieve the color monotony.

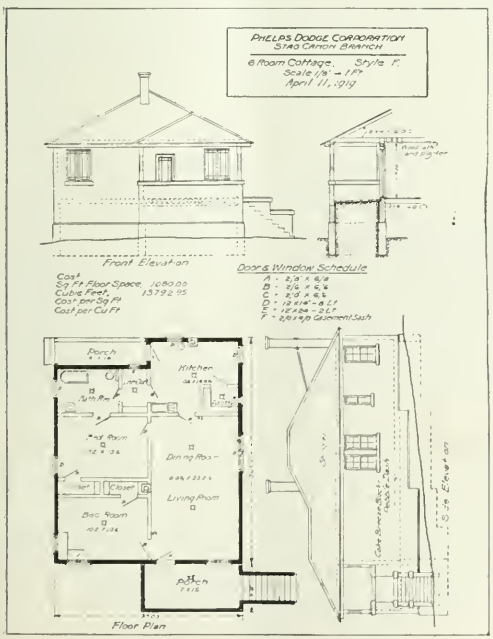
The elimination of second stories and even a second half-story has eliminated the fatigue from climbing

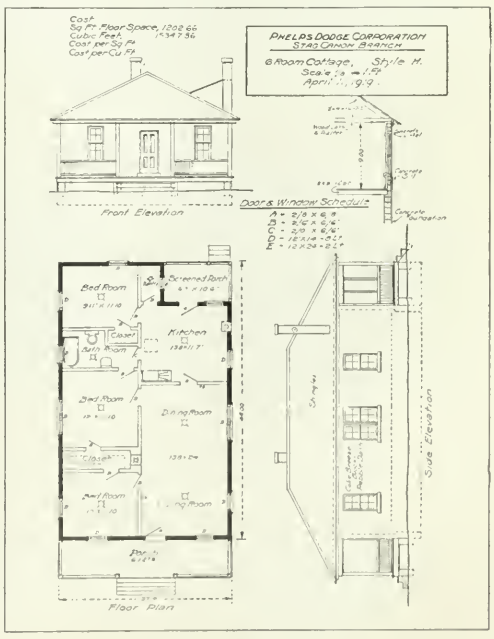
*Consulting supervisor, Department of Industrial Relations, Phelps Dodge Corporation.

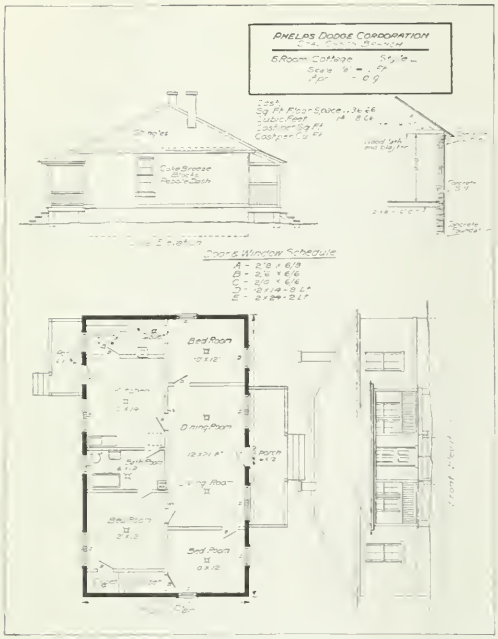


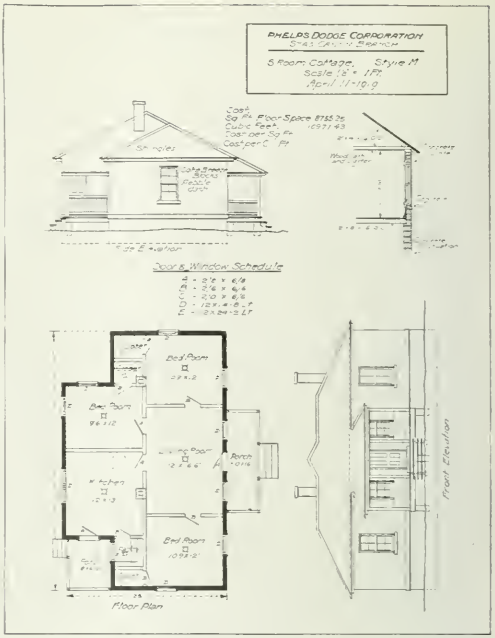


The plans here shown of some of the homes erected by the Phelps Dodge Corporation at Dawson, New Mexico, embody very excellent ideas as to convenience and sanitation

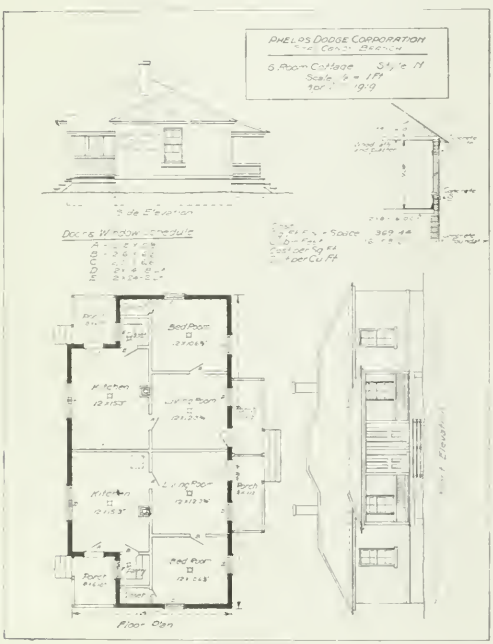


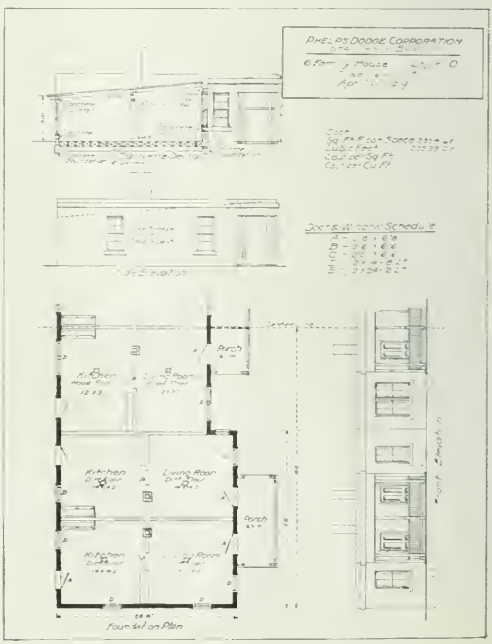


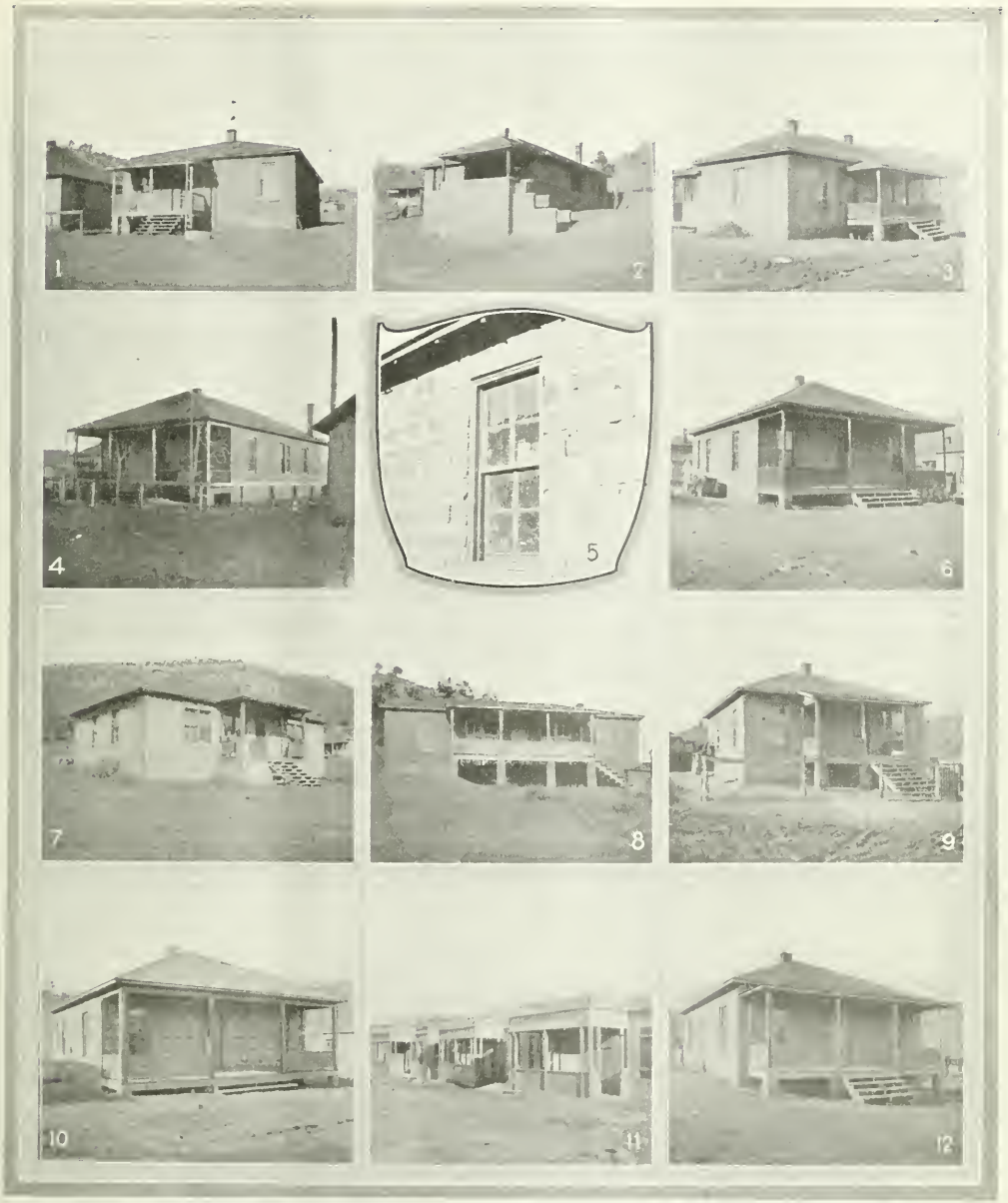




These plans have eliminated hallways and narrow courts. Complete utilization has been made of all space, with ample room at the front, back and side of each building







Types of Houses Erected by the Phelps-Dodge Corporation for the Use of Its Mine Workers at Dawson, New Mexico

1—Style E, five-room and bath.
2—Style F, five-room and bath.
3—Style N, double three-room.
4—Style H, six-room and bath.
5—Close-up, showing coke-breeze blocks used in building the houses.
6—Outside of four-room house after plastering.
7—Style K, six-room and bath.
8—Style L, six-room and bath.
9—Five-room house.
10—Four-room house shown in Fig. 6, before plaster was put on.
11—Style O, six two-room apartments.
12—A four-room house.

stairways, the additional fire risk, the abuses of the attic and the danger to children. The doing away with the second story and the use of the gabled room has greatly added to the summer comfort of the houses, because of the large air space above the ceiling, permitting the unhindered circulation of air.

The minimum amount of window space permitted for a room is 20 sq.ft., opening directly to the outside. In a few cases there is but one window in a room, the larger number, however, having at least two windows, arranged with different exposures. Where the size of the room permits of only one window, or a double window on a single side, transoms are put over the door for cross ventilation. Double hung windows are used throughout, with the possible exception of the pantry, closets and bathroom, where they may be pivoted. New York standards of plumbing practice are followed.

The three-room type is the only one built in the double house, this for the sake of outside appearance; it consists of a kitchen, living room and bedroom. The four-room type has an additional bedroom; the five-room type has three bedrooms, with a living room of sufficient size to be a combination living and dining room. One five-room type is similar to the four-room, except that the large living room is divided for a living and dining room. Front porches, back screened porches and a closet in every house complete the general layout of the rooms. Bathrooms are arranged so that there is always a means of access to them without going through a bedroom.

To a man a closet is a closet, but to the housewife it is much more; the closets in these houses, with a minimum depth of 36 in., equipped with shelves, hook strips, hooks and a place for rods, are a real joy. The same may be said of the pantry, which is well equipped with shelves and closets, and which opens directly off the kitchen.

The size and shape of the rooms represent a considerable study. One way to plan a house that will rent cheap is to have small rooms, but a minimum size of bedroom of 96 sq.ft., with a minimum width of 9½ ft., shows that the Dawson engineers did not cut costs in this way. Recognizing the fact that many bedrooms are also required to hold a crib or a cradle in addition to a bed, one large bedroom, approximately 12 x 14 ft., has been provided in each house. Rooms are designed to fit the furniture which they will hold; the bedrooms have space for the bed so that the head may be against a wall; the dining rooms provide buffet space against a wall, and in the four- and five-room houses there is wall space for a piano. A 9 ft. ceiling is uniform.

Dawson is fortunate in having plenty of building material. A concrete block, made with one part cement and nine parts ordinary coke breeze, has been found very efficient and economical. The general specifications for the houses are as follows:

Walls of coke breeze blocks, mixture 1 to 9 laid in lime mortar. Plastered outside with lime cement plaster and pebble dashed. Blocks on wall 8 x 8 x 16, joist bearing walls 8 x 12 x 24 blocks.

Floors yellow pine, 1 x 4 edge grain, on 2 x 8 joists 16 in. c. to c. Partitions 2 x 4 studs, 16 in. centers, wood lath and plastered, Brussels finish.

Roof shingled, with tin hip shingles on ridges and hips. Chimneys 8 x 8 brick, lined with 8 x 8 flue tile.

Windows double hung, 12 x 14 glass, 8 light, and 12 x 24 glass, 2 light; all doors four-panel, 1⅜ inch.

Lumber, clear native pine. Pantries and closets equipped with shelves, hook strips and hooks. Each room equipped with one and two electric light drops. All woodwork throughout painted with two coats of paint in desired colors.

During 1917 and 1918 there was a great demand for houses in Dawson, due to the increase in coal production brought about by the war, and a sufficient number of houses were built according to the new standards to make an appreciable showing in the town. The following list gives the number of each style built in the last two years:

Style	Type	1917	1918	Total
A	Four rooms	20	15	35
B	Four rooms	20	15	35
D	Five rooms	8	..	8
E	Four rooms and bath	3	1	4
H	Five rooms and bath	1	..	1
K	Five rooms and bath	4	2	6
L	Five rooms and bath	3	2	5
M	Five rooms	23	21	44
N	Double three-room	9	8	17
O	Six apartments, two rooms each	2	3	5
Totals		93	67	160

Dawson has a cosmopolitan population, representing many nationalities and people with all standards of living. It has been appreciated by the company in Dawson that good housing is not the only essential to improving standards of living, but that in some cases the people must be educated to want and appreciate better homes. To this end extension classes in home economics have been held.

The men of Dawson dig coal during the day and develop home gardens in the evening; the gardens of the community furnish many a dinner of fresh vegetables where otherwise cans would be opened. It is made easy to keep a garden; water is furnished free to all houses, and for several years prizes have been offered by the company for the best gardens. But their value is now so well known that it is doubtful if the prizes offer much if any additional inducement.

Table I represents the estimated costs on each type, and are wartime costs.

TABLE I—ESTIMATE OF PROPOSED COTTAGES, FOR 1918

Material	Style A	Style B	Style D	Style E	Style H	Style K	Style L	Style M	Style N	Style O
Lumber	$220.68	$212.40	$235.74	$269.80	$323.64	$296.30	$311.73	$273.16	$303.64	$1066.04
Shingles	57.47	56.15	58.65	65.00	80.20	76.49	76.49	70.48	87.97	79.80
Millwork	91.12	94.07	103.40	124.27	147.44	147.40	146.20	109.75	143.56	197.92
Hardware, etc	63.53	57.94	68.12	76.13	82.88	80.80	89.84	76.52	90.56	171.79
Blocks, lime, etc	350.31	351.00	421.60	435.25	471.18	465.68	467.28	446.28	519.50	713.35
Hauling	75.80	75.80	88.10	89.00	95.00	93.00	91.00	90.00	95.00	120.00
Grading	15.00	15.00	15.00	15.00	17.50	17.50	17.50	15.00	17.50	18.00
Lumber for forms	10.00	10.00	10.00	10.00	11.00	11.00	11.00	10.00	11.00	12.00
Lights	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50
Outhouse	16.00	16.00	16.00	.....	.....	.....	.....	16.00	32.00	96.00
Plumbing	..	..	..	370.00	370.00	370.00	370.00	.....	.....	.....
Total materials	$902.41	$890.86	$1019.11	$1457.45	$1601.34	$1560.67	$1583.54	$1109.69	$1303.23	$2477.40
Labor—erection	414.00	404.00	528.00	642.00	669.00	642.00	642.00	510.00	656.00	1153.00
Totals	$1316.41	$1294.86	$1547.11	$2099.45	$2270.34	$2202.67	$2225.54	$1619.69	$1959.23	$3630.40

Permissible Explosives

By John E. Miller
Huntington, W. Va.

SYNOPSIS — *Permissible explosives are only permissible if used in prescribed quantity and according to prescribed methods. It is necessary to protect all explosives from dampness to prevent deterioration. The proper use of explosives and the efficient shooting of coal is an art.*

A PERMISSIBLE explosive is one that has been approved by the United States Government as permissible for use in gaseous or dusty coal mines. The explosives used in coal mines may not only occasion accidents such as occur in the use of explosives elsewhere, but may cause widespread disaster by igniting explosive mixtures of mine gas and air or of coal dust and air, or both. It does not follow therefore that if a mine is free from gas, any explosive that may be at hand can be used with propriety; for coal dust and air may cause quite as serious an accident as may gas were it also present.

Prior to 1907 any and all kinds of explosives were used in coal mines without much regard to the safety accompanying the use of proper explosives or proper practices. In the latter part of that year, four grave mine disasters occurred in close succession—at the Monongah Mines in West Virginia, where 368 men were killed; the Darr Mines in Pennsylvania, where 160 were killed; the Naomi Mines in Pennsylvania, where 34 were killed; and the Yolande Mine in Alabama, where 61 were killed.

These frightful disasters plainly demonstrated that both humanitarian and economic needs demanded that steps be taken to prevent the recurrence of such accidents. In 1908 Congress made a special appropriation for an investigation of the cause of mine explosions, and in May, 1910, by Congressional Act, the Bureau of Mines was created. It established a testing station at Pittsburgh, July 1 of that year. Here the permissible explosive was born. Today there are 152 offsprings, many of them weaklings, we must acknowledge, but embracing nevertheless a lot of good, healthy youngsters now nearly ten years old, and perfectly capable of taking their place with the most seasoned miner in the production of the world's fuel.

The effect of the work of the Bureau of Mines station since its installation in testing, classifying, licensing and counselling the proper explosives and proper practices in their use in the coal mines of the country cannot be overestimated. It has doubtless resulted in the saving of many lives and much valuable property.

The rules and precepts promulgated by the Bureau are being ably carried out by the various state departments of mines, so that it is not possible today for a dangerous mine to go on using a dangerous class of explosive for any length of time.

PROPER WAY TO REMOVE A CAP FROM THE BOX

PROPER WAY TO CRIMP A CAP ONTO A FUSE

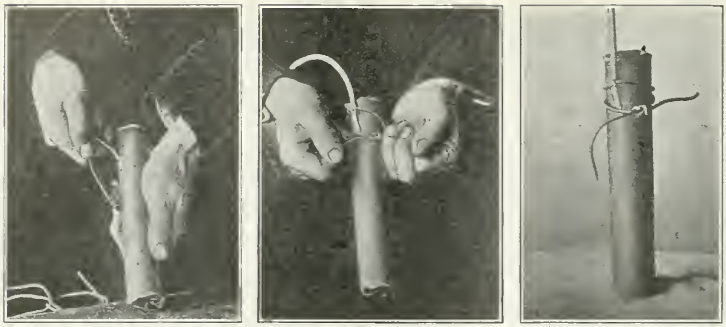
A deflagrating explosive is merely a material which burns rapidly, or oxidizes. The slowest example of oxidation is the rusting of iron. Another is the burning of coal or wood. In this process the carbon in the wood or coal combines with the oxygen of the air to form carbon-dioxide gas, and in so doing evolves heat. Deflagrating explosives are merely carbon- and oxygen-producing materials mixed in such a way that when combustion is started it proceeds rapidly and produces a large volume of gas. This in turn exerts pressure or force on the material in which it is confined. Detonating explosives, to which class the permissibles belong, do not burn, but detonate through the rupture of their molecular structure.

Explosives differ materially in rate of combustion, or rate of detonation, and by this we are able to judge with some degree of intelligence what a given explosive will probably do in a certain kind of coal or in a certain class of work.

Since all explosives produce both flame and heat when exploded or detonated, and since a flame of any kind if large enough or in contact with a dangerous gas or dust mixture long enough will ignite the gas or dust, the problem in getting a sat-

THREE STEPS IN PRIMING A CARTRIDGE

isfactory permissible is to find one evolving a minimum of flame or a flame of short duration. This is a serious undertaking, for in trying to keep down the flame it is quite probable that the kick in the explosive will also be kept down. Thanks to the Bureau of Mines we need not dwell on this phase of the situation. Suffice it to say that any permissible explosive on the latest list published by the Bureau of Mines has satisfactorily passed its tests and can be used in dangerous mines, provided the charge limit and all safety practices are observed.



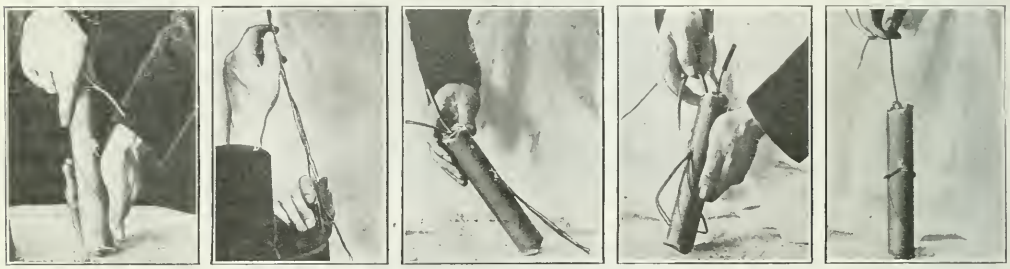
ANOTHER METHOD OF PREPARING A CARTRIDGE

No. 6, No. 7, or No. 8 strength and proper composition as the case may be.

3. That explosives if frozen shall be thoroughly thawed in a safe and suitable manner before use.

4. That the quantity used for a shot does not exceed 1½ lb. (680 grams) and that it is properly tamped with clay or other noncombustible stemming.

After an explosive has passed the required test and its brand name has been published in a list of permissible explosives, it is not a permissible explosive if one or more of any of the following conditions prevail:



DIFFERENT STEPS IN PRIMING WITH AN ELECTRIC DETONATOR

In order to make it clear what these are, I quote here just what precautions and practices, according to the Bureau of Mines, must be observed with permissible explosives in order to keep them permissible. Otherwise they are no more permissible than 40 per cent. nitro-glycerin dynamite or ordinary black powder.

1. That the explosive must be in all respects similar to the sample submitted by the manufacturer for test.

2. That detonators—preferably electric detonators—are used of not less efficiency than those prescribed—

1. If kept in a moist place until it undergoes a change in character or chemical composition.

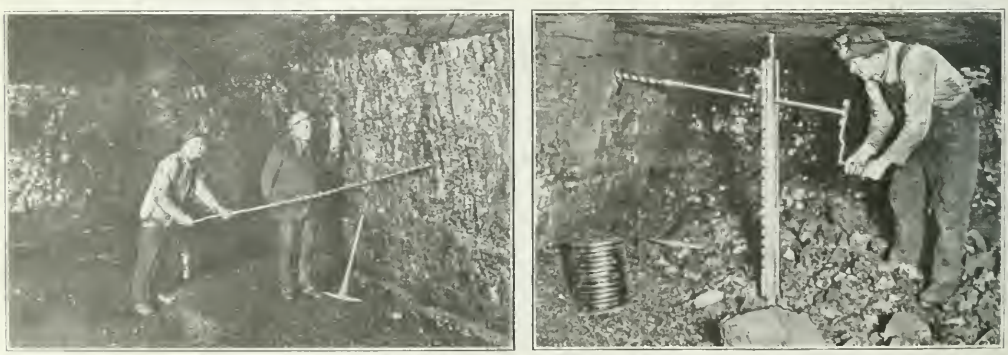
2. If used in a frozen or partly frozen condition.

3. If used in excess of 1½ lb. (680 grams) per shot.

4. If the diameter of the cartridge is less than that designated in the column of report headed "Smallest Permissible Diameter."

5. If fired with a detonator or electric detonator of less efficiency than that described.

6. If fired without stemming.



ILLUSTRATING TWO GENERALLY FOLLOWED METHODS OF BORING A SHOTHOLE

LOADING A HOLE WITH PERMISSIBLE EXPLOSIVE

7. If fired with combustible stemming.

Everyone is familiar with the dangerous practices that prevail in handling explosives around coal mines. Perhaps the gravest of these is carelessness in storing and keeping explosives. Even the largest coal companies, those employing safety engineers and taking every precaution to safeguard the lives and health of employees, have a hard time keeping their magazines clean and free from moisture, old stock from accumulating, etc. Right here let me sound a word of caution about storage. Moisture is the enemy of all explosives. When dampness gets into an explosive, its strength goes out. The old military order, "Trust in God and keep your powder dry," is still applicable, and especially to the man delving deep in the earth for coal.

Danger When Explosives Become Damp

The Bureau of Mines, as stated before, says that a permissible explosive is not a permissible explosive when it gets damp or takes up moisture from the air and undergoes a change. I would particularly warn all coal operators to watch their magazines and keep them dry and well ventilated, so that dampness will not gather therein.

The use of short fuse in shooting is a positive menace. Permissibles are not permissibles when so used. Explosive force is wasted by not properly confining the charge; furthermore, grave danger of igniting the inflammable coal dust is thus incurred to say nothing of the peril from premature explosions.

It is no wonder that accidents occur in the use of explosives; the marvel is that a great many more do not occur because of carelessness. Familiarity breeds contempt. This is particularly true of explosives. The first time a man crimps a cap onto a piece of fuse he does it very carefully and gingerly with a good crimper; but after performing this operation a few hundred times, and the crimper gets lost or mislaid, he crimps the cap on with his teeth. Should an ordinary No. 6 cap explode during such a procedure, it would surely kill the man instantly; yet he takes the risk time after time. I do not know of a better way to correct these dangerous practices than constant vigilance and patient, persistent effort with the men to keep the danger arising from carelessness constantly before them. Only in this way will fatalities be avoided.

LOADING OUT THE RESULT OF A SHOT

In selecting the proper permissible for a mine many things must be considered, among these might be mentioned: Is the coal soft, medium or hard? Is it brittle, tough and tenacious, or does it crumble and disintegrate to slack easily? Is the bed thin or thick? Is there a good roof or a poor one? Has the coal a parting, and where in the vein is it located? Is it desirable to produce lump coal for the domestic trade, or is the coal used for cooking or steam purposes? Is it machine-cut or pick-mined?

RESULT OF GOOD SHOOTING

There is a permissible explosive for almost any given condition or purpose, but as a general rule, after considering all the foregoing conditions and picking the explosive which will do the best work under the conditions present, it is necessary to proceed cautiously until the proper grade is obtained or the explosive used to the best possible advantage.

Even the best possible grade of permissible explosives for any particular work may be considered a failure unless used intelligently; that is, unless boreholes are properly placed or properly pointed, the undercut well cleaned out, the charge neither overloaded nor underloaded.

It is really an art to shoot coal properly and economically, but it can be mastered by anyone who will give the matter conscientious study and care.

Importance of Safety in Mining and Metallurgical Industries*

By W. B. Plank
U. S. Bureau of Mines

SYNOPSIS—*Accidents in the mines and industries of the southern Appalachian district have been largely reduced during past years. Improvement is decidedly possible. If further accident curtailment is to be effected there must be: The establishment of safety departments; a greater coöperation between employer and employee; continued training in first-aid and mine-rescue work.*

DURING the past few years the progress that has been made by the industries of our country has been marked not only by the rapid increase in the value of their production and the immense capital invested, but also by the attention paid to safeguarding the health and lives of the workmen. This has been true to a marked degree in the mining and metallurgical industries, which employ nearly three million men, through whose labor our national wealth is increased annually over six billion dollars.

At first there was some doubt regarding the permanency of a movement that had its inspiration in human welfare and for its prime purpose the safeguarding of life and limb. However, the experimental stage is passed and now it is the exception rather than the rule to find indifference to safety. Many mining companies and steel plants have been quick to adopt the more desirable safety measures, such as creating safety departments and requiring more careful supervision of their plants. Mining laws have been greatly improved and more strictly enforced. Various local and national organizations have been formed for promoting safety and standardizing methods. The enactment by several states of workmen's compensation legislation, with the consequent insurance against casualties, has aided the safety movement. Much stress is now being laid on the vocational education of industrial workers. More and more attention is being given to this movement, and it has undoubtedly been the means of saving many lives.

It is the purpose of this article to point out a few reasons why this safety movement should be continued, with especial reference to the promotion of first-aid and mine-rescue training in the mines of Alabama. No attempt is made to make the paper exhaustive, but it is hoped that it will be a means of stimulating interest in this humanitarian work.

The reports of fatalities in the mineral industries of the United States, in so far as data exist, show that for the past ten years, excepting the year 1917, the fatality rate in coal mining was higher than that in any other of the different mineral industries. In 1917, the year of our latest complete data, the fatality rate per thousand 300-day workers in the coal mines was 4.25, metal mines 4.44, coke ovens 2.14, ore dressing 1.93, quarries 1.83 and smelting 1.05. For purposes of comparison these figures are stated in terms of one thousand 300-day workers, thus taking into consideration the time element and equating all labor to a 300-day basis.

Fig. 1 shows the comparison of fatality rates in the different mineral industries for the period 1907 to 1917 inclusive. No data exist showing the rates for metal mines and quarries prior to 1911, nor for coke ovens, ore dressing and smelting before 1913. It is worthy of note that, while the coal-mine fatality rate has been consistently higher than the rate in other branches of the mining industry, with the exception previously stated, there has been a steady drop in the curve from 6.19 fatalities per thousand 300-day workers in 1907 to 4.25 in 1917. The number of fatalities in metal mines rose to 852 in 1917, a figure higher than was reached in any of the preceding six years. It is interesting to note also that the total coal-mine fatalities for 1917 show an increase over those for the three preceding years.

In 1918, 2579 men were killed in the coal mines of this country. This was a reduction of 117, or 4.5 per

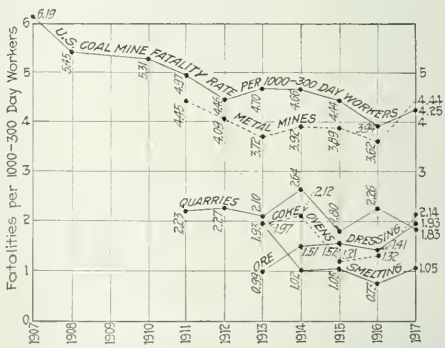


FIG. 1. COMPARISON OF FATALITY RATES IN MINING

cent., as compared with 1917. This reduction is all the more gratifying when we consider that during the larger part of the year the coal mines were under the strain of a maximum production on account of the war. It is estimated that in 1918 a total of 685,300,000 tons of coal were produced as compared with 651,402,374 tons in 1917. This is an increase of 6 per cent. in production. Also the production per fatality was the largest on record, being 266,000 tons in 1918 as compared with 241,600 tons in 1917.

In the State of Alabama 110 men were killed in and about the coal mines in the year 1918 as compared with 108 in 1917. In the coal mines of the southern Appalachian district, consisting of the states of Alabama, Tennessee, Kentucky, Georgia and North Carolina, there were 203 fatalities in 1918 as compared with 279

*Paper read before a meeting of the Alabama Safety Association, Birmingham, Ala., Apr. 19, 1919, and here published by permission of the director of the Bureau of Mines.

in 1917. This was an increase of 2 per cent. for Alabama and a reduction of 27 per cent. for the southern district. Final figures on the coal production are not yet available, but it is estimated that Alabama produced about 18,000,000 tons in 1918, and the southern district 50,000,000 tons as compared with 20,068,074 tons in Alabama and 54,189,314 tons in the southern district for 1917. These figures show a decrease of production in both cases.

Fig. 2 shows graphically the tonnage of coal produced and the total fatalities in Alabama as compared with the whole southern district. In 1917, the year of the latest complete available data, it is seen that Alabama contributed 108 out of a total of 279 fatalities for the southern district, or 40 per cent., as compared with 37 per cent. of the total coal production for the district. In other words, in 1917 there were 5.38 fatalities in Alabama per 1,000,000 tons of coal produced as compared with 5.15 for the whole southern district.

For the purpose of making a just comparison between the fatality rates in Alabama and the entire southern district, by taking into account the number of employees and the hours worked, Fig. 3 has been prepared in order to show the fatality rates per thousand 2000-hour employees in both cases. We see by studying this figure that this rate for Alabama has been consistently higher than the rate for the district as a whole over the 11-year period from 1907 to 1917, with the exception of the years 1915 and 1917, when it was slightly less. The exceptions may be explained by the fact that in the year 1915 the total number of fatalities in Alabama and in the southern district were the lowest during the period shown, because of a marked inactivity in the coal trade. In 1917 there was an increase of nearly 25 per cent. over 1916 in the fatalities in the entire district, arising mostly from a mine disaster in Kentucky, whereas in Alabama there was a reduction of nearly 10 per cent. from the fatalities of 1916.

It is worthy of note that for the year 1917 there were 2.9 fatalities per thousand 2000-hour workers in Alabama as compared with 3.44 in the whole district; but when we consider only the number of employees, leaving out the time element, we find there were 3.9 fatalities per 1000 employees in Alabama and only 3.77 for the entire district. This difference may be explained by the fact that in 1917 the coal mines of Alabama worked longer hours than the rest of the region in an effort to increase the production of coal and thus respond to the widespread appeal for the fuel needed to supply the country's war necessities.

The foregoing statistics indicate that for the country as a whole there has been a concerted effort on the part of the mining industry to lessen fatalities. This is indeed creditable when we consider the abnormal conditions under which coal mines operated during the past two years. The demand for coal was unprecedented and many of the experienced miners and officials either enlisted or were drafted into the army. There was a marked dearth of young men about the mines, their places being filled by older and, in some cases, by less experienced men. From the standpoint of labor the conditions under which the mines were operated were not favorable to a reduction in the number of accidents.

On the other hand, however, as far as possible, the mines were operated on a full-time basis, which tended to reduce the hazard from certain dangers such as explosions of gas and dust, and falls of roof. A mine working full time is likely to be kept in better condition than one working only part time.

By carefully examining the fatality records of mining, and especially those of coal mining, we find that a large percentage of the fatalities can be attributed to what are called preventable or avoidable accidents. They comprise accidents by falls of rock and coal, by cars and locomotives, gas and dust explosions, and many others which have too often been ascribed to the hazards of the industry.

For the purpose of showing more clearly the large percentage of preventable accidents which occur in our coal mines Fig. 4 has been prepared, to show graphically the different causes of the fatalities in the Alabama coal mines for 1918. It will be seen by examining this

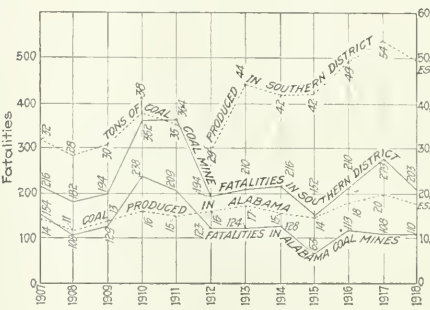


FIG. 2. FATALITIES AND TONS OF COAL PRODUCED IN SOUTHERN DISTRICT COMPARED WITH ALABAMA

chart that falls of rock and coal, cars, and explosions were responsible for 80 per cent. of the total fatalities.

A matter to which we should all give earnest consideration is that the great majority of this 80 per cent. of the coal-mine fatalities in Alabama were preventable, and they would not have occurred except for carelessness, inexperience, poor inspection, unsafe practices, ignorance, indifference, lack of coöperation between employer and employee, violations of orders or instructions, defective equipment, poor lighting, lack of proper safeguards, poor judgment and other indirect causes. The elimination of all these things, which are responsible for most of our preventable accidents, is the aim of the safety movement. Is it necessary, therefore, to raise the question of the importance of continuing this movement with more vigor than ever before, when we see what a great field of endeavor there is before us in trying to do away with this high percentage of preventable accidents? In view of the wonderful attainments of the safety movement in the past few years, during which time the hazards of the mining industries have been greatly reduced, we are bound to conclude that even more wonderful accomplishments will result in the future if we continue to make safety the first consideration.

Let us now direct our attention to a brief discussion of some of the agencies through which safety is being successfully promoted.

H. M. Wilson and J. R. Fleming, in their excellent paper on "Safety Work in Mines," published as Technical Paper 103 of the United States Bureau of Mines, classify under three heads all the different factors entering into successful safety promotion, as follows:

1. An organization that provides an enthusiastic safety committee or department, an adequate inspection system and hearty coöperation of officials and employees.

2. A scheme of safety measures designed to eliminate as far as possible dangerous conditions that have caused accidents or may cause them.

3. A system of education that will assist all employees to follow more carefully the safe and proper methods of work and will keep them constantly alert to the need of caution.

Before any progress can be made in a safety campaign there must be created a well organized and efficient safety department thoroughly imbued with the importance of preventing accidents. Such an organization should receive its inspiration from the highest officials

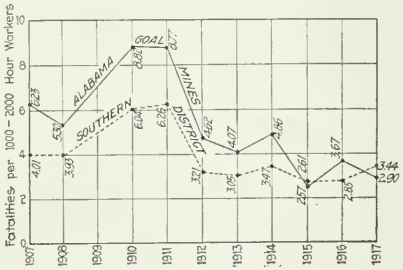


FIG. 2. FATALITY RATES PER THOUSAND 2000-HOUR WORKERS IN THE COAL MINES OF ALABAMA AND OF THE SOUTHERN DISTRICT

in the company, who must show, by their willingness to allot ample funds, that the company is firmly behind the work. We are pleased to note that much progress has been made in this direction during the past few years in Alabama. Several large coal and steel industries have created efficient safety and inspection departments, and the results already obtained have warranted the expenditure of the money and time that the work has needed. I have been told that for the first two years after the creation of a safety department by one of Alabama's coal and iron corporations there was not one fatality in its coal mines. Many other examples might be cited of the actual saving, not only in lives but in money, attained by an earnest effort at safety organization.

One Phase of an Inspector's Work

I desire to make only one observation concerning one phase of the safety inspector's work. The safety inspector is the one man in the safety organization who can and will become the missing link between the employer and the employee by removing the impersonal relationship which so often exists between the company and the worker, and by promoting that highly essential spirit of coöperation which is absolutely necessary to the successful prosecution of all reforms in operating practice looking to further safety. To the operator belongs the duty of initiating safety practices; but, unless the coöperation of the employee is sought, quite often the efforts of the operator in this regard are in vain.

It is often said that the miner is unappreciative of the efforts put forth by the operator toward making his work less hazardous, but frequently this attitude is caused by the apparent reluctance or indifference on the part of the operator to take the miner into his confidence and point out to him just why and how a proposed safety measure will benefit him. Is it not true that men who risk their lives to save those of their fellows will be willing to help better working conditions when they are approached about the matter in the right way? There should be an ever-increasing spirit of coöperation on the part of both the operator and the miner, and if the matter is handled in the right way by an efficient safety inspector the miner will be only too ready to respond.

The increasing production of the mines and plants is made possible only by the increasing use of labor-saving machinery and appliances. This has made the hazards from these appliances larger than ever before, and a goodly number of the injuries and fatal accidents are caused by machinery of one kind or another. Manifestly, then, it is incumbent upon safety departments to provide sufficient mechanical safeguards and safety apparatus and appliances.

Under this head may be mentioned the free use of danger and direction signs in and around the mines, providing sufficient timbering as a safety precaution even where good roof conditions may exist, properly insulating and guarding electric wires, providing sufficient ventilation to prevent gas accumulations, eliminating or immunizing coal dust, using permissible explosives, permissible coal-cutting machines and permissible electric cap lamps, and other safety appliances that most up-to-date mines are now using. The widespread adoption of these approved safety appliances in coal mines will go a long way toward eliminating a large number of preventable accidents both fatal and nonfatal.

Many examples may be cited of what has already been accomplished along this line, but I will present only one notable instance. A large coal-mining company in Illinois, which is always among the first to adopt approved safety appliances, recently installed permissible electric cap lamps in one of its mines where open lamps had been previously used. It found, after the installa-

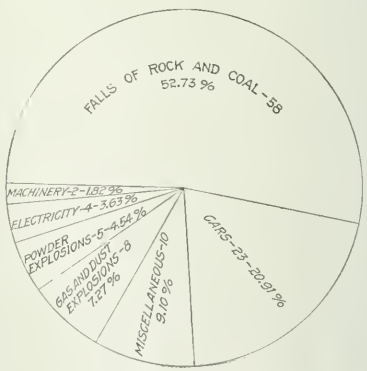


FIG. 4. COAL MINE FATALITIES IN ALABAMA IN 1918, BY CAUSES

tion of the electric lamps, that the number of injuries per employee fell below, not only the previous record at that mine, but also below the record for its five other mines where open lights were still being used. The greatest reduction was in the number of small injuries from loading coal at the face, such as cuts and bruises and eye accidents caused by falls of coal and the like. Fewer injuries, moreover, were sustained from mine cars.

I have discussed briefly some of the agencies that have caused a reduction in the number of fatalities by preventing the occurrence of accidents. Let us now direct our attention to one phase of the educational feature in connection with the safety movement which reduces fatalities after the accidents occur. I refer to the first-aid-to-the-injured and the mine-rescue work which is being conducted by the safety department of a number of large mining companies, the American Red Cross, the Public Health Service and by the United States Bureau of Mines.

We can nearly all remember the time when a miner, overcome by gas or rendered unconscious from an electric shock, was placed to one side, an object of helpless pity, to await the arrival of the doctor. We probably know of instances where men working about a blast furnace have been overcome and probably killed by carbon monoxide, because there was no breathing apparatus for them to wear, or no one know how to administer artificial respiration. We know of cases where men have bled to death after receiving an injury because their comrades did not know how to control hemorrhage. Too often in the past the injured about the mines and industrial plants have suffered untold agonies before they could be taken to the doctor or hospital, all because their comrades did not know some of the simple rules for relieving pain and suffering that can be learned so easily.

Happily, such instances occur rarely in our mineral industries today, because during the past few years first-aid and mine-rescue training for miners has been carried on quite vigorously in all the mining regions of the country. This training work undoubtedly has done much toward minimizing fatalities by preventing simple accidents from becoming fatal through ignorance and lack of proper first-aid attention. It has made more efficient workers by causing the men to be more careful of their own and their buddy's safety. It has caused the companies to take a more lively interest in safety when they have seen that efforts in that direction have been appreciated by their employees. It has proved a matter of economy to the companies by lessening liability insurance rates in those states where workmen's compensation laws are in effect.

Relation Between Fatalities and Safety Work

Let us now look into the relation between the fatalities in the coal mines of Alabama and the progress of the first-aid and mine-rescue work that has been carried on in the state by the Bureau of Mines and other organizations since 1911. Fig. 5 shows graphically the number of fatalities in the Alabama coal mines as compared with the number of men trained in first aid and mine rescue from 1911 to 1918 inclusive. The data for this figure were obtained from the annual reports of the Director of the Bureau of Mines and from the Alabama state mine inspectors' reports. It might be said that the number of men trained, as shown by this figure, includes those trained by other organizations, but who were later examined by an employee of the Bureau to receive Bureau of Mines certificates. This is in line with the bureau's policy of coöperation with state and company organizations in training work.

In examining this figure, it will be plainly noted that as the number of men trained increased from 32 in 1911 to 592 in 1915, the number of fatalities fell from 209 in 1911 to 63 in 1915. It is noteworthy that in 1915, when the largest number of men were trained, there were only 63 fatalities—the best record for ten years. This was also the year of the first state-wide first-aid contest held in Alabama, and undoubtedly the impetus which the safety movement received through this contest was responsible to a large degree for the good fatality record for 1915.

For the past two years there has been a marked falling off in the training work in Alabama. This may be attributed largely to the war, which made large production of the utmost importance. Also the Bureau of Mines has been handicapped in its training work in this state during the past year on account of the destruction, by a wreck a year ago, of the Mine Rescue Truck No. 1. I am pleased to say, however, that the truck has been rebuilt and put back in service, and a full training itinerary is now being followed by Foreman Miner J. M. Cobb.

With the present limitations in funds and personnel, it is manifestly impossible for the Bureau of Mines to cover thoroughly the many mining fields of the country; consequently, the aim has been to stimulate the mine safety and training work as much as possible by example, and to seek the coöperation and support of all agencies working for the same ends. In its effort to promote the health and safety of workers in the mineral industries, the Bureau of Mines welcomes the coöperation of operators' and workmen's organizations, of

FIG. 5. MEN TRAINED IN FIRST AID AND RESCUE WORK AND MINE FATALITIES IN ALABAMA, 1911 TO 1918

technical societies and safety associations and of state officials and state governments.

Much has been done in the past in the State of Alabama, but there is still more to be done. Now that the war is over and our mines and plants are getting back to a peace-time basis, we should take up this first-aid and mine-rescue work with renewed energy so that there may be a further reduction in the number of fatal accidents.

In conclusion, then, if we are to reduce further the number of accidents in our mining and metallurgical industries, we must, first of all, establish permanent and efficient safety departments; there must be an ever-increasing spirit of coöperation between the employer and the employee, because the success of all safety movements depends thereon; we must not relax our efforts in furthering the first-aid and mine-rescue training which has already proved so beneficial in lessening accidents.

William Gibson Sharp

AN OBITUARY

IN THE death of W. G. Sharp, president of the United States Smelting, Refining and Mining Co., which occured as the result of heart failure at his home in Boston, Mass., on July 1, 1919, the mining industry lost one who for more than thirty years had blazed trails for others to follow. Some may ask in what manner Mr. Sharp's achievements affected the coal industry; and as he had not been directly connected with coal mining for some years, his early achievements have probably been forgotten except by the older generation. He was, however, essentially a coal miner, and the best years of his life were devoted to the coal-mining industry and to the solving of its problems.

Mr. Sharp was born in Salt Lake City, Utah, on Mar. 17, 1857. His parents were John and Anne Gibson Sharp. His early education was obtained in the public schools of Salt Lake City and later in Rensselaer Polytechnic Institute at Troy, N. Y. He also did postgraduate work at Columbia University, New York City.

After he was graduated, Mr. Sharp worked for the Government as an engineer on a geological survey in Arizona and Nevada. He also worked at one time as telegrapher for the Utah Central R.R., of which his father was general manager.

In 1881 Mr. Sharp took charge of the Utah Central mine at Scofield, Utah, as superintendent and engineer. This mine was one of the earliest mines of any consequence to be opened in the state. It belonged to the Utah Central R.R., which was later sold to or absorbed by the Union Pacific interests, part of it being incorporated into the Oregon Short Line. The mine was taken over by the Union Pacific Coal Company.

In 1883 or 1885 Mr. Sharp took charge of the Winter Quarters Mine of the Pleasant Valley Coal Co., with title of superintendent. This mine was the property of Palmer and Dodge, who at that time controlled the Rio Grande Western R.R. On the sale of the Rio Grande Western R.R. to the Denver & Rio Grande, the Pleasant Valley Coal Co. passed into other hands and became the nucleus of the Utah Fuel Co., which company was practically developed to its present state during Mr. Sharp's administration of its affairs. He opened up and placed on an operating basis the mine at Castle Gate, Utah, in 1889. Mines at Clear Creek and Sunnyside, Utah, were also opened by him in 1899, and the mine at Somerset, Colo., was planned during his administration. Active development, however, did not begin until after Mr. Sharp had severed his connection.

Mr. Sharp's greatest service to the coal-mining industry of Utah and to the country at large consisted in his broadminded attitude toward sociological and safety measures. He was far in advance of the times, and many years before the Bureau of Mines came into being Mr. Sharp was instrumental in the inception of safety devices, which have since been incorporated into general mining practice. Many of the improvements which he or his organization worked out have been rediscovered in other districts, where they have been hailed as innovations or as original ideas. Historical data, however, establish the fact beyond fear of contravention that Mr. Sharp's trained mind was the first to realize the necessity for certain preventive measures, which were adopted in Utah in the early '90s. Most of these measures have since been looked upon as good practice in the State of Utah and have been adopted by all mining companies, either as a result of statutory mandate or by force of public opinion.

One of the notable improvements was the substitution of dynamite (Hercules No. 2) in place of black powder, which occurred at the Castle Gate mine about May, 1890. It should be said here that this was many years before permissible powder was thought of. Practically all of the mines in the State of Utah use permissible explosives at this time.

Early in 1890 the use of wood pulp for tamping was inaugurated. It is probable that the late Robert Forrester, one of Mr. Sharp's loyal subordinates, assisted him with this, as well as with the inauguration of other safeguards. The use of wood pulp was probably adopted due to their search for tamping material similar in its characteristics to the wet moss which at that time was used in Scotland. Wood pulp is no longer used for tamping, but at the early date at which it was introduced it was certainly an innovation of more than ordinary merit.

In 1891 the first sprinkling system was installed at the Castle Gate operation. Pipes were laid throughout the mine, which were equipped with bibbs at convenient intervals, and men were employed to wash down the roof, ribs and floor, using a $\frac{3}{4}$-in. hose, which permitted easy access to crosscuts and all other working places.

At about the same time that the sprinkling system was installed, the humidification of the intake air was begun by the admission into the mine of exhaust steam, which was augmented by a percentage of live steam from the power plant.

In 1891 an electric shotfiring system was installed at Castle Gate By this system all shots were fired from the outside after all employees were out of the mine. A description of the system used today in practically all of the mines in Utah has appeared in *Coal Age* within the past three or four years, the methods in use today

being substantially the same as those adopted in the beginning. It was during Mr. Sharp's connection in Utah that the first coke ovens were built at Castle Gate in 1889. These ovens made the first coke which had been produced in the state for commercial quantities up to that time.

Although in the beginning Mr. Sharp's title was that of superintendent, his duties and responsibilities gave him a much wider authority than the title would imply. However, in either 1890 or 1891 he was made general manager of the Pleasant Valley Coal Co., which position he occupied until he left Utah in 1901, to accept the position as manager of sales for the Consolidation Coal Co., with headquarters in New York City. His ability was of such high order that upon the formation of the United States Smelting, Refining and Mining Co. in 1905, his services were solicited by the interests in charge. He remained with this company as its president until his death, and his qualifications as an executive here developed their broadest scope.

Through his efforts, coupled with the loyal support of his associates and of the subordinates in the organization which he built up, all of whom deemed it a privilege to work for him, he acquired and developed many valuable properties, those of particular note being the Real Del Monte mines in the Pachuca district of Mexico, and several other valuable metal-mining and smelting plants. The properties that he developed, which are of particular interest to the coal-mining industry, being the United States Fuel Co. and the Utah Ry., both located in the State of Utah.

Mr. Sharp's early experience in the West had given him a most intimate knowledge of the possibilities of a section which is little known and less understood by the average easterner. He visualized the country as it would be in the years to come, and foresaw the opportunity of building up the coal-mining industry upon a scale and according to a standard which had not been attempted theretofore. Consequently, in 1912 he acquired for his company several large producing coal mines in the State of Utah, which had been opened up and developed a year or two before, these properties being the Castle Valley Coal Co., the Black Hawk Coal Co. and the Consolidated Fuel Co. A little later he purchased the Panther Mine, an undeveloped property located near Castle Gate, Utah. These plants were operated for two or three years as separate companies, but as soon as possible a consolidation was effected and they were all combined into what is now the United States Fuel Company.

The first three mentioned mines were served by two small railroads which connected with the main line of the Denver & Rio Grande at Price, Utah. The grades and curves on these railroads were of such character that their operation was both difficult and expensive; consequently, it was decided that in order to solve the difficulty an entirely new line would have to be constructed. Numerous surveys were made, which resulted finally in the construction of the Utah Ry., which was opened to traffic in 1914. This line gives the mines of the United States Fuel Co. and others built tributary to it direct connection with the Salt Lake Route and the Denver & Rio Grande R.R. at Provo, Utah. The rolling stock and motive power are of the best, and it frequently happens that a car of coal is delivered in Salt Lake City before the bill of lading, which was mailed the same day, reaches the consignee. Since this road has been operated by the owners the mines located on its line have received 100 per cent. service.

Little as W. G. Sharp is known in the coal-mining industry, he has nevertheless left his impress on mining methods, particularly in regard to safety. It was his happy inspiration that led to the practice of shooting the coal, when every person, including the shotfirer, is out of the mine. He was one of the first to recognize the danger inherent in the use of black powder underground and to substitute the safest explosive then available—dynamite. He probably was the first to introduce sprinkling systems into the mines, to humidify intake air by exhaust steam and to use safe tamping material that would not aid in the propagation of flame.

Mr. Sharp always insisted that the safety and welfare of the company's employees and their families be given paramount consideration, consequently no amount of money or care has been left unexpended in the effort to make the properties of the United States Fuel Co. modern and safe in every sense of the word. Housing facilities are far better than the average, and an effort has been made to beautify the surroundings. An emergency hospital, capable of caring for twenty patients, has been constructed. Smaller emergency hospitals are located at or near the mines of the several plants. Amusement halls, or community buildings, have been constructed at several of the plants, and a bath, or change house, has been constructed at one of the mines. Others are planned and will be erected as soon as possible. The imprint of the master mind is plainly discernible.

Not the least of Mr. Sharp's qualifications was his ability as an organizer. In the early days his relationship to his employees was intimate, and men worked for him from a spirit of personal loyalty, which is difficult to duplicate at this time. He was known to a host of oldtime Scotch, Welsh and English miners as "Wull" Sharp. This freedom of speech, instead of being looked upon as an impertinence, was considered by Mr. Sharp as an honor. He took a great interest in his employees and their families, and especially in the welfare of the young men in his organization, and many a successful man in the West today can attribute his success either to early training obtained in Mr. Sharp's organization or to assistance and advice rendered in later life.

A Problem in Coal Extraction

SYNOPSIS—*In one of the important coal fields the extraction varies from 40 to 50 per cent. The mining conditions and present practice are here detailed, and discussion is invited with a view to the development and adoption of methods that will permit better recovery.*

THE accompanying illustration shows a method of mining used in one of the important mining fields in the United States by which only about 50 per cent. of the coal in the ground is obtained. It is recognized that a high percentage of recovery is desirable and probably can be secured by a change in method, although the conditions as outlined are difficult. The readers of *Coal Age* are asked to criticize the plan illustrated and to suggest a better method of operation.

The depth of the coal ranges from 450 to 600 ft. The bed worked is 8½ to 11 ft. thick, and the top and bottom of the seam is hard coal. A middle layer is softer and rashes easily. The top coal, 1½ to 3 ft. thick, is left up to protect the shale roof. It separates easily from the under coal and also from the overlying rock, so that it can be easily recovered later if other conditions permit. A hard siliceous shale "blue-band" occurs 1½ to 3 ft. from the bottom and is 1½ in. thick, occasionally thicker. Mining is done in the bottom coal.

The bulk of the overlying hard rock is a siliceous shale that disintegrates when exposed to the air and falls readily either in irregular slabs of considerable size, in small pieces or, occasionally, in extremely large masses which break off along fairly distinct cleavage planes. In some cases this broken material chokes and there is no evidence of subsidence on the surface; but when large areas squeeze, cracks and subsidence are evident at the surface.

The top coal and the overlying shale contain indistinct cleavage planes which extend approximately north and south. Along these planes the top coal and shale roof cut upward easily when exposed to the air, sometimes arching at a height of 4 to 10 ft. above the coal and sometimes breaking irregularly for an indeterminate distance upward. Slip faults are abundant in the top rock and occasionally extend down through the top coal, or less frequently through the whole bed. The general direction of these slips is north and south with an inclination of 35 to 40 deg. from the vertical.

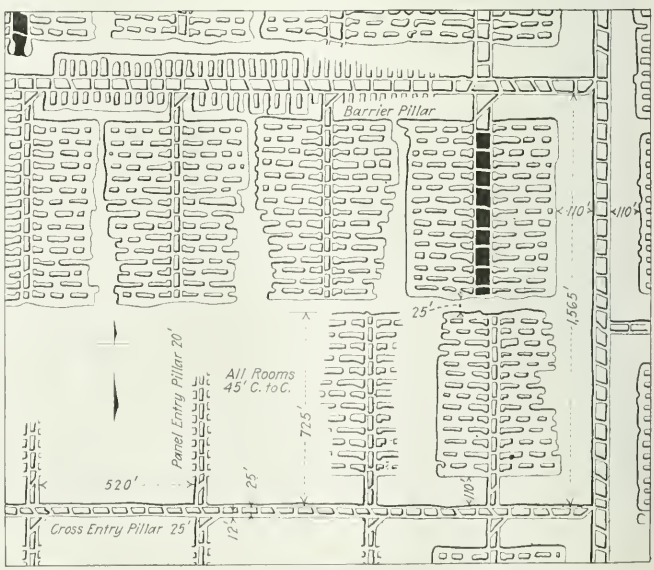
About 40 ft. above the coal is limestone, generally about 4 ft. thick, but of variable thickness. It occasionally lies directly on the coal or it may be as high as 100 ft. above it. Sometimes it is entirely absent. Occasionally other limestone beds occur at a higher elevation, but such beds are not persistent over large areas. Near the surface the drift material consists of clay and sand varying in thickness up to 100 ft.

Fireclay, which varies from a few inches to several feet, and which disintegrates when exposed to moisture and air, forms the bottom of the coal bed. This material will thus crack and heave even in crosscuts.

A modified panel system is used in mining (see accompanying diagram). Rooms are on 45-ft. centers, and for the first 100 ft. are driven 18 to 21 ft. wide. Inside this point they are gradually widened to a width of 28 to 30 ft. at the face, leaving pillars 19 to 25 ft. wide. Crosscuts are 60 ft. apart. Room entries are 725 ft. long and 12 ft. wide, with a 20-ft. pillar between. Barrier pillars are 100 to 125 ft. wide, and 14 rooms are driven off each entry, this number accommodating one breast machine for each panel. Rooms are necked when the entries are driven, the width of the neck being 18 ft., which is the minimum width without yardage charge. All the rooms on a panel are started at the same time when the entry is finished and are widened to full width of 24 ft. in four machine cuts.

It takes about one year to drive a panel entry and about another year to drive the rooms therefrom, so that each panel is completed in approximately two years. Rooms are driven east and west on account of roof conditions, as the roof falls more readily in openings driven north and south because of the cleavage in the top coal and shale.

After the rooms are driven their full length, a wide crosscut is driven along the entire face of the panel, and then, if possible, pillars are robbed with solid shooting by intermediate crosscuts through the pillars. The track is pulled back to the entry when there is any



PLAN OF UNDERGROUND WORKINGS, SHOWING METHOD OF OPERATION

evidence of a squeeze. If conditions permit, the room stumps and entry pillars are slabbed to a depth of one machine cut. Wide barrier pillars are robbed, as shown in the diagram, by means of rooms.

Squeezes usually follow the extraction of 40 to 50 per cent. of the coal, and the resulting subsidence is often evident at the surface. In case of squeezes gas is liberated in quite large amounts, but frequently it is not observable on the cross entry adjoining the squeezing panel until several days after the pillars have crushed, and until the breaking and crushing of the overlying rock is well advanced. Mines are worked with both open and closed lights. Usually the panel squeezes before the room pillars can be secured, and occasionally a squeeze occurs before the rooms are driven full length; a part of the panel may be abandoned temporarily, though frequently the remaining coal can be got from an adjoining panel.

Squeezes give ample warning, so that there are few accidents and little material is lost. They usually occur soon after the rooms have been driven full length, but occasionally pillars hold for a much longer time. The workings are fairly gaseous but dry, and generally no water comes from the workings in case of a squeeze. About 100 props per room are put in along the track, and sometimes in crosscuts. About one-third of these props can be saved if labor conditions make it worth while to do so. Where the surface is not owned in fee, leases usually contain a clause releasing the mining company from liability for surface subsidence.

The field is closely unionized, and according to the agreement there must be a working place for each man; but two men can work together in one room loading, while the other room is being cut. Gangs of six men frequently drive a number of entries, one man acting as machine runner and the others as loaders, but all sharing equally in the pay.

Crosscuts are driven 60 ft. apart as required by state law. Any change of method is difficult owing to labor conditions. Only 14 men can work with one breast machine and only 20 men with a shortwall machine.

All room tracks are laid by the company, and the miner sets his own props at his working face only. Mine cars and explosives are delivered at the roomneck. Permissible powder is used and shotfirers examine the holes and charges before the holes are tamped. They fire all shots. The miners are a mixture of foreign races and generally have had no mining experience before coming to America. The coal is used for steam and domestic purposes, and consequently should contain a minimum of slack and fine material.

Decomposition of Hydrocarbons

The process of decomposition of hydrocarbons is probably a gradual dehydrogenation. Compounds of higher molecular weight are decomposed into compounds of lower molecular weight with liberation of hydrogen or a simple hydrocarbon. These intermediate compounds are in turn decomposed. Some of the products, particularly the carbon, may polymerize to form compounds of higher molecular weight. The decomposition does not follow any single path, but is influenced by the temperature and pressure. The ultimate products are carbon and hydrogen.—*Bureau of Mines Bulletin No. 135.*

Legal Department

Selection of Mine Props—An operator is not liable for injury sustained by a miner through breaking of a prop furnished for his use and selected by him from a number of good and bad ones. It is contributory negligence for a miner to continue to use props which he knows to be defective. An employer may relieve himself from responsibility for injuries to his employees by entrusting to them performance of ordinary and simple duties incidental to the employment and resting upon the employees' knowledge and skill. (Kansas City Court of Appeals, Kube vs. Northwestern Coal and Mining Co., 209 Southwestern Reporter, 614.)

Waiver of Lease Rights—Authority of Corporate Officers—If one holding a coal-mining lease knowingly permits another to purchase the leased property and to make improvements in innocent ignorance of the lessee's rights under the lease—the lessee failing to protest or give notice of his rights—he will not be permitted to assert them against such purchaser. But where the purchaser has actual or constructive knowledge of the lessee's rights the latter's silence will not estop him from asserting them. The vice president and general manager of a coal-mining corporation has no implied authority to dispose of all of its assets. Actual authority to sell a lease for cash confers no authority to bind the company by an agreement to sell for anything less than cash. (Kentucky Court of Appeals, Empire Coal Mining Co. vs. Empire Coal Co., 210 Southwestern Reporter, 474.)

Illinois Mines Act Applied—In the case of Wendzinski vs. Madison Coal Corporation et al, 118 Northeastern Reporter, 435, the Illinois Supreme Court has reversed a judgment for $15,000 awarded by a lower court in favor of plaintiff on account of loss of his eyesight by the explosion of a cartridge while it was about halfway back in a hole 4 ft. deep which he had bored for the purpose of shooting down coal in a mine of the defendant company in which he had employment. The reversed judgment was awarded against the company and its mine manager and assistant mine manager jointly. The main theory on which the suit proceeded was that the defendants were negligent in failing to properly instruct plaintiff concerning the handling of explosives. The principal points decided by the Supreme Court of appeal were as follows: The fact that plaintiff had received a certificate of competency from the miners' examining board was properly considered on the question of fact whether defendants knew or ought to have known that plaintiff was so ignorant of the dangers of handling explosives as to make it proper to instruct him, but the fact was not conclusive against the necessity for such instruction. By electing not to be bound by the provisions of the Illinois Workmen's Compensation Act the defendant coal company lost any right to defend plaintiff's suit on the ground that the injury was caused by his own contributory negligence, or by a risk assumed as an incident to his employment, or by negligence of a fellow servant. But this did not relieve plaintiff of the necessity of establishing negligence on the part of the company directly causing his injury. Nor did it affect the right of the defendant's mine manager and assistant mine manager to interpose the three defences just mentioned. A general, uniform and well-known custom not to instruct practical miners in the use of explosives might be shown on an issue as to the existence of negligence on the part of the defendants, but would not necessarily excuse failure to give such instruction. The provision of the Illinois Mine and Miners Act, for a right of action in favor of miners injured through violation of the safety provisions of the act by their superiors, applies only to employers, and gives no right of action against the mine managers individually, although a manager may become liable to punishment as for a misdemeanor.

Who's Who in Coal Mining

AMONG the early pioneers whose lives have been spent in the Middle West and whose energy and ambition have assisted in building up the coal industry of that section, none is more worthy of recognition in these pages than our humble and faithful friend James Taylor, formerly state mine inspector in Illinois and now special mining investigator for the Department of Mines and Minerals, Springfield, Ill.

Born in Heywood, Lancashire, England, in 1854, Mr. Taylor is now, at the age of 65 years, as alert and active as a man of forty. In company with his parents he came to this country in 1873, a lad of 19, and located at Elmwood, Peoria County, Ill., where he obtained work in the mines. Three years later, Oct. 10, 1876, he was happily married to Rebecca Seaton Gilysart, of Elmwood, and their union has since been blessed with three sons and three daughters, now all grown to manhood and womanhood.

JAMES TAYLOR

Mr. Taylor's genial smile and warm sympathy for the distressed and unfortunate has won for him the appellation of "Uncle Jim," by which he is familiarly known in his large circle of acquaintances. To know Jim Taylor is to love him for the generosity of his nature and to respect him for his courage and ability. In 1885, after studying and working in the mines to fit himself for higher service, Mr. Taylor went before the state board of examiners for the second time, having failed to pass the examination the previous year. He was now successful and having obtained his certificate was at once made mine manager (foreman) of the Wantling and Howarth mine at Edwards, Ill., where he was working.

One year later, 1886, Mr. Taylor was honored by Governor Oglesby with an appointment as state mine inspector, for the third district of Illinois, serving in that office continuously till 1907, with the exception of four years, 1892-1896, when he failed of the appointment by Governor Altgeld (democrat), but was reinstated in office in 1896 by Governor Tanner.

It was in the year 1907, after 15 years of service as state mine inspector in Illinois, that Mr. Taylor was chosen and offered the position of general superintendent of the Canada West End Coal Co., operating large mines at Tabor, Alberta, Canada, where he had spent his summer vacation and, on the invitation of J. J. Hill of the Northern Pacific R.R., had inspected and negotiated the purchase of 31,000 acres of coal land, for said company.

The love of home, however, proved stronger than the allurements of that great Canadian coal field, and the following year, 1908, brought Mr. Taylor back to Illinois, at the earnest solicitation of Governor Deneen, to fill the vacancy caused by the resignation of Thomas Hannah, in the Sixth District of the state. Governor Deneen had always regarded Mr. Taylor as one of the best posted mining men in the state and had sent him to investigate the terrible disaster that occurred in the Leiter mine, at Zeigler, Ill., April 3, 1905, when 53 lives were lost in an explosion of gas in that mine.

At the time of the great disaster in the Cherry mine, Bureau County, Nov. 13, 1909, Mr. Taylor, with other inspectors from the several districts of Illinois and the adjoining states, entered the mine in the hope of rescuing some of the 259 lives sacrificed in that appalling catastrophe. His brother members of Peoria Lodge, No. 20, B. P. O. E., recognized that service by a special presentation commending his participation in that dread event.

In the reorganization of the administrative branch of the Illinois state government, in October, 1917, Mr. Taylor was appointed special investigator, and charged with the duty of investigating methods and conditions in the coal and metalliferous mines of the state regarding the safety of life and property and the conservation of the natural resources of the state, which position he still holds.

No movement for the betterment of coal-mining conditions either in his home state of Illinois or in other district or sections of the country has ever failed to receive the hearty and unqualified support of Mr. Taylor, whose untiring efforts have more than once been the main stay of disheartened workers in a cause calling for the sacrifice of means, time and effort. No worthy unfortunate one, of whom there are many in the coal-mining industry, has ever failed of his sympathy and help.

In the organization and training of first-aid teams, in mining camps and districts, Mr. Taylor has always manifested a deep interest and played an active part, and Illinois and the coal-mining interests of other states have been inspired by the help and smile of "Uncle Jim" Taylor, who has the heartiest congratulations of *Coal Age*. May he long live and prosper.

New Type of Mine Bonds

By E. Steck
Hillsboro, Ill.

All electricians who have anything to do with the operation of electrical apparatus in coal mines are confronted with the difficulty of maintaining voltage at distant points in the mine. In some cases insufficient trolley copper is provided so that the drop of voltage occurs in this wire. More frequently the decrease in potential is due to a poor track return, for in most mines the track is not given as much attention as it ought to have, and little care is expended on its bonding.

This neglect has been somewhat justified in the past because no bond was offered to the electrical engineer of the mine that would maintain a good contact and therefore a low resistance when once installed.

There is enough acid in most coal mines to seriously impair the conductivity of any mechanically applied joint in a short period. As far as this goes, I think it is safe to say that few mechanically applied bonds are in good order six months after they have been installed. In many cases the corrosion has progressed to such a point that the presence of the bond is almost useless. The corrosion between the inside of the hole which takes the bond head and the outside of the copper bond has proceeded to such a point that the resistance is so high, that most of the current flows through the earth.

The same conditions that make a mechanically applied bond of doubtful value in the coal mine simultaneously decrease the resistance of the ground return. In the majority of cases, however, a well bonded track greatly improves the voltage regulation, especially at the more distant points of the mine.

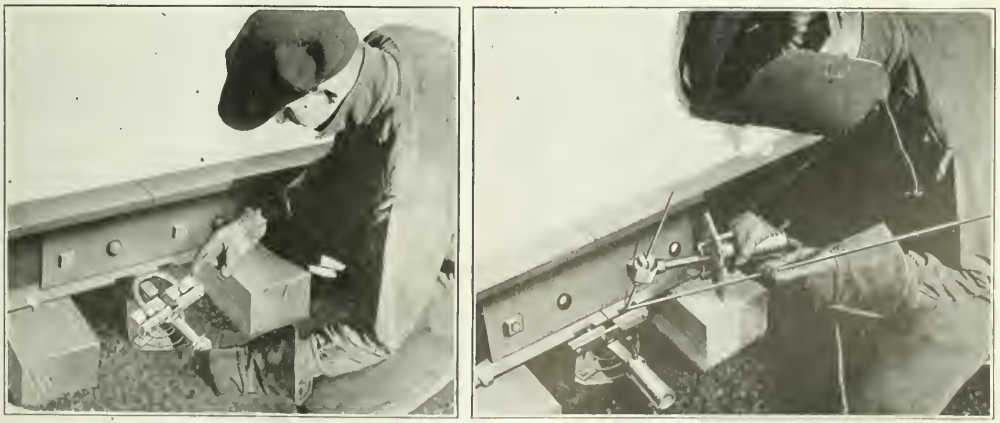
A little thought will show that the voltage regulation on the mining machines or locomotives is of great importance for the reason that with the piecework rate of payment, the miner is interested chiefly in getting out coal and not greatly concerned in preventing burnouts of armature or fields on mining machines or locomotives. Any electrician knows that when the potential on a machine gets down to 100 volts or less the effort to make the machine do its normal work causes so much current to flow as to burn the machine up in a comparatively short time.

WELDING EQUIPMENT IN OPERATION

If, therefore, some method can be offered to the coal-mine operator that will insure the bonds on the track remaining in good condition, the slight expense of installing such bonds will be more than repaid in the decreased repair bills, to say nothing of the increased output. A bond of this charactor has been developed by the Lincoln Bonding Co. within the last two years.

Experience shows that a bond on the ball of the rail is not practical, for coal cars have a bad habit occasionally of geting off the track; and a coal car off the track will scrape away all the bonds that have been applied to the ball of the rail. It is therefore necessary to place the bond under the rail in order to protect it from the damage from coal cars when off the track.

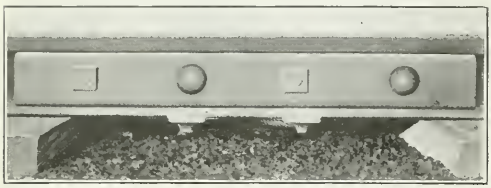
The connection between the bond and the rail is made by use of the electric arc, and in this process the copper and steel are fused together. Experience has shown that the connection between the bond and the rail will last longer than the bond itself, where both are exposed to extremely bad acid conditions. In other words, the part of the bond that hitherto has been the cause of failure has been made the strongest part of the bond. These bonds can be applied in a few minutes, each head requiring about 30 sec. to apply. Many thousands of such bonds have been used thus far with satisfactory results when properly applied.



SLIPPING A BOND INTO POSITION UNDER THE RAIL AND WELDING IT IN PLACE

This process, while it is the best that has been developed for mine bonding, and while the skill required for successful application of the bonds is small, it is not foolproof; and if the operator goes to trouble enough he can put a bond on in poor shape. It is easier, however, to put the bond on well than it is to place it on badly, and the number of complaints arising from poor bonds is small.

The machine that supplies the current for welding the bonds is a dynamotor of light weight and compact



A BOND WELDED IN PLACE

construction. The total weight of the machine is about 400 lb. and its dimensions are approximately 24 in. long, 17 in. in diameter and 20 in. high. In addition to the bonding of the rails, the same machine may be used for all classes of welding in machine shops and in any mine that does its own repair work. The machine will save its cost every year in the repair shop exclusive of what it will do in applying bonds in the mine. In a number of cases on demonstrating trips, repairs have been made that saved almost the cost of the machine the first day.

Australian Brown Coal

By Commercial Attaché A. W. Ferrin
Melbourne, Australia

A threatened but averted strike of the coal miners of New South Wales and an actual coastal shipping and wharf labor strike, which has caused a shortage of coal in several states, particularly Victoria, has revived interest in the remarkable deposits of so-called "brown coal" in the Gippsland district, Victoria.

This brown coal seems to be coal in the process of formation, not completely carbonized, but sufficiently so to make it a good fuel for many purposes, though not for the manufacture of coke. If mixed with wood or black coal it can be used for domestic purposes. It looks to be something between wood and coal. Chunks of wood have actually been found imbedded in the brown coal, and lumps of the coal itself frequently exhibit the grain of wood. The deposits are supposed to be the residuum of vast pine forests which covered part of the State of Victoria in prehistoric times. The coal in its present form is softer than bituminous, and is dull black or snuff brown in color.

The brown coal beds of Victoria are said to be the thickest in the world. At Morwell 780 ft. of coal has been passed through in a bore of 1010 ft. The four principal areas of occurrence cover approximately 1200 square miles of an average thickness of 50 ft. The depth of the coal seams below the surface varies from 60 to 500 ft., the average being near to the first figure.

No extensive mining operations in these areas, which are controlled by the State of Victoria, have yet been carried on. Up to 1916, the last year for which official figures are available, the total amount mined had been but 84,663 tons, and the 1916 production was only 2915 tons. But plans are now being made for a more rapid development, which will doubtless be accelerated by the present abnormal demand created by the strike situation.

Before the war a private syndicate, said to have a backing of $100,000,000, was negotiating for one of the larger deposits, but the state did not think it proper to permit a private company to acquire so valuable a natural asset. The total amount of brown coal in Victoria, in four distinct large areas and numerous small and widely divided deposits, is estimated at 30,000,000,000 tons.

A typical analysis of the brown coal at Morwell, the center of the largest area, showed the following composition (in percentages): Water, 53; volatile matter, 24.50; fixed carbon, 21.50; and ash, 1. Further tests showed sulphur, 0.7 per cent.; nitrogen, 0.3 per cent.; calorific value, 5500 to 6000 B.t.u.; evaporation value, 5 lb. of water; gas per ton, 6500 cu.ft.; ammonium sulphate, 32 lb. per ton.

International Mining Machinery Exposition

Announcement is made by the Merchants and Manufacturers Exchange of New York that one of the permanent expositions in Grand Central Palace will be the International Exposition of Mining Industries. Since the announcement made some weeks ago that the Merchants and Manufacturers Exchange was to take over Grand Central Palace for the purpose of converting it into a trade clearing house, considerable comment has been made in many lines of industry, especially in the mining world.

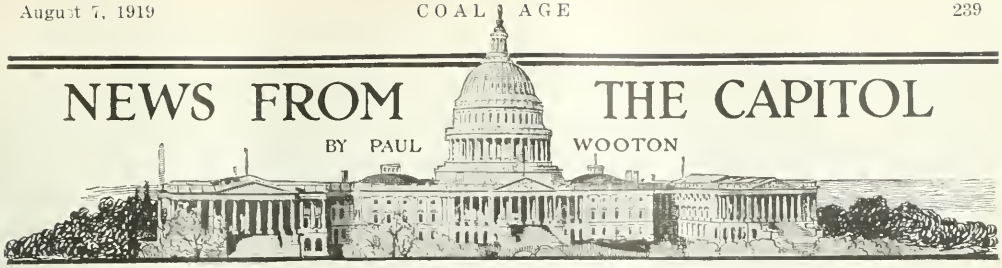
The Nemours Trading Corporation owns and controls the Merchants and Manufacturers Exchange of New York. It has 19 branch offices and 3000 foreign selling agencies throughout the world.

Through representatives of the Nemours Trading Corporation, inquiries from many parts of the world where machinery and other commodities are desired will be referred to the Merchants and Manufacturers Exchange, and those pertaining to mining will be referred to the mining exchange and exhibitors of the specified lines of goods so notified. The Exposition of Mining Industries will include all that is latest and best in machinery used in the development and exploitation of metal mines, non-metal mines and oil wells. Likewise machinery used in the subsequent extraction, reduction or refining of the raw products by concentration, leaching, cyanidation, flotation, smelting, distillation, coking, etc.

People going to the Palace interested especially in one line of goods in one exchange will take advantage of the opportunity to visit the other expositions and exchanges in the building with the result that they will find other things of interest in addition to what they came especially to see.

Coal Age Index

The indexes to *Coal Age* are furnished free to all who ask for them. The index for the first half of 1919 is now ready for distribution, and a copy can be had by addressing a postcard to the Subscription Department of *Coal Age*.



American Coal Output and Some Problems of the Industry

Whether the Senate will undertake an investigation of the coal industry has been put up to the Republican steering committee. At the request of Senator Frelinghuysen, complete statements as to the situation in anthracite and bituminous coals have been submitted by E. W. Parker and George H. Cushing respectively. These statements, along with information furnished by consumers and others interested, are being used as the basis for discussions which are in progress between Senator Frelinghuysen and members of the steering committee. Some of the facts submitted by Mr. Cushing are as follows:

We are coming now to a time when the whole coal business must be reconstructed. Indeed, it is being reconstructed. Among other things, three big problems confront the nation and the industry: (1) To reduce the cost of production by the introduction of possible economies. (2) To simplify the cost of transportation and to equalize distribution among the months. (3) To organize an export business in coal to meet the diverse requirements of the nation's coal business to meet equally diverse requirements of the foreign buyers.

More Machinery Will Reduce Costs

If we are to reduce the cost of production in ways which are easily possible, it is going to be necessary to make larger use of machinery. This is resisted at every point by the growing strength of the United Mine Workers of America.

After the cost of production has thus been reduced, it is going to be necessary to preserve at least a part of the procured economies for the consumers. To do this, there must be opposition to the growing tendency to compel the expenditure of vast sums of money upon various social enterprises such as workmen's compensation or state insurance, health insurance, amusement in mining camps, old-age pensions, and the general line of soft-hearted enterprises grouped under the general heading of welfare work.

To equalize the distribution of coal as among the months, it is necessary to educate the public to take their house coal in regular monthly installments and to arrange, perhaps, for the financing of such purchases on something approaching the installment plan basis. There is necessary, also, a rearrangement of transportation facilities and charges which will make the supply of cars adequate at all times and the charges for transportation fixed so as to bear a direct relation only to the cost of the service performed.

In organizing to carry on the extensive foreign trade, it will be necessary to protect our relatively small supply of high-grade coal—foreign buyers naturally want this coal only and it is highly essential to our own Eastern population—by in some way preparing our greater quantity of medium and low-grade coal so it can stand the charges of foreign transportation and at the same time meet the full requirements of our foreign buyers.

These three things involve nothing short of a revolution in our fuel industry. The problems are so large they must engage the careful attention of the coal people, the citizens, and the legislative branch of our government. We are, in a word, on the eve of the complete making over of our coal industry. The problems are large, and they must be approached in a spirit of encouragement to the industry rather than in a spirit of any hostility to it.

Coal has been the backbone of England's foreign trade. Twelve years ago a royal commission investigated England's coal situation and became alarmed about the rapid depletion of her coal reserves. It said there was need to conserve the supply, but it did not dare suggest a curtailment of her coal export because that would damage England's whole foreign commerce irreparably.

Coal was the foundation of Germany's coke and byproduct business. One part of the byproduct business was the foundation of her dye industry. Upon another rested her explosive industry, which was the corner stone of Kruppism. And Kruppism was the mainspring of her military system. Coal was also the corner stone upon which Germany built her foreign trade.

Those who study Russia believe that coal and other natural resources will be the corner stone of the new Russian industrial developments, which Russians expect will follow the restoration of order.

England has been forced by many causes to curtail her coal exports to about one-third what they were in normal times.

Germany's coal available for exports has been commandeered under the Treaty of Peace, for use by the Allies in part payment of indemnities.

It will take five to ten years to develop anything like a reasonable coal trade in Russia.

Meanwhile, America has between 40 and 45 per cent. of the total reserves of coal of the world. It can be exported through all of our gateways. We have every kind of coal known anywhere in the world. We have some ships and soon will have more. We are centrally located for supplying the world's coal requirements. We have, if used intelligently, enough productive capacity already in use to satisfy all home demands, to meet all foreign demands, and still have idle mine capacity. But it is all new to us. We are neither familiar with nor equipped to do this foreign business. Still, our foreign commerce henceforth and our industrial expansion at home must rest upon our coal program.

The Nenana Coal Fields, Alaska

The Nenana coal field, which lies about 200 miles north of Cook Inlet, Alaska, and will be reached by the new Government railroad from Seward, 364 miles distant, has been examined by G. C. Martin, of the United States Geological Survey, Department of the Interior, whose report on it has just been published. The field is about 100 miles south of Fairbanks, the inland terminus of the railroad, and is more accessible to the gold mines of the Tanana Valley than any other coal field in Alaska.

The coal is a lignite of good grade which, when the field is made accessible, will be used as locomotive fuel on the railroad, for generating power and for thawing at the gold mines, as domestic fuel in the region, and as fuel on steamboats that ply on Tanana River and possibly on some of the boats on the Yukon.

The report gives the classification of the coal land and non-coal land in the field by sections, contains detailed maps showing the areas of coal-bearing and non coal-bearing rocks, and gives detailed statements of the conditions of mining and transportation.

A copy of the report, which is published as Bulletin 664 of the United States Geological Survey, can be obtained free of charge from the Director of the Survey at Washington, D. C.

Coal Mining at Bolivar, Colombia

F. L. Bell, trade commissioner of the Bureau of Foreign and Domestic Commerce, has sent to the Bureau a report on coal mines at Bolivar, Colombia, which is as follows:

A coal concession obtained by Plotts, Armella y Cia. has been taken over by Parrish & Co., of Barranquilla, Colombia. It is located between the headwaters of the Rio Sinu and Rio San Jorge in the Departamento de Bolivar, Colombia. The main deposit lies on the banks of the San Jorge River.

Approximately 500,000 acres are covered by the original concession from the Colombian Government in 1913-14, and the concession still has 19 years to run. Furthermore there are 700,000 acres of additional lands containing coal deposits and petroleum indications; these lands are held in fee and are situated to the south of the lands covered by the concession in question; the 700,000-acre tract extends to the boundary of the Departamento de Antioquia. The principal outcrops of coal are along the San Jorge River and vary in size from a few inches to 12 ft. in thickness; the dip of the measures varies from 14 to 60 deg.

The deposit being developed at the present time is located near the town of Playa Rica. The seam has a thickness of 10 ft. and a pitch of 14 deg. The coal operation is at the river bank where surface soil of from 1 to 2 yd. in thickness is being removed to uncover the coal. About 3000 tons of coal have been contracted for, to be delivered at the river bank for 25c. per ton. This amount of coal is to be shipped down the San Jorge River to its junction with the Magdalena and sold in Barranquilla as an experimental shipment, the contracted price delivered at Barranquilla being $15 per ton. It will be used on the Barranquilla-Puerto Colombia and Santa Marta railways.

Several analyses of this coal varied as follows:

	Per Cent.
Moisture	8.0 to 11.0
Fixed carbon	44.0 to 48.0
Volatile	38.0 to 41.0
Ash	1.8 to 3.4
Sulphur	0.2 to 0.3

These analyses cover three seams of coal of from 5 to 10 ft. in thickness.

In the lower part of the concession outcrops of seams of coal are found dipping about 60 deg. One of these beds, with a thickness of 6 ft., will be opened; it is more accessible but will have to be worked by a shaft. No analysis of this coal has been made to date, but it is apparently of a much better grade than that noted above. The coal has been tried out by the Barranquilla and Santa Marta railroads, both of which have given an order for 500 tons at $15 per ton, f.o.b. Barranquilla.

Parrish & Co. have recently sent a small steamer with workmen and equipment to clean out the trees and snags along the upper reaches of the San Jorge River in order to bring out the experimental shipment of 3000 tons mentioned above. Steamers of 100 tons cargo capacity have gone up as far as Playa Rica, but with difficulty, on account of the snags encountered. Steamers of 150 tons capacity can get up this river to within 10 miles of the coal deposits any time; that is, to within 10 miles of the lower, or heavy pitching seams of coal. These deposits are the only known good grades of coal found on the banks of a navigable stream in Colombia.

It is proposed by Parrish & Co. to transport this coal down the San Jorge River in 60-ton scows to Calamar and Barranquilla. From Barranquilla this coal can reach Santa Marta via La Cienaga by water transportation also, a distance of 50 miles.

There is estimated to be sufficient water during the dry season in the San Jorge River to carry 40- to 60-ton barges down to the junction of the San Jorge with the Magdalena River. The San Jorge is navigable for 150-ton steamers up as far as the coal beds during nine months of the year. The river has been carefully mapped by K. C. Parrish, of Parrish & Company.

The present preliminary plans of Parrish & Co. are to open up several seams and get out enough coal for local consumption—that is railroads and river steamers—and also to try it out for bunker coal. The local consumption is estimated as being 1000 tons per month at the present time. If the proposition then appears feasible, the present operators would consider a deal with some large company. There is an unlimited quantity of coal, the proposition being a question of transportation and the quality of the coal itself.

Mining costs will be less than 50c. per ton, coal delivered at river bank ready for loading. Transportation by barges to Barranquilla is calculated at from $3 to $6 per ton at the present time. There are no facilities for cheap and rapid handling of coal at either Barranquilla or Puerto Colombia.

Commissioner Bell states that those who desire further information and data on this subject should address K. C. Parrish, of the firm of Parrish & Co., Barranquilla, Colombia; or L. B. Jackson, Sapulpa, Okla.; or James S. Harvey, Barranquilla, Colombia.

Insurance of Discharged Soldiers

On July 26, Secretary Glass signed a decision ruling that discharged soldiers, sailors and marines who dropped their insurance may reinstate themselves as insured within 18 months of discharge without paying back premiums. All they will be asked to pay will be the premium for the current month and for the time during which they received coverage without payment of premium—namely for the month of grace provided in the policy. Every mine executive should induce every discharged soldier, sailor or marine in his service who has not maintained his insurance to renew it immediately and thus secure the terms of this offer.

Senator Lenroot introduced two bills into the Senate on July 24, which have a direct bearing on the coal industry. The first, S. 2618, provides for the disposal of nonmetalliferous mineral deposits owned by the United States separate from the surface of the lands wherein they lie, and for other purposes. The second, S. 2620, provides for the leasing of coal deposits owned by the United States outside of Alaska.

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Disposal of Mine Rock and Slack

YEARS ago the only way of disposing of rock was to dump it around the shaft, drift mouth, slope entrance or tipple. After a while when railroads began to own coal mines it began to be quite a common practice to put in a rock chute with a bin-like arrangement so that rock could be dumped into railroad cars and hauled away from the crowded tipple site and out to some place where a fill needed widening or a trestle required filling. But there is soon no further need for such work, and the rock is run out to waste at some point along the road where it probably does little harm but equally does little good.

Railroad dumping is, however, not a convenient way of handling material. As a rule the railroad finds the transference of the car a nuisance; in fact, unless there is an ownership connection, no railroad will consent for any reasonable figure to perform this service. It seems strange, therefore, that more use has not been made of the motor truck that will take this rock and put it exactly where it is wanted.

Everywhere there is need for a fill—along that bottom road, in the approach to that bridge over the creek, to eliminate that steep grade, to widen out that short curve, to carry a sidewalk over that run, to level off that house or store plot, to ease the approach to that railroad crossing, to fill around the store wall or back of that coke yard, to bank against that ill-regulated stream, to build that reservoir dam, to widen that road or make it safe for travel in winter, to surface that roadway and to place sand rock for that piece of masonry.

With a motor truck, not only is the rock removed from the point where it is not needed, but it is placed just where it is most useful. Even if a railroad fill is projected, the motor truck will usually make it as economically as the railroad car when all the transportation annoyances of such work are considered. And then on idle days or days when rock is not coming out of the mine, the truck is available for all manner of work, for hauling top soil or manure to lots, for taking props to the mines and fence posts to the lots, for hauling sand from the creek bed, for the collection of the rubbish from sundry kitchen middens, for use in making road and railroad excavations or excavations for houses. The motor truck is the natural means for disposing of waste rock where the rock has to be hauled.

Where it does its proper work how many problems of recontouring the country will be solved without any real expense other than the needed wasting cost, how many new openings will be provided with a roadway graded excellently and without expense with the rock from other mines, how much bony coal will surface highways which otherwise would be unsurfaced? The motor car will revolutionize our methods, for it goes almost everywhere, whereas the railroad car goes only to those few points for which elaborate preparation has been made.

The motor car will help in disposing of slack especially where a thin layer only can be spread over the storage site for fear of spontaneous ignition. It is easier with a motor truck to build a six-foot pile than it is to do it with a railroad car, provided the distance is short.

To sum up the matter: It will be found that the motor truck is more flexible than the railroad car. It is ready for service everywhere. Its use is well worthy of thought when the disposal of rock and slack is under consideration and where it has been decided that disposal at the immediate mine site is out of the question.

When prices of commodities go up, money goes down. Owners of commodities—lots, houses, comestibles, clothing—get rich. Owners of money—bonds, mortgages, bank balances—grow poor. Every rise in wages makes commodity owners rich, and impoverishes owners of money, and among the owners of money are working men with bank balances. Wage increases cause changes in the relative wealth of both wage workers and capitalists. They do not as a whole help either one class or the other.

Starving Public Utilities

A HOSTLER is reported to have gradually and systematically reduced the feed of his horse till the ration of the well-trained animal consisted of one wisp of hay a day. It was a great achievement and the horse took some months to reach that acme of abstention, and at the end he spoiled the experiment by incontinently dying. You can't tell how soon valuable experiments of the kind described may be rendered of no avail by the lack of coöperation on the part of the subject experimented on.

In substance, Walker J. Hines has tried, on the railroads, this method of saving. They have done without coal till the mines starved along the road and until the prospect of a coal shortage loomed ahead. They have done without car repairs till conditions threaten to be as bad as when the Government took the railroads over. They have delayed road repairs till the cars sway from side to side like a child's express wagon.

A horse will live for a while on the meals it once enjoyed, and a railroad will carry on for a time on the money once expended on it. But the strengthening fare that is known as maintenance is needed after a while, and if the railroad does not get it, all the full meals of past months will not avail.

All public utilities, whether publicly or privately owned, are just now being starved. They do not do well on such treatment. They are neither satisfying, prompt nor safe when so treated. We have got to learn that a steady profit ration is necessary if we would have them serve the public. This is true of all public utilities, whether they be railroads, street railways, electric-light plants, gas plants or coal mines. Unfortunately many anthracite mines are not only public utilities but have been afforded for a long term the usual treatment meted out to public utilities. If that treatment still continues the hard coal producers will fail, like other essential public servants, to perform their duties as satisfactorily as they should.

Increased wages are rarely as bad as increased privileges, for a larger wage may not produce a lessened product, but a privilege, such as shorter hours and apprenticeship restrictions, is almost sure to do so. Lessened product reduces the national wage fund, whereas a general rise in wages only holds a magnifying glass over the wage fund and makes it appear larger than it is.

Our Convention Safety Number

THE HEAT of the summer will by the last of September be over, and the vacation season will be at an end. Then will follow the second summer institute season. The American Institute of Mining and Metallurgical Engineers and the National Safety Council will hold their summer meetings and between these will be the great housewarming meet of the United States Bureau of Mines with its first-aid and mine-rescue competitions. These meetings will be the biggest institutional events of the year, for they are all international associations. *Coal Age* expects to celebrate these events with a special issue on Oct. 9, which will of course be a first-aid, safety and welfare number, and will detail the conventions in full.

Mysterious is the sympathy between the exploited and exploiter. The man whose salary or earnings have not increased during the war speaks sympathetically, about the cost of living, with the working man whose mounting wages have been the cause of the high cost, and who has made living difficult to the man of stable wages. You would expect the exploited workman to condemn his exploiting associate but he doesn't. He sides with him against some imaginary profiteer.

As To Larger Wages and Shorter Days

THE RISE in prices, in the anthracite region, for clothing and other household goods, is making the employees of the mines uneasy, though they may be assured it is not a condition that is peculiar to them. Those whose wages have not been raised or have been raised but little since the war commenced have had to meet the same phenomenon while the war continued and since its close.

No one surely will deny the mine worker the right to have the cost of living before the war and now accurately determined and to receive a rise in wages when a new contract is made, if it is merited, in proportion to the increase. The public should and must be willing to meet whatever burden may fall on it if the computation when made shows the change to be just. But if it prove that such an increase in wage is not justified, no discontent on the part of the mine worker will make it expedient. The cost of living *must* be kept down by keeping down the item of labor, which item is the cause of all the trouble from increased costs.

A shorter working day seems generally demanded, and the demand is explained and excused by the fact that mining companies have in some few cases shortened up the time for the daymen to six hours, as has been noted already in recent issues of the Labor Department of "Coal Age." To superficial observers, this provident act seems to justify every contention that six hours is enough for a working day. And so it is, for those daymen where a part of the working force persists in going home early thus laying off those who would remain because paid by the day. If the miners and their laborers were to quit work after only two hours of labor the day men in those mines that have slope chambers might find it hard to find any work that they could do long before high noon. The best way to get a full day's run is for everyone from contract miner to trapper boy to work eight hours whenever the chance is afforded.

The men are to blame and not the company for the short time, which is a hardship on the day hands and one that they may not be able to meet, but their remedy is surely to be found in coercing the miners and laborers who persist in working only a short day. To require the company to pay for a full day when only a part of a day is worked, through no fault of the company, is to put a penalty on the company for the misconduct of the miners and laborers. The public does not propose to pay the daymen for the folly of the contract miners.

The Department of Labor declares that in the coal mines there were 370 strikes in 1916, 339 in 1917 and 149 in 1918. In the three years the mine workers had 858 strikes—more than the workers in any other industry. Machinists were second with 653 strikes. May we ask, Was the strike frequency of the mine workers the outcome of that clause in the agreement requiring that all disagreements must be arbitrated?

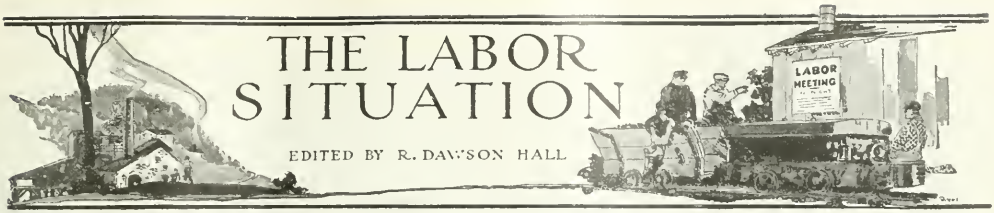
Educational Pitfalls

AUTHORITY is one of the biggest pitfalls in education. Too many students at our colleges believe that they enter the institution, merely to learn facts. The dicta of authority are avidly accepted and stored away, the student becoming enamored of a situation which saves him necessity for further thought. He likes to leave his thinking to the godlike beings enumerated in his Trautwine, his Peele, or his Marks. "It has been said," is with him the end-all and be-all of his education.

One should go to college, not so much to be crammed as to be educated. The idea of such institutions should be "to draw out," as the word well expresses it, the analytic abilities of the brain. The effort should be, not merely to store facts in the mind, but to teach it to function, to develop imagination, criticism, inquiry, creation. Education fails if it falls short of that. The brain of the crammer becomes rather an orderly warehouse than a home in which the reason can live and thrive.

Your college man who cannot write evinces himself largely as a "spoon-fed" fellow. His diction is as clear, and only as clear, as his thoughts. If he only thought rightly, he would express himself plainly. The confusion of the poor writer is not in the pen or in the hand, but in the brain. He has the thought grasped by the heel; how shall he, with such an uncertain purchase, stand it up fairly on its feet?

The privileges of the working man if they interfere with his production ultimately reduce his wages or at least the wages of other working men, for low production means, in the long run, low wages. A privilege may be rated as an unimportant working condition, but it may cost dearly in the end, sometimes to the privileged employee and sometimes to the workman in other trades.



General Labor Review

Frank J. Hayes, president of the United Mine Workers of America, who is now in a hospital undergoing a course of treatment, has been granted a four-month leave of absence and his duties will be performed by John L. Lewis, vice-president. This announcement causes surprise in certain circles, but by those on the inside and conversant with the situation it was expected. Hayes has been ill since last spring. Some months ago, before the armistice, he was summoned by President Wilson to go to Paris and consult on the industrial and especially the coal-mining situation.

During the period of the war the officials of the United Mine Workers were under a great nervous strain, and now are facing a situation considered one of the most important in the history of the organization and the country. With the ratification of peace, a new contract must be negotiated by the operators and miners. By some it is thought that a crisis is confronting the workers. Hence the great surprise over the temporary retirement of Hayes. Notice to this effect was made on July 21 by Secretary-Treasurer William Green.

Union Quarrels Disturb Scranton District

After a period during which the disagreement regarding and disputed election was quietly shelved, the meeting held by District No. 1, of the United Mine Workers of America, in Scranton, Penn., broke into riotous debate which ultimately resulted in its breaking up in confusion. The excitement arose on the submission of the tellers' report, when a resolution was presented which called on the convention to inquire into the charges of fraud. In the confusion which followed a motion to adjourn was put and carried. At the morning session of the same date, July 25, a resolution called on the Government to take off restrictions from the sale of beer containing 2.75 per cent alcohol or less.

On July 30, the Locust Gap colliery of the Philadelphia & Reading Coal and Iron Co. was laid idle because of a strike of its 1000 employees. It seems that the company reopened the Holmes workings, and six men violated a rule of the union by loading their own coal. The union men contend that the company violated its contract by not meeting with union officials and deciding what working conditions should prevail in the newly opened area.

At Coral, Indiana County, central Pennsylvania, just south of Indiana town there has been a strike lasting several months. As the men would not work the company evicted them, whereupon they secured tents and camped on the hills above the town. The coal company obtained an injunction restraining the men in the tent colony from interfering with the men who wanted to work. It was claimed that the striking miners would not heed the injunction and 17 were arrested, given a hearing and committed to jail for contempt of court.

At last advices the strike at the Brackenridge mine of the Allegheny Coal and Coke Co., mentioned last week, still continues. The Allegheny Steel Co., which uses the product of the mines, is adjusting its plants to the use of gas as far as is possible. It expects to get coal from other sources if the strike continues. The company declares that, whereas the union scale calls for 62c. per ton to loaders, the company voluntarily pays 77.77c. per ton. The union scale is 16c. per ton for cutters and the company scale 19.55c., the difference being 25.4 per cent in one case and 22.2 per cent in the other. The loaders average about 10 tons per day and the cutters about 150 tons for a two-man crew, but energetic men frequently load 15 to 20 tons a turn, which cutters and scrapers often cut 200 tons a day for days at a stretch.

Representatives of the operators and mine workers of the New River District, after many weeks of conferences, beginning early in June, finally reached an agreement upon the terms of a wage contract in the New River field, on Wednesday, June 30, the agreement reached being subject to ratification by the operators and mine workers respectively. It was thought when this was written that the mine workers would hold a convention on Aug. 5 and would ratify the new agreement without much quibbling since they secured all that they demanded, including even the union check-off system which in effect means that the closed shop will be in operation in the New River district hereafter.

The outstanding sections of the new agreement which will become effective on Sept. 1 are as follows: The wage agreement will continue in effect from September 1, 1919, until the following April and thereafter will remain in effect as long a time as will the new agreement which is to be negotiated by the operators and miners of the Central Competitive field, a field which comprises the States of Illinois, Indiana, Ohio, and western Pennsylvania.

There is a provision in the agreement that should there be any change in the wages of the Central Competitive field, the same increase or decrease shall apply to wages in the New River District. Any decrease in hours to be worked which may be ordered in the contract to be written by the operators and mine workers of the Central Competitive District shall be held to apply on the Kanawha agreement.

Agreement Clear and Unequivocal

The contract has been written so that its terms will be easily understood, and it is said that there will be no excuse for a single strike during the life of the contract, heavy penalties being provided for all strikes or lockouts.

The wages to be paid for mining as well as for inside and outside day labor are practically the same as provided under the terms of the existing wage agreement. There will be some slight differences, however, in striking an average for the different classes of labor. Complete recognition of the union, with the collection of the dues for the members of the United Mine Workers, is a new feature of the agreement. There are a number of men employed in and around the mines who will be exempted from the jurisdiction of the United Mine Workers, but the check-off system as agreed upon, which is similar to that in use in the Fairmont field, is a measure of so drastic a character that, with the few exceptions noted, only union mine workers will now be employed in the New River mines. The provision for cleaning coal is rigid. This has special significance in the districts producing smokeless coal because the fuel has to be of "Navy Standard."

The agreement was not entirely satisfactory to either party to the contract, but as usual represented a compromise between the conflicting views of the two parties to the final agreement. The opinion has been expressed by some New River operators that on the whole the contract will be reasonably satisfactory to the operators of the field and when thoroughly understood by the mine managers, will be accepted, no doubt, as the best solution of several difficult industrial problems which have confronted the operators and mine workers of the New River District for some months.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Fusibility of Ash in Burning Pennsylvania Coals

Letter No. 1.— I have read with deep interest the paper on "Fusibility of Ash from Pennsylvania Coals," by W. A. Selvig and A. C. Fieldner, *Coal Age*, June 12, p. 1086, but there is one statement made in that paper that I think should not be allowed to pass without comment and qualification.

The authors state, on page 1086, "The ash from the anthracite region of Pennsylvania is highly refractory, coming in Class 1. The softening temperature, in practically every instance, is above 3000 deg. F."

For the purpose of discussion, the authors of this paper have classified coals in three subdivisions or groups, according to the fusibility of their ash: Class 1, refractory ash softening above 2600 deg. F.; Class 2, medium fusibility, softening between 2200 and 2600 deg. F.; and Class 3, easily fusible ash, softening below 2200 deg. F. Then follows the statement just quoted, placing the anthracite coals of Pennsylvania in Class 1, as having a generally refractory ash.

Now this statement no doubt is true in so far as it covers the ashes of coals tested and reported in this particular paper, but the fact remains that the ash from certain anthracite coals not included in the results published by Messrs. Selvig and Fieldner do not conform to their statement.

Other Analyses Show Lower Fusibilities

In order that the statement made by these authors may not mislead anyone into thinking that all anthracite ash is highly refractory, I desire to submit some data on anthracite ashes tested in my laboratory. In an article entitled "Chemistry in Coal Mining," published in *Coal Age*, Vol. 10, p. 296, I have already called attention to the different fusing temperatures of the ash of anthracite coals taken from different beds. The table given in that paper showed that the ash of some anthracite coals fused between 2210 and 2282 deg. F., whereas the ash from other anthracite coals did not fuse at a temperature of 2570 deg. F., that temperature being the highest reached in the tests made at that time.

Later work, in which higher temperatures have been reached, has shown practically the same results. The ashes from Shamokin, Locust Mountain and hard white-ash coals have, in general, shown high fusing temperatures, mostly above 2600 deg. F. The ashes from Lorberry coals have shown somewhat lower fusing temperatures, while those from the Lykens Valley coals have been very much lower, some of which fused even below 2282 deg. F.

The lower fusing temperature of the ash seems to be coincident with a relatively higher content of calcium oxide and sulphuric anhydride in the ash of the coal. The sulphur content of the coal itself, in the case of the Lykens Valley coals, is very low; but much of this sulphur is left in the ash after burning the coal, possibly in the form of calcium sulphate. Further work on this problem is highly desirable.

It might be remarked, in passing, that, while the ash from Lykens Valley coal has a low fusing temperature, that from bony coal or slate has a fusing temperature above 2600 deg. F.

Unfortunately, our tests on coal ash were made in a rather crude way. The ash, molded into the form of a small cone, was heated in a muffle furnace over a coke fire, the temperature being determined by comparison with Seger pyrometric cones. The atmosphere, if we may judge from the appearance or color of the ash cones, was an oxidizing one.

We do think, however, that this work is of considerable value, at least from a comparative standpoint, and I submit this information as modifying some of the conclusions reached by Messrs. Selvig and Fieldner.

A. G. Blakeley, Chief Chemist
The Philadelphia & Reading Coal & Iron Co.
Pottsville, Penn.

Lawful Examination of a Mine

Letter No. 1—I want to offer a few comments on the excellent article of Steve Gosnell, *Coal Age*, July 3, p. 18, which he has written in the interest of safety-first in mining. And, first, let me say that Mr. Gosnell is right in saying that a mine should be examined not more than three hours before the men enter the mine for work, and when no one is present underground who would molest the circulation of air by carelessly leaving open a door in the workings.

It has frequently happened in my examination of mines that I have run across doors carelessly left open by motormen. This is very apt to occur often in mines where strict discipline is not maintained by the management, and it is easy to understand that an open door, if not discovered in time by the fireboss, would soon create a dangerous condition in the section of the mine where the circulation of air would be cut off.

As suggested in the article to which I have referred, every mine should be examined within three hours of the time the men go to work. If this is not done it is possible for a dangerous condition to develop by reason of a fall of roof or any settlement of the overburden that would release gas in the workings.

In every case, the territory that a fireboss must cover should never be so great but that the work can be done properly and in accordance with the requirements of the law, within the space of three hours. During the remainder of the shift, the fireboss should be employed looking after the ventilation, erecting brattice where such is needed and detecting dangerous roof and coal in the working places in his section.

As an instance where mine examiners have too large a territory to look after, let me cite a mine in southern Illinois that puts out 4000 tons of coal a day and employs but two men as examiners. In that mine, one examiner must inspect 4 splits of air, visits 224 places, pass through 41 trapdoors, covering 10,000 ft. of motor road, 6000 ft. of manways, 2000 ft. of bottom and run-around. This is in addition to the 8000 ft. he must travel in the first split, 7000 ft. in the second, 12,000 ft. in the third and 7500 ft. in the fourth, makes a total of 52,500 ft. the man must walk to complete a single examination of his section of the mine. The total distance is almost 10 miles.

Walking at a speed of 3 miles per hour, which is a good average pace underground, it would require 3 hours 20 minutes to walk this distance. Then, allowing 1 minute for examining each place visited and for making the necessary observations and tests, another 3 hours 44 minutes is necessary, which would make the total time spent inside, 4 minutes over 7 hours. If the examiner's report is made out properly, about another hour will be consumed in that work and in taking up the checks of the men whose places have been found to be unsafe for work.

There is no man living who can do efficient work in examining a mine under such conditions. To insure safe conditions in mines, safe and reasonable rules must be adopted. In one mine that I have in mind, there are employed four face bosses who are uncertified men and one who holds a certificate, besides a mine manager (foreman) and a superintendent, making seven men in charge of the work of putting out the coal, while only two men are employed as examiners to look after the safety of the mine.

My experience of 23 years in the mines as miner, dayman, examiner and manager convinces me that fewer accidents will occur in the mines of Illinois if more certified men are employed as face bosses and the mine examiners be given less territory to look after.

Harrisburg, Penn. G. D. York.

Certification and Safety

Letter No. 13.—In his letter, *Coal Age*, July 3, p. 30, William Wesnedge states, "the past history of coal mining is a record of great loss of life and property as the result of unrestrained and careless practices." Let me add that it is these oft-recurring disasters in mines that have made necessary the enactment of laws requiring that mine officials shall possess greater practical knowledge, and the enactment of such laws has made the mining of coal safer today than formerly.

Yet, Mr. Wesnedge, in referring to what is required of a candidate for a certificate of competency to act as a mine foreman, says that a longer period than five years' practical experience is not always essential. The mining laws of Great Britain (Coal Mines Regulation Act) require but five years' practical knowledge of mining coal, and mine officials there, today, possess no more practical knowledge than formerly.

Now it was my meaning, in my last letter, Apr. 17, p. 723, that a mine foreman should possess nine years' experience in general mining work and five years' experience in shotfiring and firebossing, making fourteen years in all, before a man could be a candidate and sit in examination for a certificate of competency to act as mine foreman.

I cannot agree with Mr. Wesnedge when he says, "the granting of a certificate to a candidate is simply evidence that he has satisfied the requirements of the examining board. Here the authority of the state mine inspector, as a member of the examining board ends." In that case, let me say, it would be left to a contractor of labor or a mine operator, to ascertain whether or not the holder of a certificate is competent to take charge of a coal mine.

I contend that a body of men constituting a board of examiners and charged with the issuing of certificates of competency should be held responsible for the competency of the men they examine and to whom they grant certificates. In my judgment, it would be absurd to refer a man, who has been examined and granted a certificate of competency by an examining board and certified to as possessing a practical and theoretical knowledge of mining, to a contractor of labor to ascertain whether he is competent to manage a coal mine.

Springfield, Ill. James M. Roddie.

[The discussion of "Certification and Safety" will close with Letter No. 15, now on hand.—Editor.]

Firebosses as State Officials

Letter No. 10.—Referring to the discussion of this subject, kindly permit me to express the opinion of a fireboss who has spent several years in the performance of that work in coal mining. My experience compels an opinion against the employment of firebosses by the state.

Allow me to say, in all seriousness, that there is no individual employed in the operation of a mine, from the superintendent down to trapperboy, on whom the responsibility for the safety of the mine and the men employed therein rests so heavily as on the fireboss. Everything depends on the careful and thorough manner in which he examines the mine and the faithfulness of his report regarding its condition.

The fireboss must report the condition of each working place, in respect to its ventilation, presence of gas, condition of roof, sides and coal face, besides making numerous other observations in regard to amount of coal down, number of cars, timber and other supplies on hand, and be able to report the results of his observation on his return to the shaft where he must enter his report in the book for that purpose, and hold back the checks of men whose places he has found unsafe to allow of their working.

What Harm a State Fireboss Could Do If He Was So Disposed

Consider, for a moment, the position of a fireboss employed by the state. He is beyond the control of the superintendent and mine foreman and, in that position, can often throw the mine idle by reason of his absence, when the superintendent or foreman would be unable to employ another fireboss to examine the mine. Or, if so disposed, a fireboss can report finding gas where the superintendent or the foreman claims there is none. My idea is that a good fireboss will perform his work as faithfully in the employ of the company as when employed by the state, and avoid the possibility of the difficulties arising such as I have mentioned.

By way of illustration, allow me to cite an incident related to me by my father when I first undertook the work of firebossing. At that time, my father was

superintendent of the mine and, in order to impress on me how much the safety of the mine depended on my careful and faithful performance of my duties as fireboss, he related an incident that occurred when he was 17 years of age. He was then working with a safety lamp at the face of a chamber, in a mine that was so gaseous that the inspector was accustomed to visit it about once a week.

On one of his visits, the inspector called to my father to bring his lamp and come. He hesitated to obey, stating that he was working on tonnage. The mine foreman, however, said, "Hugh, take your lamp and do what the inspector wants you to do." The inspector then sent him into a certain place and he went, until he found an accumulation of gas and stopped. The inspector urged him to proceed; but he refused, saying that the law was that when one got a cap on his lamp he was to withdraw.

Obedience to Mining Law Rewarded

The inspector then turned to the mine foreman and said, "If you appoint this lad as fireboss I won't require to come here more than once a year, instead of every week. The appointment was made and my father's record, from that time was one fatal case underground, in 40 years; and that was the result of a miner's carelessness in going back to the face too soon after firing a shot, and not waiting for the smoke to clear. He was caught under a fall of slate where a timber had been knocked out by the shot. My father's advice to me was that, wherever I suspected danger might exist, to go into that place ahead of the miner and make sure that it was safe for him to work. I have followed that advice, and my record is one fatal case in 30 years and that was the result of a contravention of the mine law by a careless miner.

Let me say, in closing, that while I agree with the suggestion made in another letter, that firebosses should perform their work in the nightshift, so as to give them ample time to remove gas and other dangers where they exist, I consider it as important that every working place should be examined by the fireboss not more than three hours before the time for the men to enter the mine for work. To my mind, that is the only safe method of firebossing. FIREBOSS.

McKeesport, Penn.

Letter No. 11.—As one who holds a position as mine examiner (fireboss) and who has held a similar position (examining deputy), in various parts of the world, I trust you will allow me to give an opinion on the question of firebossing.

Some 22 years ago, in the North of England, a miner (agitator) arose to ask the appointment, by the Home Office, of a miner who would be charged with the duty of examining working places, daily, in each mine, before the men reported for work. This was at once opposed by the mining companies who claimed that the person who paid the piper should call the time.

It was not until the Maypole and Whitehaven disasters occurred that the pressure of public opinion compelled the Home Office to appoint workmen as inspectors in each district. The persons so appointed were independent of the coal owners or operators, and presumably were outside of any economic influence. This is still the practice in coal mining, in Great Britain, today, and has undoubtedly been a deterring influence to minimize the risks that all practical mining men know are taken, in mines, daily and hourly.

In England, it is the duty of all deputies to examine each working place, three hours before the beginning of each shift, and to remain in the mine as long as any person is underground, as required by the Coal Mines Regulation Act. The principal objection to the employment of firebosses by the state, in this country, as I see it, is that the appointments would be subject to political influence, and a change of administration would generally mean a similar change of state-employed firebosses.

Training Men for Positions of Responsibility Requires Time and Patience

It is my opinion that, no matter how lowly the position, it requires time and money to train men for places of responsibility, and I speak from an underground experience of 40 years, as driver, trackman, mine examiner (fireboss) and mine manager (foreman). However, one must take things as he finds them, in whatever latitude he may be placed.

Referring to the comments of Robert A. Marshall, *Coal Age*, July 3, p. 31, regarding the removal of dangerous quantities of gas while the men are at work in the mine, I should think that any uptodate examining board would reject a candidate for certificate who would suggest such a proceeding. I do not wonder that Mr. Marshall condemns the practice in his state.

In this connection, allow me to suggest that there should be greater coördination in the work of mine inspection, in the United States. It would seem that this should be under some supreme authority such as the Federal Bureau of Mines. In England, the Home Office is the supreme authority in such matters and has the power to enforce any provision of the act regulating the safety of mines and the men employed therein.

In closing, let me say that firedamp or any other gas, in dangerous quantities in mines, is a menace to safety, wherever found, from Birmingham to Seattle, and the most stringent regulations should be enforced for its detection and removal, and the law should be applicable to all states of the Union. As Patrick Henry has stated, "We can only predict what will occur in the future by referring to the past." It is my hope, however, that it will not require a series of diastrous explosions to convince the American public that firedamp and naked lights or sparking electric appliances contain all the necessary factors for such occurences.

West Frankfort, Ill. THOMAS McDERMOTT.

Errors in Surveying Practice

Letter No. 1—The reference to the inaccuracies in chaining or, more particularly, measuring distances with a steel tape, which are caused by its elongation under tension, or expansion due to changes in temperature, reminds me of the extreme care taken in the measurement of baselines, in extended triangulation work and in other important operations requiring great accuracy.

Very often, in precise triangulation, it is found that the notes do not check up as closely as desired. This result is more frequently due to inaccuracies of measurement than to fault in reading the vernier, or in the handling of the instrument, in the measurement of angles. Accurate measurement is a science in itself;

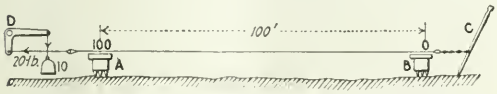
but, with careful supervision, and the use of a few homemade devices it is possible to minimize these inaccuracies and make the results all that can be desired. The degree of accuracy attained, of course, will depend on the amount of time and care taken in the execution of the work.

While it is not necessary to be extremely accurate in the survey of farm lands or when performing other similar work, a great degree of accuracy is absolutely necessary in the measurement of baselines for more important work, such as driving the tunnels under the East River, to connect the boroughs of Manhattan and Brooklyn, in New York City.

The Accurate Measurement of an Important Baseline in Tunnel Work

In the tunnel work just mentioned, all baseline measurements were required to be made with the utmost accuracy. The steel tape used had been sent to the Bureau of Standards at Washington and standardized for a temperature of 65 deg. F. and a tension or pull of 20 lb. When taking measurements in the tubes or on the surface, a thermometer always formed part of the equipment and all measurements were balanced or corrected for temperature.

In the accompanying sketch, I have shown a simple arrangement of homemade devices that can be employed



DEVICE FOR MAKING ACCURATE MEASUREMENTS

where accurate uniform methods of taking measurements are required. At *A* and *B* are shown two "spiders." These each consist of a round block of hard wood that fits into and rests on a section of wrought-iron pipe cut so as to form the three legs on which it stands. These two spiders are lined in with the transit, at distances of approximately 100 ft. apart.

The first spider, *A*, having been placed exactly over a station of the survey, the steel tape is pulled across the two spiders and submitted to a tension of 20 lb., by means of the handbar *C*, the pointed end of which is stuck into the ground, so that the bar furnishes a lever for stretching the tape and lifting the 10-lb. weight off the ground. This weight is attached to one arm of the device shown at *D*, which is supported on a suitable standard that is anchored or held firmly in place to prevent its movement while the measurement is being taken. The spiders, also, must be firmly set in the ground to make them solid.

The handbar C is moved sufficiently to raise the weight from the ground such a distance that the zero of the tape corresponds to the first station marked on the spider at *A*. A mark is then made on the spider *B*, at a distance of 100 ft. In taking the next measurement, the spider *A* is moved forward with the device *D* and the measurement taken from *B* to *A*. Levels are taken on the spiders and correction made for slope and temperature.

This method, I believe, is a good stunt and should be helpful to an engineer who has to measure a baseline for a large triangulation system. The spiders take the place of the pins in measuring and it is very easy to carry the work to half a hundredth of a foot, at least.

Pittsburgh, Penn. LOUIS S. YOUNGLING.

Outlook in Coal Mining

Letter No. 1.—The thought expressed in the inquiry of "Operator," *Coal Age*, June 19, p. 1138, is one that is uppermost in the minds of many coal men at the present time. While I am inclined to think that the present crisis is nearing its climax, I feel that the path of the coal operator, in the future, will not be a rosy one and extreme caution is necessary.

In commenting on the probable exodus of the foreign-born miners of southern Ohio, John Moore, president of the Ohio Coal Miners' Association, estimates this at 14 per cent. of the mine labor in that state and foresees a shortage of coal production in the fall and winter months. He says, "this is no time to throw a monkey wrench into the industrial machinery of the country, which is being gradually greased; but let everybody get on the job and set things going good and proper."

Labor Shortage a Problem of the Future

In my own humble opinion, labor shortage will prove an important consideration in coal mining, for a time at least, or until the installation of improved modern machinery counterbalances the effect. Assuming that an operator has a fairly marketable product that will enable him to overcome the competitive condition that will doubtless exist in the market, and has outlined a policy for his sales force, he should then give the most of his attention to the operating department to assure himself that he has the necessary labor to operate his mines in a manner that will guarantee a uniform output and a tonnage that will give him a decided advantage in the market.

As Mr. Moore has said, the time for an operator to be continually at loggerheads with his employees is past. He must have the interest of his men at heart; learn to know them and teach them to know him, so that there will be coöperation, and there will be no reason for suspicion and disgust on either side. It is surprising how far-reaching, in effect, a little personal interest proves in promoting good-will between employer and employed. Let there be whole-hearted interest in the living and working conditions of the men.

Increased Efficiency Needed To Avoid Disaster

As has been stated, owing to the extraordinary demand for coal during the war, many new operations sprang into being, producing much coal of inferior quality. The future will determine the life of many of these operations, the quality of whose output will be unable to compete with openings mining better coal and more favorably located. Many mines of the more favored class have been extravagant in their methods of operation and, now that the crisis is passing, the management will be obliged to get down to business and improve their methods of operating and increase their efficiency.

While I cannot agree with the suggestion made by this inquirer, which was to the effect that the coal industry is drifting toward disaster, I feel that the situation is one looking toward the survival of the fittest. His reference to mines "more favorably located" but "by no means equipped to compete with longer established operations," suggests the need of reorganization and the installation of equipment that will place such mines on a more favorable footing.

All this means that they shall abandon wasteful and extravagant methods of operating, install modern equipment and study efficiency in every branch of the work. It is surprising how substantial savings can be effected by eliminating little leaks that, as stated in the reply to the inquiry, are unsuspected and occur to a varying extent in all industries.

Consumers of coal are becoming more and educated on the fuel question. They are discriminating closely today, in the purchase of coal suited to their needs both in respect to size and quality. Because a coal has a higher heat value than another does not recommend it as adapted to the equipment in different power plants.

Salesmen Should Know How To Fire

In keeping with this statement, let me suggest that a good investment for any live coal company would be to have an experienced fireman initiated into the art of salesmanship to an extent that would enable him to visit customers, acquaint himself with conditions and explain to them the nature of the coal and how better results can be obtained by improved methods of firing adapted to their equipment. Such a one would also be required to inspect shipments of coal and solicit the complaints of customers, all of which would tend to promote the mutual interest of producer and consumer.

The old saying is, "Coming events cast their shadows before," and I think the dawn of a peaceful prosperity should find no one unprepared, from a business standpoint, and unable to enjoy its benefits to the fullest extent. While present indications seem to forecast the need of caution, it is no time for despair in respect to the coal industry, which promises well for all efficient operations for a long time to come.

Portage, Penn. Jerome C. White.

Letter No. 2.—The inquiry on this subject presented in *Coal Age*, June 19, p. 1138, is one of great interest and concerns a deep problem worthy of careful consideration. There is no question but that a great many men who are inexperienced in coal mining invested large amounts in that business during the four years of the war, and the results were truly surprising, as the price of coal reached the zenith, which enabled many of these new small operations to return to their owners all they had invested.

While many new ventures in the coal business were, no doubt, promoted by a patriotic spirit, there can be no doubt but that the high price of coal was the controlling factor in most instances. Also, it was recognized that many consumers of fuel were willing to take almost anything that could be shipped to market as coal. Under these conditions, almost any patriot would be willing to invest his all in the anticipation of realizing a fortune in what was generally regarded as the "golden days" of the industry.

Golden Days Yet To Come

In my way of thinking, however, there are "golden days" yet to come and the present depression is but temporary. Then, as the sowing must always go before the reaping, the present is a time when coal operators should make all possible preparation to enable them to reap the benefits of the coming harvest when the demand for fuel will call for a large production of coal.

Speaking of mines that are isolated by reason of their position with respect to transportation of their output to market, I consider such isolated operations as a hard proposition in the days to come, unless they can establish a camp where the living and working conditions will be inviting. In the growing scarcity of labor, it will be difficult to draw men to such isolated mines and hold them without special inducements, such as comfortable homes, places of amusement and recreation where men can pass their idle hours and take their families, besides churches, schools and playgrounds for the children.

Only by making such provisions can isolated operations expect to obtain and hold men that are good miners. Men will often stay in a place, isolated from other centers, because of the fair treatment accorded them. Indeed, I have known miners to live in such places until their children were advanced from childhood to manhood. It is unfortunate that so many companies operating mines in isolated places pay so little attention to providing comfortable homes.

Improved Equipment Needed

Again, speaking of places more favorably located, but not equipped in a manner to compete with larger and longer established operations in their districts, there is but one solution. A small operation, using mule haulage and employing pick miners, cannot expect to compete favorably with a larger operation equipped with uptodate appliances for mining, loading and shipping their coal. An electric power plant, motor haulage, mining machines, etc., materially reduce the cost of production of coal and make it impossible for a mine not so equipped to compete successfully in the same market with an uptodate operation.

On the other hand, compare two mines having like equipment, but the one being an old and long established operation, while the other is a new mine in the early stages of its development. In this instance, the advantage is with the latter mine, for the reason that a newly developed operation can put out the same tonnage at a far less cost of operation per ton of coal mined than is possible in an old mine having a greater length of haul, with more roadways and air-courses to maintain and where the work is distributed over a wide area. The newly developed mine with concentrated work, low cost of maintenance and a smaller outlay for ventilation, drainage and haulage, will prove a better paying poposition than the older mine with its heavy expenditures.

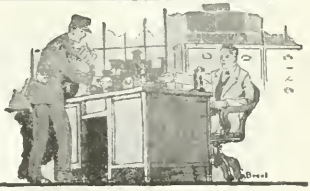
During the past 25 years, history records many times when the outlook of the coal industry has been bad. Many operators whose all was invested in the mines have regarded the situation with anxiety; but, notwithstanding, all have lived to retrieve their losses in those seasons of depression. With some of these I am personally acquainted. It is true that some large operations have been forced into bankruptcy, but these have been generally owing to causes not explained.

In closing, let me say that it is my belief that the future for each individual coal operator lies very largely with himself. If he is shrewd enough to take advantage of his opportunities and careful enough to provide against contingencies that may arise, he is taking step for step with his neighbor and need not fear competition. It is a question of good business judgment and foresight, together with providing suitable equipment and improving the efficiency of every department.

Rossiter, Penn. J. T. Jones

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Maximum Grade in Motor Haulage

We have been using a 12-ton motor in our mine, hauling 24-car trips where the maximum grade has been 2 per cent. against the loads. The loaded cars will average 3½ tons in weight. All of the mine cars are equipped with roller-bearing wheels and the track is in good condition the entire length of the haulage road. We anticipate a slight dip in the formation, which will probably necessitate changing the direction of the main haulage road, so as to lessen the grade against the loads. The dip of the seam will probably reach two degrees.

Kindly state what is the maximum grade that we can expect to haul the same number of loads without difficulty, and what angle will it be necessary to deflect in the line of the main road to produce such grade, assuming that the direction of the main road, at present, corresponds to the direction of the dip of the seam, or at right angles to the strike.

———, Ky. SUPERINTENDENT.

It is common for manufacturers of mine locomotives to estimate the tractive effort of a locomotive having steel tires and operated on steel rails, without sanding the rails, as 30 per cent. of the weight resting on the drivers. This would make the tractive effort of a 12-ton locomotive under these conditions, 0.30 (12 × 2000) = 7200 lb. The weight of the loaded trip in this case, is 24 × 3½ = 84 tons, which makes the entire moving load including the locomotive, 96 tons.

Cars equipped with flexible roller-bearing wheels may be safely estimated as having a track resistance of 10 lb. per ton, making the total track resistance of cars and locomotive 10 × 96 = 960 lb. Then, deducting this from the estimated tractive effort of the locomotive leaves 7200 — 960 = 6240 lb. available for overcoming the grade resistance, which is 20 lb. per ton for each per cent. of grade, or, in this case, 20 × 96 = 1920 lb. for each per cent. of grade. On this basis, the maximum grade for hauling 24 loaded cars is 6240 ÷ 1920 = 3¼ per cent.

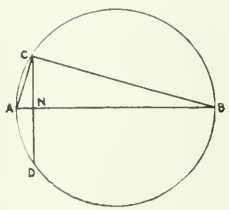
Much will depend, however, on how closely these assumed conditions approximate the real. It is for the interest of manufacturers to estimate the track resistances at as low a figure as possible. The frictional resistance of roller-bearing wheels has been stated, by some manufacturers, to be as low as 6 or 8 lb. per ton, which, it is claimed, is the result of actual tests of such cars, made under mining conditions.

Finally, assuming the main haulage road is driven on the full dip of the seam, which it is expected will reach an inclination of 2 deg. corresponding to a grade of 3½ per cent., in order to reduce this grade to 3¼ per cent. against the loads, it will be necessary to deflect the main road an angle of $A = 21° 23'$. The cosine of this angle is found by dividing the percentage of grade expressed decimally by the tangent of the dip angle. Thus, cos $A = 0.0325 \div 0.0349 = 0.9312$. To be safe, we would suggest deflecting the main road, say 30 deg., which would reduce the grade grade against the load to 3 per cent.

Middle Ordinate for Bending Rails

Kindly state the formula for finding the ordinate for bending iron rails to any desired radius, and show its development. MINE ENGINEER.

Des Moines, Iowa.



According to a principle of geometry, the half-chord of any arc of a circle is a mean proportional between the center ordinate of the arc and twice the radius of the circle minus that ordinate. Thus, referring to the accompanying figure, denote the chord CD by c, the middle ordinate AN by o and the diameter AB, or twice the radius of the circle, by $2r$.

Then, applying the principle just stated, we have,

$$o : \tfrac{1}{2}c :: \tfrac{1}{2}c : 2r - o$$

$$(\tfrac{1}{2}c)^2 = o(2r - o) = 2ro - o^2$$

Subtracting each member of this equation from r^2, so as to complete the square of the second member, we have,

$$r^2 - (\tfrac{1}{2}c)^2 = r^2 - 2ro + o^2 = (r - o)^2$$

Again, extracting the square root of each member, we have,

$$\sqrt{r^2 - (\tfrac{1}{2}c)^2} = r - o; \text{ and } o = r - \sqrt{r^2 - (\tfrac{1}{2}c)^2}$$

While this is the exact formula for determining the middle ordinate of a chord, the length of this ordinate is so small in comparison to the length of the radius of the curve that the proportion can be written

$$o : \tfrac{1}{2}c :: \tfrac{1}{2}c : 2r$$

which gives for the value of the middle ordinate

$$o = \frac{c^2}{8r}$$

The last formula gives the value of the middle ordinate expressed in feet. Expressed in inches, this value is

$$o = \frac{3c^2}{2r}$$

For example, to bend a rail to a curve whose radius is 50 ft. and using a 10-ft. chord, the middle ordinate of this chord is $(3 \times 10^2) \div 2 \times 50 = 3$ in. The 10-ft. cord or string must touch the gage line of the rail at each end and the ordinate must be measured from the string to the gage line.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Indiana Mine Bosses' Examination. Held May 24, 1919

(Selected Questions)

Ques.—What are the two purposes of coursing air currents through a mine?

Ans.—The purpose is, first, to absorb and carry away the smoke and foul gases that are produced and which would otherwise accumulate in the mine workings; and second, to supply fresh air in the working places of the mine and dilute and render harmless the explosive and poisonous gases generated therein.

Ques.—Trace the development of mine ventilation to the present time.

Ans.—In the early attempts at mining coal, no provision was made for the ventilation of the underground workings, further than to induce *natural ventilation* by diverting the surface winds into the mine, by erecting wind cowls at the opening, or causing a current of air by permitting water to fall down a shaft. Natural ventilation was also caused by providing two separate shaft openings or dividing a single shaft by means of a partition, so as to create a downcast and an upcast current by reason of the natural heat of the mine causing the warm air to rise on one side of the partition, while the colder outside air descended on the other side.

A little later, *furnace ventilation* was employed, the air in the furnace shaft being heated by maintaining a fire in the mine furnace, situated near the foot of that shaft. The heated air column in the furnace shaft caused a strong upward draft and produced a depression in the mine workings, which caused the outer air of the atmosphere to flow into the mine.

Furnace ventilation continued to be used in all of the larger mines, until the introduction of *mechanical ventilators*, in the form of large air pumps or huge air boxes or similar devices for forcing air into the mine, these devices being operated by steam or water power. Then came different types of fans, the propeller type or disk fan being simpler though less efficient than fans of the centrifugal type, having blades perpendicular to the plane of revolution. These latter were generally adopted and are now almost universally used in mining practice. They are made to operate either on the exhaust or the blowing principle, but are often arranged for both.

Ques.—(a) What is the air pressure on a square inch at sea level? (b) What is the theoretical height a suction pump will lift water, at sea level? (c) What is the practical lift of a pump and what is the difference?

Ans.—(a) The normal atmospheric pressure, at sea level, is practically 14.7 lb. per sq.in. Barometric pressure varies through a range of 1 or 2 in., depending on the approach of storm centers.

(b) Taking the pressure due to 1 ft. of water column as 0.434 lb. per sq.in., the theoretical height of suction, at sea level, is $14.7 \div 0.434 =$ say 34 ft.

(c) The practical height, in feet, a pump will lift water, under ordinary conditions at sea level, may be taken at nine-tenths of the barometric pressure, in inches. Thus, the normal barometric pressure at sea level being 30 in., the normal suction lift of a pump, at that level, is $0.9 \times 30 = 27$ ft. It may be greater or less than this, depending on the size, inclination and condition of the suction pipe, and the condition of the pump.

Ques.—(a) Give the fundamental formulas on which mine ventilation is based. (b) Which of these are most frequently used in ventilating calculations?

Ans.—(a) There are, practically, but six fundamental or elemental formulas in mine ventilation; namely,

Unit pressure	$p = \frac{k\,s\,v^2}{a}$
Quantity,	$q = a\,v$
Work,	$u = q\,p$
Horsepower,	$H = \frac{u}{33{,}000}$
Rubbing surface,	$s = l\,o$
Resistance,	$R = p\,a$

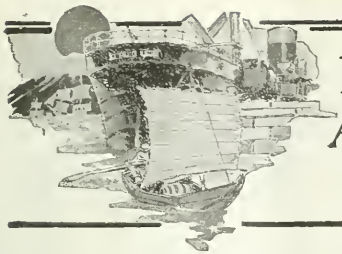
From these six formulas practically all of the important formulas in mine ventilation can be developed.

(b) The formulas for unit pressure, quantity and power are the ones most commonly used.

Ques.—(a) Compute the perimeter, sectional area and rubbing surface of an entry 8 ft. wide at roof, 10 ft. wide at bottom, 6 ft. 8 in. high and 900 yd. long. (b) How much air is passing per minute, the anemometer registering 250 r.p.m. at roof, 225 r.p.m. on each side and bottom and 300 r.p.m. in center?

Ans.—(a) To find the perimeter of this airway it is necessary to first calculate the length of each side, which is the hypotenuse of a right triangle whose sides are $6\frac{2}{3}$ and 1 ft. Thus, $\sqrt{(6\frac{2}{3})^2 + 1^2} = 6.74$, say 6 ft. 9 in. The perimeter of the airway, or the total length of the two sides, top and bottom, is therefore $8 + 10 + 2 \times 6\frac{2}{3} = 31\frac{1}{3}$ ft. The average width of this entry is $\frac{1}{2}(8 + 10) = 9$ ft. The height of the entry being 6 ft. 8 in. ($6\frac{2}{3}$ ft.), its sectional area is $9 \times 6\frac{2}{3} = 60$ sq. ft. The length of the entry being $3 \times 900 = 2700$ ft., its perimeter $31\frac{1}{3}$ ft., the rubbing surface is $2700 \times 31\frac{1}{3} = 85{,}050$ sq. ft.

(b) Estimating the average velocity for the entire cross-section of this airway as, say $266\frac{2}{3}$ ft. per min., the volume of air passing is $266\frac{2}{3} \times 60 = 16{,}000$ cu. ft. per min. The average velocity, in this case, is approximated by multiplying the observed velocity at the roof (250), by the width at the top of the entry (8); and the observed velocity at the sides and bottom (225), by the combined length of the three sides of the trapezoid ($23\frac{1}{3}$); and the observed center velocity (300), by the sectional area of the airway less its perimeter, expressed numerically ($60 - 31\frac{1}{3} = 28\frac{1}{3}$); and dividing the sum of these products by the sectional area of the airway. Thus $(250 \times 8 + 225 \times 23\frac{1}{3} + 300 \times 28\frac{1}{3}) \div 60 = 264$ ft. per min.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Great Britain's Coal Output Constantly Decreasing

A statement has recently been made by a prominent member of the Government that, owing to the continued decrease in the output of coal in Great Britain, it will be necessary either to reduce the supply of coal to industry and for domestic use or to limit exports still further. As is shown by the following table, the output of coal has been decreasing intermittently since 1910, but the most significant figures are those showing the decrease in the output per miner, which amounts to practically 10 per cent for the period mentioned:

Year	Persons Employed, Number	Total Output, Tons	Output per Person, Tons
1910	1,049,407	264,417,588	252
1911	1,067,213	271,878,124	255
1912	1,089,090	260,398,578	239
1913	1,127,600	287,411,869	255
1914	1,057,505	265,643,030	251
1915	953,642	253,206,081	265
1916	998,063	256,375,366	257
1917	1,021,340	248,499,240	243
1918	1,008,867	227,714,579	226

It will be seen that the output per person employed reached its highest point in 1915, when the number of men employed was smallest, but the patriotic impulse perhaps highest. From that year, however, the individual output shows an accelerating downward movement.

The output for the first three months of the present year was:

Four Weeks Ended—	Persons Employed, Number	Total Output, Tons	Output per Person, Tons
Feb. 1	1,064,828	18,321,100	17.2
Mar. 1	1,097,541	19,172,200	17.7
Mar. 29	1,106,299	18,676,200	16.2

On the basis of the foregoing figures the total production for this year would be about 224,000,000 tons, as compared with 227,714,579 tons in 1918; but there were nearly 100,000 more men in the mines in March than last year, and the average output per man for the present year on the basis of the March figure would be only 203 tons, against 226 tons last year. This represents a drop in total output of over 63,000,000 tons, as compared with the last pre-war year, and a drop of 62 tons in the individual output since the high-water mark was reached in the first year of the war.

The chairman and three members of the Government Coal Commission estimate the reduction in output involved in the shortening of the working day by one hour at 10 per cent in a full year. This, on the basis of the figures for the first quarter of this year, means a further reduction of about 10,000,000 tons in the year's output, which gives a total production for 1919 of some 214,000,000 tons. The fall since 1913 would thus be 73,000,000 tons—the exact amount, curiously enough, of Great Britain's coal exports in 1913. In other words, the normal surplus available for export will have been wiped out.

The official estimate of the British coal output for 1919-20, according to the British (Government) Board of Trade Journal for June 12, 1919, places the output for the first 20 weeks of 1919 at the rate of 212,000,000 tons per annum, as compared with 287,000,000 tons in 1913. The average number of men employed during the 20 weeks was 1,111,000, being exactly the same number as the average employed during the year 1913.

The average weekly output for the four weeks ending May 24, 1919, during which period there were no holidays and few stoppages, was 4,813,000 tons, or at the rate of, say, 238,000,000 tons per annum after allowing 5 per cent for holidays and stoppages.

The estimated output for the year 1919, on the basis of the average weekly output of the first 20 weeks, and allowing for the reduced hours after July 16, is, say, 230,000,000 tons; or, calculated on the weekly output for the first 20 weeks, the output for the remainder of the year being estimated on the average weekly output for the four weeks ending May 24, with an allowance of 5 per cent for holidays and stoppages, the total is some 228,000,000 tons.

The output for 12 months from July, 1919, after the reduced hours have come into force is estimated at 217,000,000 tons, calculated on the output of the first 20 weeks, or 214,000,000 tons, calculated on the weekly output of the four weeks ending May 24, 1919, with an allowance of 5 per cent for holidays and stoppages.

The consumption of coal for inland purposes and bunkers was 210,000,000 tons in the year 1913 (the average for the five pre-war years was 209,000,000 tons), and for the year 1918 was 196,000,000 tons. The exports of coal in the year 1913 were 77,000,000 tons, and in the year 1918, 34,000,000 tons. In order to provide approximately the same quantity of coal for inland consumption and bunkers for 12 months from July, 1919, all present restrictions on consumption must be fully maintained, and, in addition, exports must be reduced from a rate of 34,000,000 tons per annum to a rate of 23,000,000 tons per annum.

It is estimated that the deficiency on the working of the industry on the basis of the estimated outputs given for the period of 12 months from July, 1919, after providing guaranteed profits to owners at the rate of 1s. 2d [$0.284] per ton, will be about £46,600,000 [$226,779,000], equal to 4s. 3d. [$1.03] per ton of output. For the calendar year 1919 it is estimated that the deficiency will be £37,000,000 [$180,060,000].

Yorkshire Coal Mining Industry

More coal is mined in Yorkshire than in any other county in Great Britain. The two great coal-producing areas are known as the South Yorkshire and the West Yorkshire coal fields. The former embraces 78 collieries in the neighborhood of Barnsley and Doncaster in the Sheffield district, and the latter consists of 65 mines in the neighborhood of Wakefield, Normanton and Castleford, in the Leeds district. The production of the West Yorkshire coal fields in 1918 is estimated to have been 15,000,000 tons, and that of the South Yorkshire area 25,000,000 tons, a total production for Yorkshire County of 40,000,000 tons, or about one-sixth of the total amount of coal estimated to have been mined in Great Britain in 1918.

The statistical office of the customhouse has now resumed publication of its returns of coal shipped to foreign countries and the British possessions from the various districts in the United Kingdom. The total shipments of coal from all ports in Great Britain were 59,039,880 tons in 1914, 43,534,560 tons in 1915, 38,351,553 in 1916, 34,995,587 in 1917, and 31,752,901 in 1918.

Since the war began every demand of the colliers has been conceded in order that production should not be interfered with. From Aug. 14, 1914, to Oct. 31, 1918, 339,435 coal miners joined His Majesty's forces, according to a statement of the acting chief inspector of mines at the Home office, London, and up to Jan 31, 1919, 198,612 had been released. The effect on the output has been very serious, although actual tonnage comparisons do not show it to the full extent, as previous to 1915 a very large loss in output was caused by short-time working at house and gas-coal pits in the summertime, in some cases not more than two days a week being registered. Since the beginning of 1915 pits in most districts have been fully employed, the exceptions being in the South Wales and Newcastle areas.

According to the latest official report of the acting chief inspector for mines and quarries to the Home Office the production of coal in 1917 of the four leading counties in the United Kingdom was as follows: (1) Yorkshire, 40,874,522 tons, made up of North Riding, 1909 tons, West Yorkshire coal fields (Leeds district), 14,860,067 tons, and South Yorkshire coal fields (Sheffield district) 26,012,546 tons; (2) Glamorgan (Swansea district), Wales, 32,133,288 tons; (3) Durham (Newcastle district), 30,842,539 tons; and (4) Lancaster (Manchester district), 21,759,859 tons. The total output of coal in the United Kingdom in 1917 was 248,499,240 tons, valued at £207,786,894 ($1,011,194,920).

The recent prosperity of the coal trade was the direct result of conditions arising out of the war and the advantage accrued mainly to the workers, whose wage advances by means of war bonuses, etc., have been very substantial since the war began and are now considerably higher than at any previous time. Many colliers provide houses at low rents for their workmen, besides which they are entitled to house coal free or at a merely nominal price. Not content with these conditions, the Miners' Federation is now formulating demands for a six-hour day, a fortnight's holiday every year with pay, and a further substantial advance in wages (30 per cent. has been suggested).

The *Iron and Coal Trades Review*, commenting on present conditions in the trade, says:

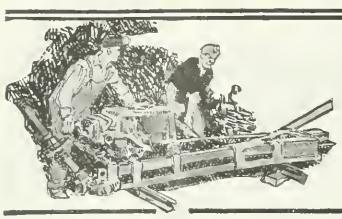
"It is advisable, under the circumstances, to draw the attention of the Miner's Federation to the fact that other countries are large coal producers and that interested circles in America—where it might be mentioned the output per man per day is more than twice as much as in this country—are already formulating schemes to enter into competition for business at European ports. It is reported that branch offices are to be opened in Paris and Genoa. It has been our habit to look to France and Italy as our own special markets, but when it is pointed out that coal has already been offered by American coal-exporting firms at prices c. i. f. Genoa which are not very different from the figure quoted for the best-grade steam coals from this country, it looks as though the Americans, with their usual thoroughness, are out for business as soon as restrictions are withdrawn, and as they will have a proportionately larger supply of carrying tonnage than we have, they may become very formidable competitors.

"The severe competition from this quarter and also from Germany (if no restrictions are placed on its export trade by the Peace Conference), the Miners' Federation of Great Britain will do well to further seriously consider matters before placing any more harassing restrictions on the coal trade of this country."

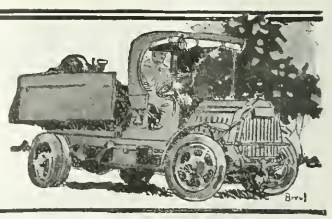
The Coal Controller is already allowing some abatement of the rigid restrictions of the household fuel and lighting order, and commencing with Jan. 1919, the allowance of gas and electricity to consumers has been increased by 25 per cent.

The opinion of competent authorities is that there will be a huge demand for British coal for several years, especially from the near continental neutrals — Sweden, Norway, Denmark and Holland — which since the war have obtained only limited supplies of coal, under license and in exchange for their own products. Consequently, prices are expected to keep up.

Vice Consul Augustus I. Hasskarl reports from Rio de Janeiro, under date of May 23, that total imports of coal into Brazil during April amounted to 75,688 metric tons (1 metric ton equals 2204.6 pounds). Of this amount the United States furnished 64,153 tons and the United Kingdom, 11,534 tons. During the corresponding month, 1918, the United States supplied 12,042 tons, and the United Kingdom, 31,826 tons. In April, 1917, the United States furnished the total imports, 56,761 tons.



COAL AND COKE NEWS



Pittsburgh, Penn.

Shortage of coal cars in western Pennsylvania to be relieved by thousands of new cars. Question of price argued by Railroad Administration and private owners of railroads while country faces fuel shortage.

The false shortage of coal cars which has caused unrest among mining men and loss to coal and steel companies will be relieved shortly by the placing of upwards of 16,000 cars in service says a Pittsburgh authority. These cars are now held in storage awaiting a settlement of the difficulties that have arisen between the Railroad Administration and the owners of the various roads, over the price to be paid for such cars. Several thousand other cars are expected to be transferred from the West and the extreme East for service in western Pennsylvania. When the whole situation clears up it is expected that the car shortage will be at least temporarily relieved.

The new cars were built for the Government at a price greatly in advance of the prevailing price for cars in normal times. Private owners of railroads claim that the purchase of these cars at their contract price would be a hardship and have refused to accept them. The cars have been in storage since about the time of the signing of the armistice. More than 4000 of these cars are said to be stored in or near Pittsburgh and are not in use by local railroads. Plans looking to the prompt use of the cars is understood to have been brought about by strong pressure on the Railroad Administration by the National Coal Association and the steel industry.

Charleston, W. Va.

Pronounced car shortage throughout most of West Virginia fields. Mines working about half time. Tidewater embargo continues on Kanawha coal. Navy takes over large quantities of smokeless.

Production was knocked galley west during the week ended July 26 in most of the producing fields of West Virginia by a most pronounced shortage of cars in all such districts, spoiling plans for a large production during the month and making it impossible for producers to even come anywhere near to taking care of the demand. Cars were so hard to secure that a large number of mines either found it necessary to shut down altogether or to operate during only a portion of the week. In some sections the supply was restricted to about 33⅓ per cent. while in others it dwindled to the extent of 20 per cent. Every railroad operating in the state was short of cars. Railroad officials ascribed the shortage to the fact that there was a congestion of loaded coal cars on eastern lines which it had been impossible to deliver to tidewater destinations and consequently to unload, the result being that hundreds of cars could not be returned empty. There has been little shipping in the coastwise trade for several weeks and little hope is held out that prevailing car conditions will be improved for the present. Government hoppers have not been delivered to the railroads for service although it had been indicated that a large portion of such cars (which have been idle) would be put in service by the last of July. With such car service it is utterly impossible for producers to fully supply an ever increasing demand in every field, for all kinds of coal mined in the state. There was an exceptionally strong demand for gas and splint coals, but steam coal also shared in the general increase of activities in the coal markets of the country. And while two weeks ago buyers were fighting shy of contracts, it is now the producers who are in no hurry to bind themselves to contract deliveries at a stipulated price. The embargo against gas and splint coal to tidewater imposed on July 7 was still in effect on July 26, with nothing to indicate just when it would be lifted.

With the supply of cars in the Kanawha field reduced to about 50 or 60 per cent. of the normal supply, mines in that field were greatly handicapped during the week ended July 26 and were unable to operate in many cases as much as half time. Operators viewed the shortage with concern because of the way it was interfering with a prompt filling of orders which are pouring in in such heavy volume. The tidewater embargo shut off shipments to the seaboard, but the impetus given to the production of steam coal had to some extent balanced the tidewater losses. Producers declare that the demand for all kinds of fuel produced in the Kanawha region to be most insistent with facilities for taking care of such a demand somewhat limited.

Production of New River smokeless was retarded materially during the week ended July 26 by a most pronounced car shortage; the output of New River coal being restricted to about 50 or 60 per cent. of possible production during a period when there was a most urgent demand for such coal, at home and abroad. Large quantities of New River coal are now being taken over by the Navy.

Fairmont, W. Va.

Most serious car shortage in Fairmont region. Mines working on short time. Marine strike the cause. Nova Scotia taking large quantities of Fairmont coal.

The most serious car shortage of the present year, and in fact in several years, was experienced in the Fairmont and other producing fields in the northern part of the state during the week ended July 26, the supply of empties being cut down during part of the week at least two thirds. The result was that 80 mines on the Monongah division alone of the Baltimore & Ohio were unable to continue operations at the end of the week because of lack of cars; out of a total of 235 mines on that division, only a little more than 100 found it possible to produce. The car shortage was caused by the large number of coal cars awaiting delivery at tidewater where no coal could be unloaded because of the marine strike. For that reason the total equipemnt available was shortened by at least 10,000 cars. The car shortage arrived at about the same time a further increase in demand was felt in northern West Virginia for both prepared sizes and slack. Even in the face of an embargo to tidewater piers it would have been possible to have maintained production but for the car shortage in view of the increased activities in steel coal and the better movement of slack as well as because of a somewhat heavier movement of coal to the Lakes. On the other hand railroad fuel shipments were not as heavy in volume as during the earlier part of the month. Owing to the shortage of cars the output in most northern fields, was cut down at least one half. Much Fairmont coal, it is understood, is being shipped to Nova Scotia where it is being used in large quantities by the Canadian Pacific and other railroads in the Dominion of Canada.

Huntington, W. Va.

Serious car shortage in Logan field. Production 55 per cent. of capacity. Steady growth in New River output in April, May and June. Car shortage decreases July production.

One of the most serious car shortages of the present year in the Logan mining district was that experienced during the week ended July 26 when the production of 134,000 tons of coal was lost because no cars were furnished in which to load coal. The tonnage lost from the same source during the previous week amounted to 46,000 tons. Between July 19 and 26 there was an increase of 88,000 tons in the production loss through a car shortage alone; the increase in percentage being from 15 to 37 per cent. of full time capacity. This reduced total production to a fraction more than 55 per cent. of full time capacity as against 71 per cent. for the previous week; production being cut down from 219,000 to 200,000 tons, so that the total output was short about 53,000 tons of the tonnage loaded during the corresponding week in 1918. Lack of equipment was altogether responsible for limiting working time in the mines to 3300 cars as compared with 4200 cars for the week ended July 19—a loss of about 900 cars. Losses from labor shortage and from mine disability were comparatively light and a percentage of loss from the production from no market was only 5.41 per cent. or 19,000 tons. The total production loss for the week was 162,000 tons.

Figures compiled by the Chesapeake & Ohio Ry. show a steady growth in the output of the New River district for the months of April, May and June; but it is very much feared that owing to the pronounced car shortage in evidence during the latter part of July that the output for that month will show a material decrease as compared with previous months. The tonnage loaded in the New River field for each of the first six months of the year is as follows: January, 388,000; February, 425,000; March, 302,000; April, 497,000; May, 597,000; June, 596,000. Producers are inclined to believe that when figures are finally compiled, they will show July production to have been about 200,000 tons short of that for either May or June.

Bluefield, W. Va.

Increase in Pocahontas production—car shortage more than offset by labor improvement. Production reaches new high total in Kenova-Thacker field—77 per cent. of capacity.

Contrary to general expectations there was an increase instead of a decrease in the coal production of the Pocahontas district during the week ended July 26, although there was an increase in the shortage of empty cars for the week. Despite such a shortage, however, mines of the district succeeded in getting out a larger tonnage of coal by 20,000 tons, production reaching 337,000 tons as against the previous week's production of 317,000 tons, the output in fact being only 5000 tons below the high production of July 12. The gain in the amount of coal mined and shipped was due to the fact that miners were able to work over a longer period and also to a slight improvement in the labor situation. The production loss as a whole was only increased about 10,000 tons or from 55,000 to 65,000 tons; the largest part of such loss being due to an increase in the car shortage from 24,000 to 39,000 tons. Such a loss was offset in part by a reduction in the loss through labor shortage of 2000 tons and a reduction in the loss through mine disability of 4000 tons. Much coal from the Pocahontas field was being shipped to western and northwestern markets during the week, particularly to Wisconsin markets. There was a slight reduction in the tonnage of coal coked, only 6000 tons being coked during the week.

A car shortage, so prevalent in other fields of West Virginia, was scarcely felt in the Kenova-Thacker district during the week ended July 26, although there was a slight increase over the previous week. It had no effect on the output as production reached a new high total for the year—142,000 tons—almost equal to the production (149,000 tons) for the same period last year and an increase of 17,000 tons over the week ended July 19. Increased working time in the mines, amounting to about 100 hours, made the increase in production possible. A shortage of cars failed to make any difference in mining and

loading coal; the increase in the loss from lack of cars being only about 4000 tons and amounting to about five per cent. of full time capacity. The percentage of loss from labor shortage was also reduced affecting production only to the extent of six per cent. While there was a slight increase in the tonnage loss from no market, the percentage of such loss to full time capacity was slightly reduced. In short, mines of the Kenova-Thacker district were able to produce up to about 77 per cent. of capacity.

Louisville, Ky.

Meeting of southern coal operators' associations. Car distribution, car shortage and car repairs discussed. C. D. Boyd to confer with Director General Hines.

Officers and members of six of the leading coal associations operating south of the Ohio River were gathered at the Seelbach Hotel, Louisville, on August 1, to discuss traffic matters and the car shortage which is spreading rapidly throughout the southern coal fields. A considerable amount of statistical information on the subject was presented by C. D. Boyd, traffic manager for three of the associations, and formerly coal traffic manager for the Louisville & Nashville R.R.

It was shown that the mines were not securing an equitable distribution of cars; that there was at present no car shortage, due in part to cars being under long hauls to the North and Northwest; and that under the U. S. Railroad Administration's curtailment policy, cars were not being properly repaired and kept in operation. At the conclusion of the meeting C. D. Boyd was instructed to make a trip to Washington immediately to confer with Director General Hines in an effort to secure relief, and improve certain existing conditions.

The associations represented were the Southern Appalachian, Harlan, Hazard, Alabama and Virginia Coal Operators' associations and the West Kentucky Conservation Association.

McAlester, Okla.

Coal operators of Oklahoma move against cheap fuel oil of Mexico. Affiliation with National Coal Association. Cheap petroleum displacing coal in certain markets. Protective tariff sought.

Affiliation with the National Coal Association, as a means to save the Oklahoma coal mining industry from being strangled to death by cheap Mexican oil was the principal business before the meeting of the Oklahoma Coal Producers' Association at the special session held at McAlester on July 25. This move was discussed at a recent meeting of all the state's coal operators in Muskogee. No action could be taken at that time officially as it was necessary that the matter be stated in the call sent out for the meeting.

Since that meeting, about a month ago, the price of Mexican oil has dropped from 65 to 19c. a barrel, it is reported. Only a prohibitive tariff will protect their business from this killing competition, the operators say. The oil costs less than the freight to most of the points in the territory supplied by mines in eastern Oklahoma. Cheap petroleum from the southern republic is displacing coal all along the Gulf and Atlantic coasts and is becoming strongly entrenched in New England it is said.

The purpose of the meeting at McAlester was to enlist the influence of the powerful National Coal Association in Washington for a high protective tariff against Mexico's fuel product. This assistance has already been pledged; it remains only to consummate the formality of joining the state body to the national association.

PENNSYLVANIA

Anthracite

Wilkes-Barre—The famous Parrish breaker of the Lehigh & Wilkes-Barre Coal Co. is now only a memory. This old breaker had been a landmark in the Wyoming Valley for many years.

Buzleton—It was announced by coal operators here recently that bottom men at various collieries would be furnished with steel helmets similar to those worn by men in service in the late war. These "Bessemer derbies" should offer considerable head protection to men working at the foot of slopes and shafts from pieces of coal rolling down or falling off cars being hoisted out of mines.

Reading—The 16th convention of the Pennsylvania Retail Coal Merchants' Association was held here during the week ended July 26. The membership includes coalmen from four adjacent states, most of whom deal exclusively in anthracite. This convention was of unusual importance as the dealers are now resuming full control of their business after the era of Federal administration. A lengthy report covering all phases of the coal situation, as viewed by a retailer, was given by the secretary, which includes the following points: There is no likelihood that present anthracite prices will be reduced this year. If the miners win higher wages, higher prices will follow. Early buying is essential. Governor Sproul's plan for municipal coal yards is not practical.

Wilkes-Barre—The Susquehanna Collieries Co., operating coal properties in Dauphin, Schuylkill, Northumberland and Luzerne counties, has filed a mortgage for $11,000,000 in the counties affected to replace a $9,000,000 mortgage, the Girard Trust Co., of Philadelphia, being the holder of the mortgage in both cases. Counsel for the company in Dauphin County, has given the statement that electrification of the mines at Williamstown and Lykens, and the sinking of a shaft at Big Lick, between Lykens and Wiconisco, will shortly be started, the cost being from $2,000,000 to $3,000,000, and the necessary time two years. The new shaft is expected to reduce the present heavy expense of long inside hauls for coal, and to cut the cost of removing water from the mines.

Bituminous

Latrobe—Fire of incendiary origin destroyed the stables and other property of the Oakwell Coal and Coke Co., near here recently. Horses were burned to death and a total loss of several thousand dollars reported.

Homer City—Recently J. B. Hutchinson, superintendent of the Conemaugh division of Pennsylvania R.R., inspected the Yellow Creek branch. It is rumored that some new coal development will be made up the creek and the branch will be extended to haul the outputs from the mines.

Washington—The Imbire Coal Mining Co. of this place, is just completing its new slope mine at Nichola. It will be equipped with electrical machinery at a cost of $50,000 and have an output of 500 tons a day. W. F. Taylor is superintendent of the work.

Washington—The Vesta Coal Co., of Pittshurgh, has just purchased 552 acres of coal land in eastern Washington County from the estate of Joseph Ulery for $193,000 or at the rate of about $350 an acre. The Vesta company has large boldings adjoining the tract.

Brownsville—The engineering departments of the various Hillman companies, with the exception of J. Dickerson Martin, Chief Engineer (who will remain in Pittsburgh) have moved headquarters from Pittsburgh and Masontown, Penn., to South Brownsville, Penn. The Hillman companies include the Hillman Coal and Coke Co., Merchants' Coal Corporation, Hecla Coal and Coke Co. and Thompson-Connellsville Coke Co. The general offices of the Hecla Coal and Coke Co. and the Thompson-Connellsville Coke Co., in Pittsburgh, are being moved from the Oliver Building to the First National Bank Building where the Hillman Coal and Coke Co. and Merchants' Coal Corporation have been located. The combined offices will occupy two floors.

WEST VIRGINIA

Fairmont—The Fairmont Mining Machinery Co. has been re-organized in so far as the executives of that company are concerned by the election of Walter D. Stockley, as president; J. M. Boyle as vice president; and Messrs. Stockley, Boyle, F. R. Lyon, Sprigg D. Camden, A. T. Watson and A. S. Denham as directors. Such reorganization is a part of the policy initiated by Col. C. W. Watson in again assuming the presidency of the Consolidation company, of decentralizing the management not only of the Consolidation company but of companies identified with it.

Plymouth—The Plymouth Coal and Mining Co., with an operation on the Kanawha River about twenty miles from here, has just sunk a shaft 115 ft. deep to a 5- to 7-ft. seam, the shaft having been completed in 57 days. This shaft will facilitate development of the company's holdings of about 7000 acres of coal land. The Plymouth company was consolidated not long ago with the Hatfield companies, with headquarters in Cincinnati, Ohio, (a river transportation company being one of the concerns absorbed); the bulk of the coal from Plymouth will be shipped by water to Cincinnati and other points down the Ohio River.

Charleston—According to the amount report of the West Virginia Department of Mines for the fiscal year ended June 30, 1917, **(just published)**, there were 1203 producing mines in the state during that period, operated by 667 companies and firms, the production from which for the fiscal year was 79,806,652 gross tons, or an increase of 194,354 gross tons representing less than one per cent. of the gain over the previous year. The value of the coal produced greatly exceeded that for the year ended June 30, 1916. The total value of all coal produced during the year ended June 30, 1917, in West Virginia, was $180,363,033.52, the increase of the value in the product over the previous year being $87,969,481.03; the coke produced during the same period showing an increase in value of $7,972,880.58. There was an increase in the average selling price of coal in West Virginia during the year ended June 30, 1917, of $1.17 per ton over the price prevailing during the previous year; the average selling price of coal throughout the year being $2.26 per gross ton for run-of-mine coal. The average price of coke, f.o.b. ovens during the year was $4.77 per ton, which represented an increase over the previous year of $2.76 per ton. Although the miners worked a shorter number of days and produced less coal per man during the year, yet their earnings were larger by 28.8 per cent.

KENTUCKY

Louisville—The Harlan County Coal Operators' Association and the Southern Appalachian Coal Operators' Association are making a determined bid for lower freight rates to Charleston, S. C., and Savannah, Ga., to enable them to handle coal at competiting rates to southern Atlantic ports for export. The matter was recently taken up with the U. S. Railroad Administration, and the Louisville Freight Traffic Committee. It is estimated that Europe will be a large buyer of American bituminous coal for the next few years, due to the mining situation in France, Germany and England and the western Kentucky operators are anxious to get in on the movement, and establish a foreign demand for their product.

OHIO

Martins Ferry—The Youghiogheny & Ohio Coal Co. has started the building of approximately 50 dwellings at its Dorothy mine near Yorkville. The company is also erecting a store.

Akron—The Murray Hill mine of the Akron Coal Co. was destroyed by fire recently. The work of rebuilding is progressing and officials of the company state that they expect to dump coal in a temporary tipple early in August.

Columbus—Practically all of the mines of the Sunday Creek Coal Co. (33 in all) located in the Hocking Valley field are now in operation, according to P. A. Coen, acting president of the company. While the company has large steam and railroad contracts, still a large part of the output is taken by the domestic trade.

Columbus—Ohio coal mines are said to be operating from 65 to 75 per cent. of full time as compared with 45 per cent. three months ago, when thousands of miners were idle. Practically all mines in eastern Ohio are said to be working nearly full time. In the Hocking Valley or southern Ohio district some mines are still closed down and others working only part time, but conditions are improving rapidly. Approximately 15,000 of the 50,000 miners of the state were idle from the signing of the armistice until three months ago it is said. The demand for coal is becoming better and unless a car shortage and severe winter intervenes, all mines are expected to run full time shortly.

INDIANA

Indianapolis—In a recent decision handed down in the suit of the Lower Vein Coal Co. and seventy-one other Indiana coal mining companies for a permanent injunction against the Indiana Industrial Board to prevent it from enforcing the amendment to the Indiana Workmen's Compensation act, Federal Judge Anderson has ruled that this amendment is constitu-

tional under both Federal and state laws. A temporary injunction granted early in the present year, which prohibited the Industrial Board from passing on petitions for compensation of coal miners filed with it, was dissolved. The amendment was attacked on the ground that it was class legislation, as it provided that it was mandatory for coal mining companies and municipalities to come under the law.

ILLINOIS

Zeigler—The Bell & Zoller Mining Co. has recently bought a 750-K.W. steam turbo-generator and three motor-generator sets to improve the power distribution in its mine.

Carterville—The "Dale" mine of the Duncan Coal Co., recently resumed operations after being shut down since last February. T. S. Cousins of Duquoin is general superintendent of this mine and of two other large mines in southern Illinois, one at Johnston City and one at Duquoin.

Duquoin—Engineers are at work in the southern part of Jefferson County, surveying that section for the location of a branch line which is to be an outlet northward for the coal fields of Williamson and Franklin counties. The work is to be done by the Illinois Central R.R. At the present time the Burlington is carrying the larger portion of the coal from this district and another outlet is needed.

Harrisburg—A general resumption of mining activities throughout southern Illinois is expected during the month of August according to C. M. Moderwell, general manager of the O'Gara Coal Co.; this company operates many mines in Saline County. He has announced that there will be a marked improvement in the production of that company's mines as well as others in the district unless a car shortage proves too great a detriment to the industry.

Marion—A mining case was recently decided in the County Court of Williamson County between the State and the Johnston City & Big Muddy Coal Co. The company recently sank a shaft and failed to construct an air or escape shaft; instead connecting the new mine with old workings of the company on adjoining property. The injunction, which was sustained, was to prevent the company from operating the new shaft until another shaft had been sunk and opened up for use.

Granite City—Ground was recently broken by the St. Louis Coke and Chemical Co., near here (Madison County), for the erection of a large steel and coke plant. The plant will cover 500 acres of ground and will cost about $10,000,000 it is said. Approximately 2000 tons of coal from the southern Illinois coal fields will be handled daily in the 80 coke ovens which are to be installed. A blast furnace with a capacity of 500 tons will be constructed and the products of this furnace and steel plant will be used by the mills which are located near Granite City.

The location of the plant has many advantages, being directly on the Litchfield & Madison R.R., and the Illinois Traction System; a belt line will be built connecting the plant with the Terminal Railway Association of St. Louis. The distance from the heart of the Illinois coal fields to the proposed plant is not over 30 miles and this will make transportation of the coal quite cheap. There are also some 10 or 15 separate railroad lines which pass near Granite City, terminating in East St. Louis and St. Louis. The Mississippi River barge fleet will be utilized both for bringing iron ore from the Lake Superior region and for distributing the finished products of the company.

In addition to the manufacturing of coke and steel, the plant will turn out byproducts, among them dyestuffs. Owing to its close location to Illinois coal fields, the company expects to produce steel cheaper than is now being made in Pittsburgh.

ALABAMA

Birmingham—Teams are being trained at many of the coal mines in this district in first-aid and safety-first work, and practically all the larger companies will send picked teams to the National field meet to be held at Pittsburgh, Penn., Sept. 30. The mine rescue car from the local station of the Bureau of Mines has visited the mines and given the men training in mine rescue work, under the direction of District Mining Engineer W. B. Plank and Foreman Miner James M. Cobb. It is also probable that a field meet will be held this fall under the auspices of the Bureau of Mines and the Alabama Coal Operators' Association, at which time contests will be held between teams from this district.

IOWA

Melcher—The Red Rock Coal Co., of this place, has installed the following equipment: A Jeffrey fan driven by a General Electric motor; two 6-ton Goodman electric locomotives; four Goodman mining machines; one 200-K.W. Ridgeway generator, also 100 hp. additional boiler capacity. The capacity of the mines is to be increased from 1000 to 1500 tons per day.

MISSOURI

Jefferson City—The Missouri Legislature, at its recent session, gave official recognition to Missouri as a coal producing state by inserting in the general appropriation bill a clause requiring that for the biennial period 1919-1920, preference shall be given to Missouri coal, quality and cost considered, in purchases for the state sanitariums, the soldiers' homes and other state institutions. It is estimated that the coal for the period will cost $340,000. Missouri's coal industry gave employment in 1918 to 9000 miners and about an equal number of other persons in connection with the industry.

Personals

Joseph Maize, who recently resigned as superintendent of the Edna mines of the Hillman Coal and Coke Co., near Irwin, Penn., has accepted the position of superintendent of the Graff Mining Co. near Blairsville, Penn.

Phillips F. Jarvis has resigned his position as sales manager for the territory controlled from the St. Louis office of the Sullivan Machinery Co. In the future this territory is to be subdivided and the following appointments are announced:

Marion C. Mitchell is sales manager for Indiana and Illinois with temporary headquarters at St. Louis. Don M. Sutor, formerly at El Paso, is sales manager for western Kentucky, western Tennessee, Missouri, Arkansas and Kansas with headquarters at St. Louis. Dan H. Hunter is sales manager for Louisiana, Texas (except the southwestern section) and the oil fields of Oklahoma and Kansas, with headquarters at Dallas, Texas.

S. P. Kuntz, formerly mine foreman at one of the operations of the Madeira-Hill Coal Mining Co., in Clearfield County, Penn., has resigned. Mr. Kuntz plans to develop a tract of coal land at Clover Run, near Mahaffey, on his own account.

H. G. Nash has been appointed manager of the Huntington district, Mine Car Department, of the Hyatt Roller Bearing Co. **H. D. Hynds** has also been assigned to the same district; he will devote his time to the solving of haulage problems for those operators desiring such assistance.

Thomas O. Morgan, until recently head of the service department of the New York office of the American Steam Conveyor Corporation, has been promoted to the position of sales engineer. This corporation also announces the appointment of **H. S. Valentine** as sales engineer in charge of its Philadelphia office.

Ralph E. Sanderland, vice president of the Colonial Coal and Timber Corporation, formerly of Omaha, Neb., now of Charleston, W. Va., and Mrs. Alma S. Pendleton, of Charleston, were united in marriage July 18, leaving shortly after the ceremony for a trip through the West. For the past year Mrs. Pendleton had been an attaché of the West Virginia Department of Mines.

Ernest P. Kipp is the district manager in charge of the new sales office and warehouse opened up by the Hazard Manufacturing Co. (headquarters at Wilkes-Barre, Penn.), at Denver, Colo. The Denver office will cover the Inter-Mountain district, including in its territory the states of Colorado, Wyoming, Montana, Idaho, Utah, New Mexico and the western portions of Nebraska and South Dakota.

Professor H. H. Stock, head of the Mining Department of the University of Illinois, spent two weeks recently at the Pittsburgh Station of the Bureau of Mines and in the Connellsville coke region. Professor Stock investigated the methods of mining of western Pennsylvania in the interest of the state of Illinois with a view of improving the mining methods and gaining a greater revovery from the coal beds of Illinois.

J. J. Brown, formerly vice president and general manager of the Wheeler Condenser and Engineering Co., of New York, was elected president of this company. He succeeded Charles W. Wheeler, recently deceased. **H. S. Brown** was elected vice president. The business of the Wheeler company has more than quadrupled during the past ten years and the manufacturing capacity of the plant has been correspondingly increased.

R. R. Shafter has returned to the Sales Department of the Traylor Engineering and Manufacturing Co., of Allentown, Penn.; he will have charge of the company's New York office at 30 Church St., in the capacity of district manager. For two years Mr. Shafter was general superintendent of the Traylor Shipbuilding Corporation, which under his management completed more 3500-ton cargo carriers than any other yard on the Atlantic and Gulf coasts.

Lieutenant Commander John L. Murrie, U. S. Navy, formerly of the New York Edison Co., and **Captain Edward F. McCrossin**, U. S. Army, formerly of the McCrossin Engineering Co., have been relieved of active duty in the Government service and announce the formation of the firm of Murrie & Co., engineers, with offices at 74 Broadway, New York. In addition to general consulting engineering, the firm specializes in engineering and financial reports on railroads, gas and coal byproduct plants and gas and electric rate cases.

Obituary

Thomas Jefferson McCowan, 72 years of age, a large owner of coal and timber lands in eastern Kentucky, recently died at his home at Penny, Ky. Mr. McCowan for many years was one of the big operators of the district, later retiring and taking up the ministry. He is survived by two sons and three daughters.

H. J. Wheeler died on July 18. He had been with the North East Coal Co., of Paintsville, Ky., for a number of years as chief electrician. In 1917 he opened up (with associates) the Salt Lick Coal Co., on Beaver Creek. Mr. Wheeler had acted in the capacity of mine foreman until July 1 when he was promoted to the position of superintendent of power having charge of all the mechanical and electrical equipment of the Wells-Elkhorn Coal Company.

Coming Meetings

The United Mine Workers will hold a convention at Cleveland, Ohio, beginning Sept. 9.

The Bureau of Mines on Sept. 30 and Oct. 1 will hold a national first-aid and mine-rescue contest at Pittsburgh, Penn.

The National Safety Council will hold its annual meeting Oct. 1 to 4 at Cleveland, Ohio. Secretary, S. J. Williams, Chicago, Ill.

New York Coal Merchants' Association will hold its annual meeting Sept. 11-13 at Alexandria Bay, N. Y. Executive secretary, G. W. F. Woodside, Albany, N. Y.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

National Exposition of Chemical Industries will hold its first annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

The Tennessee Mine Foremen Association, Southern Appalachian Coal Operators' Association, Tennessee Mine Inspectors and the United States Bureau of Mines will hold a miner's field day and first-aid contest at Jellico, Tenn., Aug. 23.

Publications Received

Annual Report of Coal Mines of State of Washington for Year Ending December 31, 1918. James Bagley, State Mine Inspector, Seattle. Unillustrated; pp. 62; 6 x 9 inches.

Thirty-seventh Annual Coal Report of Illinois. Department of Mines and Minerals, Springfield, Ill. For the fiscal year ended June 30, 1918. Illustrated; pp. 306; 6 x 9 inches.

Bibliography of Petroleum and Allied Substances in 1916. By E. H. Burroughs. Bulletin 165. Department of the Interior, Bureau of Mines. Unillustrated; pp. 159; 5⅝ x 9⅛ inches.

Monthly Statement of Coal-Mine Fatalities in the United States. April, 1919. Compiled by Albert H. Fay. Department of the Interior, Bureau of Mines. Unillustrated; pp. 13; 6 x 9⅛ inches.

War Gas Investigations. Bulletin 178-A. Advance chapter from Bulletin 178 War Work of the Bureau of Mines. By Van H. Manning. Department of the Interior, Bureau of Mines. Unillustrated; pp. 39; 5⅞ x 9⅛ inches.

The Determination of Combustible Matter in Silicate and Carbonate Rocks. By A. C. Fieldner, W. A. Selvig and G. B. Taylor. Department of the Interior, Bureau of Mines. Technical Paper 212. Illustrated; pp. 22; 5⅞ x 9⅛ inches.

The Decline and Ultimate Production of Oil Wells, with Notes on the Valuation of Oil Properties. By Carl H. Beal. Department of the Interior, Bureau of Mines. Bulletin 177. Petroleum Technology 51. Illustrated; pp. 215; 5⅞ x 9⅛ inches.

Recent Developments in the Absorption Process for Recovering Gasoline from Natural Gas. By W. P. Dykema. Department of the Interior, Bureau of Mines. Bulletin 176. Petroleum Technology 50. Illustrated; pp. 90; 5⅞ x 9⅛ inches.

Petroleum Investigations and Production of Helium. By Van H. Manning. Department of the Interior, Bureau of Mines. Bulletin 178 C. Advance chapter from Bulletin 178 War Work of the Bureau of Mines. Unillustrated; pp. 87; 5⅞ x 9⅛ inches.

Burning Steam Sizes of Anthracite With or Without Admixture of Soft Coal. Department of the Interior, Bureau of Mines. Technical Paper 220. Reprint of Engineering Bulletin No. 5. Prepared by the United States Fuel Administration in collaboration with the Bureau of Mines. Illustrated; pp. 8; 6 x 9 inches.

Recent Coal and Coke Patents

Furnace. H. Batchelor, Sheridan, Wyo., 1,296,906. Mar. 11, 1919. Filed May 28, 1915. Serial No. 30,980.

Mining Machine. E. O'Toole, Gary, W. Va., 1,283,880. Nov. 5, 1918. Filed Feb. 24, 1913. Serial No. 750,218.

Mechanical Underfeed Stoker. C. Erith, London, England, 1,298,189. Mar. 25, 1919. Filed Jan. 13, 1915. Serial No. 1,907.

Mining Car Coupling. N. Mandabach, Vincennes, Ind., 1,298,238. Mar. 25, 1919. Filed Oct. 7, 1918. Serial No. 257,304.

Skid for Mining Machines. G. Dobson, Palisades, Col., 1,298,304. Mar. 25, 1919. Filed Apr. 30, 1918. Serial No. 231,721.

Safety Stop for Mine Cars. J. Klansnic, Black Diamond, Wash., 1,297,575. Mar. 18, 1919. Filed Jan. 31, 1918. Serial No. 214,618.

Automatically Operated Mine Gate. S. W. Warman, Brounsville, Penn., 1,299,074. Apr. 1, 1919. Filed Aug. 31, 1917. Serial No. 189,179.

Adjustable Clamp for Side Rails in Mines. H. F. Heumann, Marissa, Ill., 1,298,946. Apr. 1, 1919. Filed Dec. 6, 1918. Serial No. 265,580.

Drive Gearing for Mining Machines. J. A. Brantley, Sand Springs, Okla., 1,297,647. Mar. 18, 1919. Filed Feb. 3, 1917. Serial No. 146,414.

Center and Side Dump Car. J. O. Neikirk, assignor to Rodger Ballast Car Co., a corporation of Maine, 1,299,212. Apr. 1, 1919. Filed June 4, 1917. Serial No. 172,637.

Central Station Heating; Its Economic Features, with Reference to Community Service. By John C. White. Technical Paper 191. Department of the Interior, Bureau of Mines. Illustrated; pp., 23; 6 x 9 inches.

Trade Catalogs

Saving 63 Per Cent. of the Drinking Water Expense. Armstrong Cork and Insulation Co., Pittsburgh, Penn. Folder. Pp. 4; 3⅞ x 5⅞ in.; illustrated. Comparison of the old bucket with the new pipe system.

The Scoop Conveyor. Portable Machinery Co., Inc., Passaic, N. J. Circular. Pp. 2; 8½ x 11 in.; illustrated. Compares original conveyor with an imitation which has been put on the market.

Centrifugal Pumps. Dayton-Dowd, Quincy, Ill. Bulletin 240. Pp. 15; 7½ x 10½ in.; illustrated. Contains descriptive matter about the pumps in question, also useful information.

Van Dorn Portable Electric Drills. Van Dorn Electric Tool Co., Cleveland, Ohio. Catalog. Pp. 51; 3⅞ x 8⅜ in.; illustrated. Describes and illustrates the various types of drills made by this company.

The Vulcan Soot Cleaner. The Vulcan Soot Cleaner Co., Du Bois, Penn. Bulletin 541. Pp. 8; 8½ x 10½; illustrated. Illustrates and describes the Vulcan patent diagonal method for cleaning soot from the tubes of boilers.

Portable and Stationary Mine Pumps—Horizontal, Single and Double-Acting. The Deming Co., Salem, Ohio. Bulletin 310. Pp. 23; 6¾ x 9½ in.; illustrated. Describes and illustrates the various types of these forms of mine pumps.

Sullivan Drills. Sullivan Machinery Co., Chicago, Ill. Booklet No. 118. Pp. 32; 3½ x 5½ in.; illustrated. Illustrates and describes Sullivan hammer and rock drills for every kind of rock excavation, in mine, quarry or on public work.

Fifteen Points of "Ironclad-Exide." The Electric Storage Battery Co., Allegheny Ave. and 19th St., Philadelphia, Penn. Booklet. Pp. 4¾ x 7 in.; illustrated. Details of the company's storage battery, its performance and various applications.

Forgings. Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin 1538. P. 18; 8 x 10½ in.; illustrated. Illustrates some of the company's forge and machine shop equipment used in the production of forgings.

Chart Giving Relations Between Power, Shaft Diameter, Torsional Stress and Speed. The Wellman-Seaver-Morgan Co., Cleveland, Ohio. Bulletin No. 22, June, 1919. Pp. 4; 8½ x 11 in.; illustrated. Graphical charts and directions showing method of use.

Electrical Precipitation. The Recovery of Valuable Material from Smoke and Gases. Application Circular 7375. Westinghouse Electric and Manufacturing Co., East Pittsburgh, Penn. Pp. 23; 8½ x 11 in.; illustrated. Discusses suppression of dust and fumes and principles of electrical precipitation. Types of equipment noted.

Industrial News

Tylersville, Penn.—The Canonsburg Gas Coal Co., has a new plant under construction at this place. A 250-ft. shaft mine is expected to furnish an output of 1500 tons daily.

Sandoval—The Chicago Sandoval Coal Co. is installing electric haulage, including two 100-KW, 250-volt generators direct connected to tandem, compound, high-speed engines. Three 6½-ton electric locomotives will be used.

Dunmore, Penn.—The Bonna Coal Co., of this place, is understood to be considering plans for the reconstruction of the coal washery at its local plant. The estimated cost of rebuilding the washery is placed at about $100,000. W. P. Jennings is general manager.

Marion, Ind.—The Marion Machine, Foundry and Supply Co. of this place, has recently purchased 15 acres of land adjoining its present property and is entirely rebuilding and enlarging the old plant at a cost of $100,000. This step has been made necessary in order to cope with the company's rapidly increasing business.

Wheeling, W. Va.—The Williams Improved Stretcher Co. receives frequent orders for quantities of stretchers for use in the United States navy. The standard patented Williams stretcher meets every requirement specified by the navy. Many of the reasons which recommend this type for mine service warrant its use under trying conditions in other fields.

Gassaway, W. Va.—Work is being rushed by the West Virginia Coal and Coke Co. on its new No. 12 colliery near Bower, W. Va., (on the Coal and Coke Ry. in Braxton County), where a tipple is being built. This company is also pushing development work on its No. 8 plant near Norton, W. Va., in the Randolph County field. The vice president and general manager of this company is E. Brennen, of Elkins, W. Va.

Columbus, Ohio—With car shortage developing rapidly in many producing fields of the state, it is rather an anomaly to have 4000 hopper dump cars idle. But such is the case and that number are crowding the sidings in and around Columbus because of a controversy over the price of the cars. The contract for their manufacture was made by the Railroad Administration and now individual roads will not pay the contract price.

Wheeling, W. Va.—Engineers have been making surveys for a large coal-mining plant for the Derrick & Derrick Coal Co., on Fish Creek, Marshall County. An initial outlay of several thousand dollars is planned. This company is composed of Scottdale, Penn., capitalists and it has secured control of 3000 acres of Pittsburgh seam coal on Fish Creek. The tract was formerly owned by A. D. Williams, of Uniontown, Penn., and the Derrick estate.

Welch, W. Va.—Extensive improvements are under way at two plants at the Central Pocahontas Coal Co. near here. Nearly 50 new houses for the miners are being erected at the Caples plant; a new drainage system is being installed and a welfare building erected for the employees. The principal improvement under way at the O'Toole plant is the construction of a fine club house for the use of employees. The general manager of the Central Pocahontas Co., is W. J. O'Toole.

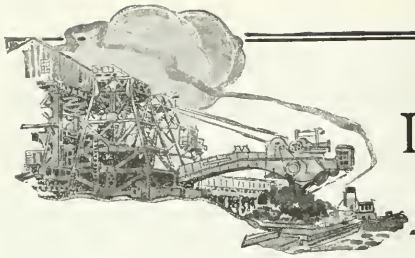
Huntington, W. Va.—The Ohio Valley Car and Mine Machinery Co., of this city, has completed arrangements for the purchase of the plant of the Kyle Smith Aircraft Co. as well as for property adjoining that plant in this city; the company will utilize the plant in the manufacture of mine cars and other mining machinery. The company was reorganized not long ago by E. M. Brown and others; at that time it was the intention of the company to operate its plant in Ironton; since that time the company's plans have been changed.

Birmingham, Ala.—Notes to the amount of $6,000,000 are being offered for sale, proceeds of which will be used for the extensive development and improvement of the properties of the Sloss-Sheffield Steel and Iron Co. The funds thus made available will be employed to complete by-product coke ovens, for building a central power station, the electrification of mines, the acquisition of additional properties and for other general improvements. This company's coal properties are in Walker and Jefferson counties, Birmingham being in the latter county.

Logan, W. Va.—Plans for the early operation of the new plant of the Three-Forks Coal Co. at Lundale are being executed. This is a $600,000-company which was organized by Geo. M. Jones, a prominent operator of the Logan field in association with other well known coal men of that field. Construction work includes the completion of the branch railroad to the plant as well as to the building of 100 cottages for the miners. The company also has under construction a temporary tipple, and is putting up a modern store and office building as well as a club house for the use of employees.

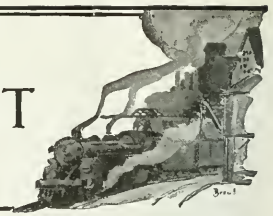
Washington, Penn.—The Lincoln Gas Coal Co., of Pittsburgh, Penn., is developing a large acreage of coal west of this place. Superintendent George Watson of this company announced recently the completion of plans for doubling the capacity of the plant, necessitating the employment of twice the number of men and the construction of about 70 new houses. Work on the new tipple is under way and 15 of the houses are in various stages of construction; the houses can be bought by the employees at cost of construction. This company expects to build a large community amusement house, with a theater to seat 500, and other recreational features.

Louisville, Ky.—The Kentucky & West Virginia Power Co., of Hazard, Ky., with a capital of $6,000,000, by Baily P. Worden, Harry T. Taylor, J. G. Greene and others, has taken over three large power plants in the coal fields of Kentucky and West Virginia. The company is said to be backed by the American Gas and Electric Co., of New York City. The companies taken over include, the Kentucky River Power Co., with offices at Hazard, Ky.; the Tug River Electric Co., of Sprigg, West Virginia, and the Logan County Light and Power Co., of Logan, W. Va. The main offices will be at Philadelphia. The individual companies have been furnishing power for hundreds of mines, the Hazard company alone having 15 mines on central station service. It has been announced that connecting lines will be run between the plants so that in event of a breakdown at one plant the other two may carry the load without interfering with the service. It is also said that lines will be extended into the Elkhorn and other fields, and power furnished to many operators.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Soft Coal Market Still Active—Consumers Show Keen Discrimination When Buying Coal—Better Grades of Soft Coal Up in Price and Hard to Get—Anthracite Situation Well in Hand

THE bituminous market continues active. A noticeable feature of the buying is the keen discrimination that is being shown by consumers who are not covered by contract. Only the better grade coals are wanted, and this in spite of the fact that prices on the quality grades are continually advancing, while the poorer coals are still selling at the price levels that obtained three or four weeks ago.

Spot sales are being shipped with great promptness. While it cannot be said that there is an abundance of coal, there seems nevertheless to be sufficient to meet all requirements, and prices are gradually going to higher levels. The better grades are practically out of the market, and as time goes on consumers will be forced to rely more on the medium to fair grades of fuel, which have also advanced in price.

Reports of car shortages in the mining regions are more numerous. In the Pittsburgh district, for instance, many operations that have plenty of orders on hand have been forced to curtail production for lack of cars in which to ship the product, while in many of the Middle West mines operation was at a standstill for days at a time because cars were not received. Fear is expressed that the car supply the country over will become still poorer as the season advances and the movement of grain begins.

Many inquiries are being received in the United States from representatives of foreign governments that desire coal, and the export business is active. Trouble is being experienced, however, in chartering bottoms.

During the week ended July 26 the production of soft coal totaled 9,990,000 net tons, an increase of 78,000 net tons as compared with the output of the preceding week. The production of bituminous coal is at a lower rate than in 1917 and 1918, the greater falling off in output being reported from the mining districts of the South and Middle West.

Dealers are in a better frame of mind concerning the future in anthracite. Production is steadily increasing, the output for the week ended July 26 being estimated at 1,827,000 net tons. At this rate the situation before long will be well in hand. While winter may find many dealers with orders unfilled, at least every consumer will have some fuel on hand.

Egg and stove coals remain scarce, with chestnut much easier, although no surplus exists. Pea coal is more readily obtainable, but is by no means a drug on the market. The demand for steam coals is more pronounced than it has been. Buckwheat No. 1 is scarce, with rice and barley more plentiful than buckwheat. Consumers are eager to store larger quantities of steam coals, as they have learned that the production of steam sizes has been reduced by the closing down of many washeries which were formerly engaged in the turning out of these sizes. The steam coal market is tightening.

WEEKLY COAL PRODUCTION

The new level of output of bituminous coal to which production jumped the second week in July, after months of extremely low records, was maintained in the week of July 26. Estimates placed the production in that week at 9,990,000 tons, compared with 9,912,000 tons the preceding week. The rate of production has not yet passed that in 1917 and is of course much below that of 1918. The total production of bituminous coal from Jan. 1 to July 26, estimated at 250,478,000 tons, which compared with 334,000,000 tons in the same period last year, represents a decrease of 83,500,000 tons, or 25 per cent. The decrease has been much greater in the Middle West and South than in the East. The percentages of decrease this year, compared with 1918, range from 10 in Virginia to 22 in the Somerset district of Pennsylvania, and 27 in Ohio, in the East, up to 34 in the Middle West and 39 in Alabama. In other words, the industrial demand has been better along the eastern and northern Atlantic coast than in Michigan and the Mississippi and the Missouri Valley territory. And, further, the higher-grade coals from the eastern fields have generally been in better demand than western coals, even in the Middle West markets.

Production of anthracite, which increased in the middle of June in response to a growing demand, from a weekly rate of around 1,700,000 net tons to better than 1,800,000 tons, maintained the rate in the week of July 26. Production in that week is estimated at 1,827,000 net tons, compared with 1,823,000 tons the previous week. Considering only the period from Apr. 1, the beginning of the coal year, production this year is estimated at 28,633,000 net tons, or 4,800,000 tons behind the same period last year. The largest part of this decrease is shown by statistics just available to have been in the fine sizes. Many of the culm-bank washeries that were able to operate last year, when the demand for steam coal was at its height, this year have been closed down and the ouput of steam sizes has declined materially. The actual decrease in domestic sizes is not more than 1,500,000 net tons.

Percentage of full-time operation declined from 67.6 in the week of July 12 to 64.0 the week of July 19. The average of no-market losses was about the same in the two weeks, but losses because of car shortage increased from 2.8 to 7.4, the average for the country the third week of July, this year, being greater than in the corresponding week of 1918.

In the Middle West the situation in Illinois and Indiana has not changed in the last few weeks, but western Kentucky reports increasing demand, and for the week of July 19 a marked increase in car shortage. Demand in the Southwestern States has shown a consistent but slow improvement in the past two months. Car supply has been good, but labor shortage has increased since the first of July. In Washington and the Rocky Mountain States three-quarters full-time operation is being maintained with lack of demand the principal limiting factor.

The situation in Alabama has varied but slightly in the past eight weeks, with about three-fourths full-time operation, limited mainly by lack of demand; the Southern Appalachian district has not been doing so well, but Harlan has averaged nearer 90 per cent. There were marked increases in car shortage in all the eastern Kentucky fields the week of July 19, coincident with better demand. The market for southern Ohio coal though still limited is improving, and car supply is good; in northern and central Ohio demand has taken up the supply now limited by car shortage.

In West Virginia demand and car supply in the smokeless fields as a whole are now better than the average, but in the high-volatile fields in the southern part of the state a greatly improved demand is coupled with a marked lack of cars. Incomplete data from the Fairmont field show about one-half running time with both no market and car shortage sharing in the cause of the losses.

After three weeks of good car supply, western Pennsylvania in the week of July 19 reports loss of time on account of car shortage of more than 7 per cent. In the Somerset, Westmoreland and adjacent districts demand is good but output is limited by increasing car shortage. Central Pennsylvania mines have been averaging about four days a week operation with lack of market accounting for the greater part of the loss.

The output of beehive coke in the week ended July 26 is estimated at 369,900 net tons, an increase of 7 per cent., compared with the previous week, but 41 per cent. below the corresponding week of 1918. Lack of demand is entirely responsible for the low production this year, the curtailment in iron production and the increase in byproduct coke capacity being the causes.

Shipments of lake coal after dropping below last year in the week of July 12, again rose, and the record for the week of July 19—920,184 tons—exceeds the 904,600 tons in the corresponding week of 1918. The total to date is now 11,849,900 tons, about 1,000,000 tons above last year for the same period. From the first of August to the middle of October, 1918, lake shipments were maintained well above 1,000,000 tons a week, 1,200,000 tons hav-

ing been exceeded in eight out of twelve weeks.

A smaller percentage of lake coal, shipped so far this year, is destined for Canada than in 1918. Statistics through June show that 25 per cent. of lake cargo coal moved to Canada in 1918, whereas it 1919 the percentage was 18 per cent. To the end of June, this year, there had been 1,548,000 tons of lake coal shipped to Canada, compared with 1,786,000 tons in 1918.

In the first six months of 1919 shipments of bituminous coal to the Atlantic tidewater ports, including Charleston, were 16,627,000 net tons, a decrease compared with 20,163,000 net tons in 1918, of 3,536,000 tons, or 17.5 per cent. The largest decreases were from the fields reaching tide at Hampton Roads, more than 1,000,000 tons each on the Chesapeake & Ohio and Norfolk & Western, and more than 500,000 tons on the Virginian. Shipments to tide from mines on the Baltimore & Ohio increased about 300,000 tons, and shipments over the Southern Ry. to Charleston nearly trebled.

Although the total tidewater dumpings increased 17.5 per cent., coal destined for New England decreased 42 per cent. in the first half of 1919, compared with 1918. The New England tidewater tonnage from January to June, 1919, was 3,963,000 net tons, compared with 6,865,000 net tons in the same period of 1918. New England coal from Hampton Roads decreased from 4,278,000 net tons in the first half of 1918 to 2,402,000 tons in 1919, a drop of 1,875,000 tons, or 44 per cent.

BUSINESS OPINIONS

Dry Goods Economist — One of the causes of the excellent business conditions in this country, conditions that are reflected in the sustained activity of the demand for textiles and kindred goods, is the remarkable increase in our exports and imports

Marshall Field & Co.—Current wholesale distribution of dry goods was slightly in excess of the corresponding week a year ago. More merchants were in the market compared with the same week of 1916 and all reported excellent business. Orders from road salesmen for both immediate and fall delivery were greater in volume than for the same period last year. Collections are satisfactory.

The American Wool and Cotton Reporter.—Demand for wool continues strong, although for a week or so it has been somewhat spotty. The call is becoming greater for the medium and low wools because the fine wools have become so high and scarce. It is estimated that some 40 per cent. of the new clip has been absorbed. Fleeces are selling at high prices in the Middle West. The talk of a scarcity of cotton seems to be general, but the fact that there are not enough spindles in the world to hasten million bales of cotton of American production in addition to other supplies seems to be worthy of some consideration.

Atlantic Seaboard

BOSTON

Market continues active, although there are signs of reaction. Spot sales being shipped promptly. Higher grades increasingly difficult to get. Prices of medium grades advance only moderately. Buying thus far largely confined to middle houses. Movement light over New York and Philadelphia piers. Hampton Roads coals show little change. Anthracite deliveries slow. Reading fleet tied up. "Independent" coal held for liberal premiums.

Bituminous—The week has disclosed quite an amount of active buying all-rail. Steam-users who have contracts have been making quiet efforts to get "a little more" as insurance against any breakdown in deliveries later, but to this point there has been no broad market for coal "without guaranty as to quality." Quite to the contrary, buyers in New England are insisting upon grades of known value, and the trade does not recall a time when there was so much intelligent discrimination between coals of different origin.

For a few days the market stiffened consistently, but quite naturally. In a situation of this kind, shippers of some of the second-rate coals boosted prices rather more rapidly than current demand would warrant, and at this writing there are signs of a reaction that is expected to be only temporary. For a day or two options were given for only a few hours, and the volume of coal placed must have been fairly large for spot tonnage and as this season. Now, however, particularly on Beech Creek and coals of that character, the figures quoted somewhat over-step what would be considered a fair market price. Certain buyers have ceased making purchases for that reason.

It is a commentary on the state of business when spot sales are shipped with great promptness, as is the case today. Apparently operators are seizing upon advanced prices with great avidity. It also tends to show how relatively few contracts were placed this season on the fair to medium grades from the Cambria and Clearfield districts. Offerings for delivery beyond September are now very few, so much confidence is there in higher prices in the fall.

The best grades from South Fork and other Cambria districts are harder each week to buy, or even to get deliveries on contract. Export and bunker trades are most attractive and, until the spot market all-rail rises to the figures offered to coal ships, the bulk of the free output is certain to go to New York distributors. Demurrage charges at the piers have some bearing, but where bunker coal is being constantly sought the price range is high enough to relieve the shipper of any worry on this score.

This will account for the much improved demand for coals of medium quality. Buyers who must have volume shipments are obliged to be less finicky, so long as the coal is low volatile and does lend itself readily to spontaneous combustion. Grades that sold at first hands for $2.50 per net ton a fortnight ago have lately sold up to $2.85, although the latter does not represent the state of the market in this territory at this writing. Through agencies $3.15@3.25 has been paid for slightly better grades from favorably known operations, but there is no assurance that the same coals will continue to advance in price at the same rate.

On Pocahontas and New River there are apparently no new developments. Prices are still on a $6@6.25 f.o.b. vessel, but no such figure has been realized thus far on shipments to this territory. Factors here are making practically no commitments and are confining themselves to making such deliveries as they can on contract. Receipts have increased the past week, but the dependence of New England upon Hampton Roads this year is as nothing compared with 1917 and 1918. Consumers here are now looking with most anxiety to Central Pennsylvania.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F. o. b. mines, net tons	$2.50@3 00	$2 90@3 60
F. o. b. Philadelphia, gross tons	4.69@5 25	5 10@5 80
F. o. b. New York, gross tons	5.00@5 60	5 40@6 20
Alongside Boston (water coal), gross tons	6.75@7.25	6 95@7 75

Georges Creek is quoted at $3.70 per net ton, f. o. b. mines.

Pocahontas and New River are being quoted at $6@6.25 per gross ton f. o. b. Norfolk and Newport News, Va., in response to export demand. There are practically no sales for coastwise shipment.

Anthracite—Shipments in July to this territory were somewhat larger than during June, although retail dealers throughout New England continue most anxious over the outlook. Deliveries are slow both all-rail and by water, and the sizes in most demand continue extremely hard to get. Pea and buckwheat are in ample supply with only small tonnages being absorbed. From New York, shipments by water have been even more irregular than early in the season, although the city markets have somewhat let up on the demand. The western trade is most insistent, however, and before long it is expected there will be an increased movement in that direction.

One of the disquieting features is the present tie-up of the Reading fleet. Beginning with last week several of the tugs have been laid up at Philadelphia without crews, until at this writing 9 of the 11 tugs upon which New England depends for so large a proportion of anthracite are lying idle pending the settlement of a wage dispute. There were indications the fleet would resume operations the latter part of last week, but the controversy is still unsettled. It will mean a setback of at least ten days or two weeks in the movement of coal to New England.

Premiums for coal originating with "independent" operators are being exacted up to $1.50@1.75 over the company circular. Even at these prices there is difficulty getting deliveries, and there are no signs of an easier demand.

NEW YORK

Better feeling exists in the anthracite market. Coal moves easier, but there is no let-up in demand. New York tidewater expects larger shipments in September. Much heard of high premiums, but the reported average is much lower. The buckwheats in good demand. Bituminous is active and prices stronger. Consumers storking up. The best grades short.

Anthracite—There is a better tone to the anthracite market. Dealers are in a better frame of mind regarding the future, and while there has been no let-up in demand for coal, the situation appears to be more settled. Coal is moving faster and retail dealers appear to be better satisfied.

The trade here is inactive. Dealers are well booked ahead and, while receiving a goodly portion of their standing orders from the larger companies, are in the field for whatever Independent product they can obtain. The latter operators are well sold ahead, and while one hears of premiums ranging from 50c. to $1.50 per ton for domestic coals, according to place of destination, it was stated that the average premium would be around 75c. As a rule it was stated that even that was about 25c. more than New York dealers were paying.

Egg and stove coals remain scarce, but chestnut is much easier, although there is no surplus. Pea coal is not so tight as a week ago, but it is by no means a drug on the market.

The market for the steam coals is stronger. Buckwheat No. 1 is by no means as free as it has been and shippers say quotations are not so easy. Consumers are in the mood for storing large quantities in anticipation of a shortage and higher prices, inasmuch as the production of these coals has been reduced by the non-operation of the washeries. Rice and barley are more plentiful than buckwheat, but there is no desire to move them by price concessions.

Quotations for company white ash coals, per gross ton at the mines f.o.b. New York tidewater lower ports, during August, follow:

	Mine	Tidewater
Broken	$5 95	$7.80
Egg	6.25	8.10
Stove	6.50	8.35
Chestnut	6.60	8.45
Pea	5.20	6.95
Buckwheat	3.40	5.15
Rice	2.75	4 50
Barley	2.25	4 00

At the conclusion of the hearings before the Interstate Commerce Commission of the complaint of the Wholesale Coal Trade Association of New York against the United States Railroad Administration, held at the Waldorf-Astoria Hotel, it was felt that a strong case had been presented by the complainant. The hearings were not concluded until July 31, having been going on for ten days. Many witnesses were heard on both sides. Commissioner McChord, who heard the testimony the last few days of the hearings, gave both sides until Oct. 1 to submit briefs. An early decision is looked for.

Bituminous—A very active market exists here. While it cannot be said there is an abundance of coal at the local piers, there is plenty to meet all requirements and prices are gradually going to higher levels. Buyers are continually in the market and the consumer who failed to take advantage of the advice given in the early spring to sign a contract is not finding it as easy to obtain the kind of coal he wants as he thought it would be.

The better grades are practically out of the market, and the demand has fallen on the medium and fair grades, the advance in prices being noticeable in the quotations for those coals.

The improvement has been reflected in all phases of the industry. Demand has increased all around and large consumers have been able to store large tonnages in their factory yards. One drawback, however, is the lack of cars. The railroads are not able to keep the mines supplied with cars, and fear is expressed that the supply will be poorer as the season advances and the movement of grain begins.

Handlers of bunker coals report increased business now that the marine labor troubles are over, the greatest difficulty being to obtain the quick loading and unloading of barges.

The export situation is active, although shippers have some trouble in chartering bottoms. Many inquiries are being received from representatives of foreign governments as well as from consumers, all

of whom are said to be willing to pay good prices provided they can be assured of prompt deliveries.

With contract coals moving in good volume the best grades are easily absorbed and spot buyers are forced to take the other grades.

Prices quoted for the various tidewater pools show an increase, the quotations ranging about as follows:

Pools 1 and 71	$5.60 to $5.75
Pool 9	5.50 to 5.60
Pool 10	5.15 to 5.35
Pool 11	4.75 to 4.85
Pool 18	

There were many changes in the current quotations for the various grades of coal at the mines. They range as follows:

	Spot
South Fork (best)	$3.10—$3.25
Cambria (best)	2.95— 3.10
Cambria (ordinary)	2.65— 2.90
Clearfield (best)	2.95— 3.10
Clearfield (ordinary)	2.65— 2.90
Reynoldsville	2.70— 2.90
Quemahoning	3.10— 3.25
Somerset (best)	2.95— 3.10
Somerset (poor)	2.65— 2.75
Western Maryland	2.50— 2.75
Fairmont	2.10— 2.35
Latrobe	2.60— 2.65
Greensburg	2.50— 2.60
Westmoreland, ¾ in	2.75— 2.90
Westmoreland run-of-mine	2.50— 2.60

PHILADELPHIA

Anthracite prices go up. Individual increases large, ranging from 45c. to $1.60. Company schedule adheres to fixed advance. Retail prices likely to respond accordingly. Public criticism imminent. Egg, stove and nut all short. Pea plentiful. With relatively low price this size is likely to move better. Buckwheat slightly stronger. Other steam coal quiet. Bituminous prices up. Car shortage the cause. Even higher prices probable.

Anthracite—The trade was stirred this week by the announcement of heavy price increases by all individual shippers. The announcement by one concern, which has usually received a premium for its coal, was that August prices would be 45c. above company circular. It had previously intimated that the monthly increase would be 15c. per month instead of 10c. as practiced by company shippers. When this announcement was quickly followed by an increase of 75c. above company circular by one of the other independents the trade realized that the increases would be general. At this time there is hardly a company that has not made an advance of at least 45c.

It had been taken for granted ever since last month when some of the smaller shippers began adding to their prices that by the time winter prices became effective all companies would reach the 75c. differential as in effect under the Fuel Administration and which the officials decreed was a proper one. Whether it is the intention of the shippers to even go beyond this price is now a question. The explanation given for the increase is that the companies claim they have been operating at a loss since the first of the year and there was nothing else for them to do but to increase the mine price. Among smaller producers and some brokers the increases have been from $1.25 to $1.60 a ton on prepared sizes. Almost all of the individual companies are holding pea at the company price, but there is no doubt that with the coming of real coal-burning weather pea will also be proportionately increased.

Despite the increase in prices the retailers have not shown the least hesitancy to accept shipments. They need coal to fill the orders on their books and more than one shipper received inquiries if they could make additional shipments to new customers at the increased prices.

The local market is almost bare of the large domestic sizes. Of pea there is still a plenitude. Egg and stove have in no way eased up and chestnut is fast approaching the same class. Because of wet weather the previous week some dealers seemed to have been accumulating a stock, but this was only because the rainy weather had held back deliveries. Little comfort is obtained by them from the shipping offices, when they are informed that the outside markets must be given the usual summer attention before it is possible to divert coal in this direction. With the natural increase in the larger family sizes the dealers are expecting a much livelier demand for pea coal and it would not be at all surprising to see the fairly large stocks of this begin to dwindle before the actual coal-burning weather arrives.

There is no particular improvement in the steam trade, although there is a slight tendency toward an improved demand for buckwheat, especially from the concerns accustomed to stock heavily on this size. This is also explained by the growing demand for bituminous coal and the tendency to tightness now being displayed in that trade. While a little more rice is being taken this size has not improved to the extent of cutting down appreciably the amount going into storage. Barley continues inactive.

With the usual 10c. increase in company prices the quotations per gross ton at mines for line and tide shipments are as follows:

	Line	Tide		Line	Tide
Broken	$5 95	$7.80	Buckwheat	$3 40	$4.45
Egg	6 25	8.10	Rice	2.75	3.65
Stove	6.50	8 35	Boiler	2 50	3.50
Nut	6.60	8 45	Barley	2.25	3.15
Pea	5.20	6.80			

Bituminous—In the soft coal trade there have also been quite substantial price increases. The advances were greatest in the Fairmont region, the increase in some instances being as much as 40c., although the average was around 20c. The higher prices asked have been due principally to the bad car supply, this being such as to greatly curtail production in the mining regions. It would seem that there are plenty of cars, but owing to the condition of much of the equipment many hundreds of cars are not in service.

On account of the car shortage high-grade coals were almost entirely out of the market and even medium grades were hard to get. Encouraged by the better prices a number of operations idle for several months are again coming into the market with their offering of tonnage, although they are finding it difficult to man their works.

There is a greatly increased tendency on the part of buyers to take in fuel, as they are finally becoming convinced of the need of a stock of coal on hand to meet the difficulties of transportation later in the year. As it is only the fact that coal that would ordinarily be handled at tide has gone into the line trade has prevented a greater scarcity locally. Owing to the difficulty with marine workers the tide business continues unsatisfactory in many respects.

The prices per net ton in effect lately are as follows:

Georges Creek Big Vein	$3.15 @ $3.30
South Fork Miller Vein	3.15 @ 3.30
Clearfield (ordinary)	2.90 @ 3.00
Somerset (ordinary)	2.80 @ 2 95
Fairmont lump	2.70 @ 2 80
Fairmont mine-run	2.50 @ 2 60
Fairmont slack	2.00 @ 2.15
Fairmont lump (ordinary)	2.40 @ 2.50
Fairmont mine-run (ordinary)	2.15 @ 2.25
Fairmont slack (ordinary)	2.00 @ 2.15

BALTIMORE

Strike ended, embargo lifted, and both foreign and domestic demand strong. Some large consumers preparing to stock. Anthracite schedules advanced for August.

Bituminous—With the shipping strike at an end, the embargo against shipments to the piers here lifted for any one who has a bottom waiting or some ready disposal means at hand, and with the export and local demands both active, there is now hope that an early clearing of the excess coal here will be recorded. The freight jam at eastern ports caused serious delay in the arrival of empties in the mining districts that ship through the Cumberland gateway, and the recent past saw the usual movement of some 1000 loaded cars a day reduced to less than a 600 per day average. Some mining regions complained that they did not have a 30 per cent. supply, and quite a few mines had no cars at all on some days of the past week.

The coal at tide and the preferred coal coming through enabled another good movement on export the past week, as nearly 50,000 tons was loaded on cargo and bunker foreign account. The total loading for the month of July will run approximately 250,000 tons, the highest total in the history of the trade here except for the months of June and July of 1915, which was the banner coal exporting year of this port.

The local situation continues pretty brisk, although there is some little let up in demand from smaller manufacturers who have been storing coal. Some of the larger consumers are now beginning to look about for storage coal, however, and a well sustained market seems likely, although some dealers believe that a slump may come in the early fall because the Lakes seem destined to close some weeks ahead of the usual time since that region is getting its stocks unusually early this year.

Prices here are well maintained, low grade coals selling at from $2.25 to $2.50, with medium to good coals all the way from $2.75 to $3.25 mine basis to the trade. Some weakness was shown in better grade gas coals because of the jam here at tide, and there were offerings off the usual run around $2.50.

Anthracite—An August schedule of prices has been set by the Baltimore Coal Exchange for this territory—unless a freight rate increase is ordered during the month; in which case the jump will be added to the retail prices announced. It was decided to put 25 cents a ton on egg, stove and chestnut sizes of hard white ash and Lykens Valley. The price on broken, pea and buckwheat was left unchanged. It was also decided not to advance Sunbury prices, which thus become the same as for hard white ash. The new schedule is as follows:

Hard white ash—Broken per long ton, $11.50; egg, $12; stove, $12.25; chestnut, $12.35; pea coal, $10.25; buckwheat, $8.20. Sunbury, egg, $12; stove, $12.25; chestnut, $12.35. Lykens Valley, egg, $12.70; stove, $13.10; chestnut, $13.10.

Lake Markets

PITTSBURGH

No heavy emigration. Car shortages restricting production.

Conditions in the Pittsburgh district coal trade continue in a state of flux. On the one hand there is observed a noteworthy absence of that emigration of labor to foreign countries that was not only predicted but weeks ago was claimed to be actually occurring. On the other hand, car shortages are more numerous and in many parts of the district are actually curtailing the production of coal companies that are well supplied with orders. Again, there is more discrimination as to character of coal, whereby the spread between gas coal and steam coal has been widening, the former advancing while the latter is at about the same prices as for three or four weeks past.

The value of coal is continually increasing, particularly in the case of gas coal. This is reflected not only by the spot market but by the monthly settlements made for contracts that are not a flat price. One important gas coal contract with a steel interest was settled for July at 5c. over June, while the August settlement of course with the full consent of the consumer, is at 25c. over July, carrying the price to a point above $2.35.

The market is separating widely the low sulphur, low phosphorus, high volatile, long-flame Youghiogheny gas coal from the steam coals of the Pittsburgh district, there being now quite a divergence in price. Coal operators refer to this as one of the results of the war, steel producers finding that it is greatly to their advantage to use this coal not simply for producer work as formerly but also in heating furnaces. During the war the steel producers were forced to use much coal that was unsuitable and thus they learned what a wide range there is in coals, merely from different parts of the Pittsburgh district.

We quote gas coal higher than a week ago and steam coal stiffer but not quotably higher, prices for spot and nearby shipment being: Steam slack, $1.50@1.70; gas slack, $2@2.30; steam mine-run, $2.25@2.40; gas mine-run, $2.50@2.70; ¾ in. gas, $2.80@3, per net ton at mine, Pittsburgh district.

TORONTO

Great shortage of stove coal. Teamster strike interferes with deliveries. Transportation slow. Demand for bituminous begins to show improvement.

The outstanding feature of the coal market continues to be the shortage of stove coal, the great bulk of domestic orders being for this grade. Dealers are generally refusing orders or accepting them only at the price prevailing at the time of delivery. Nut, egg and pea coal are obtainable, but some of the yards are badly handicapped in deliveries by the strike of teamsters. Transportation continues slow, and not much improvement is anticipated until the close of navigation diverts the supply from the upper lake ports. Many of the industrial plants which have been closed on account of the strike in the metal trades are resuming operations, and bituminous coal, which has been little in demand for

some time, is beginning to move more freely.

Quotations for short tons are as follows:

Anthracite, egg, stove, nut and grate	$11.50
Pea	10 00
Bituminous steam	8.00
Slack	7.00
Domestic lump	10.00
Cannel	11.50
Wholesale f. o. b. cars at destination:	
Three-quarter lump	6.10
Slack	5.00

BUFFALO

Quiet bituminous market. Slow improvement with prices firmer. Gas coal strong. Jobbers find caution necessary. Cars not plentiful. Anthracite in usual heavy demand.

Bituminous—The situation improves slowly. Shippers find consumers are eager as ever to make contracts, but do not find operators willing to sell much coal on time. They are well supplied with spot coal and can usually find cars enough to move it in, though the supply is not as good as it was and is apparently running down. The effort to push coal into market is not so great as it was, for the idea of an early boom has been dropped for the most part. There is a fair market and that is all that is now looked for.

The outlook is for a slow stiffening of the market all along the line, so that by fall the movement will be good and profits adequate. As it is, neither the operator nor the jobber is getting what he is entitled to. The greater degree of satisfaction reported is really because this period is following one in which little or no profit was made by anyone. Improvement is general, but it is not as great as it was expected to be. The best of the situation is that the better market is ahead. Everybody is confident of that.

Bituminous prices are firmer from week to week, but the change is slight. Quotations are as follows: Allegheny Valley sizes, $4.45; Pittsburgh and No. 8 lump, $4.80; same three-quarter, $4.65; mine run, $4.20; all slack, $3.70; Pennsylvania smokeless, $4.60; smithing, $5.70, all per net ton, f.o.b., Buffalo.

Anthracite—The situation does not change much. People study the reports of mining and find little that looks like relief from that direction. The winter shortage seems to be a certainty, unless the consumption has fallen off materially. That, with a mild winter, would help the consumer, but neither can be depended upon. Nobody knows what shape the consumer is in for as a rule he is taking all the coal he can get and maybe is hoarding it as he was two years ago. There is no fuel administration to look into the situation now. Shippers are piecing out their supply as well as they can, giving nobody all that is asked and so are trying to make the best of it.

An effort is making to induce anthracite consumers to buy coke, which is being offered at $6.60 net f.o.b. here and ought to look attractive at that price, but it has not sold actively yet.

CLEVELAND

Steam-coal demand has come out in greatly increased volume in the last 10 days. Mine operations appear to have been increased about proportionately, despite the labor and car shortage. Prices on practically every grade have been advanced slightly. Domestic coal demand continues in excess of normal for this time of year.

Bituminous—The great wave of buying which has been sweeping over the East, according to operators here, has increased by about 15 per cent. the demand for steam coal. An evident desire to stock is being expressed by almost every consumer. Some who have been refusing to buy other than from hand to mouth for the past six months have experienced a change of heart. Steam-coal demand in northern Ohio has been increasing consistently for some time, and now is not far below the normal of pre-war years.

Southern and eastern Ohio mines continue to be hampered by car shortage, which still appears in spells. A full supply one day is likely to be followed by one of 20 per cent. the next. But with orders rushing in the mines appear to be rising to the occasion. The noticeable slowing down in requirements for the lake trade has released a sizable tonnage each week for northern Ohio. Labor which left the mine regions early in the year is now almost all back. Offsetting this to an extent is the exodus of foreign labor to Europe.

Pocahontas and Anthracite—Retail dealers still could dispose of 20 per cent. more than they are receiving of both grades. The very continues one not of slack demand but of slack shipments. The way consumers are buying, winter will find them just about 100 per cent. stocked. Pocahontas prices remain stationary, but the four anthracite grades quoted have been pushed up. Some dealers are threatening to increase Pocahontas prices soon.

Lake Trade—Bituminous coal shipments to the head of the Great Lakes are scarcely able to top the 850,000-ton mark these weeks, due primarily to the shortage of cars. More coal is now coming forward, proportionately, from the No. 8 than from the Pittsburgh district. At the rate shipments are falling off—they are about 200,000 tons a week under last season's movement—another six or seven weeks will see 1919's total behind 1918's. Last year coal just began to move at this time, while shipments this season will show a tendency to drop as the season wears on. Some of the larger freighters must go to several docks in order to get a full cargo, and much time is being lost at the lower end of the route.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg	$11.15 to $11.25
Chestnut	11.65 to 11.75
Grate	11.45 to 11.55
Stove	11.55 to 11.65
Pocahontas:	
Forked	9.50
Lump	8.50 to 8.75
Mine-run	7.50
Domestic Bituminous:	
West Virginia splint	7.80 to 8.10
No. 8 Pittsburgh	6.30 to 6.65
Massillon lump	7.50 to 7.70
Steam Coal:	
No. 6 slack	4.35 to 4.55
No. 8 slack	4.90 to 5.10
Youghiogheny slack	4.95 to 5.25
No. 8 ¼-in.	5.60 to 5.75
No. 6 mine-run	4.70 to 4.80
No. 8 mine-run	5.10 to 5.20

DETROIT

Sales of steam and domestic sizes of bituminous are of small amount and more or less irregular.

Bituminous—Buyers are not evincing the disposition to stock up that the general outlook in the coal trade would seem to justify, according to Detroit wholesalers and jobbers. The orders placed are described as of small proportions and rather irregular, suggesting a tendency to avoid purchases until necessity arises for renewal of supplies. This is particularly applicable to a considerable proportion of the steam-coal trade.

Only a small amount of coal is to be found on tracks in Detroit, as the bulk of the shipments now are being made direct to consumers to avoid the risk attending operation of high demurrage charges. Jobbers say it is difficult to find coal around town that can be turned over to customers seeking immediate delivery.

On a net ton basis at the mine, Hocking is offered at $2.75 for domestic lump, $2 for mine run, and about $1.50 for slack Pittsburgh No. 8, three-quarter lump is selling around $2.50, mine run at $2 and slack at $1.75. West Virginia 4-in. lump is quoted at $3.25 to $3.50, 2-in. lump at $3, mine run at $2.25 to $2.50 and slack at about $1.85. Smokeless is scarce, mine run of that description selling for $2.75 to $3.

Anthracite—While some orders for anthracite are coming to retailers, the amount of business is of smaller size than the prospect of a shortage in supply would warrant. Dealers report shipments are delayed and that there is considerable lack of promptness in filling orders by producers.

Lake Trade—Less coal is being moved over the lake routes than in June and car shortage is curtailing shipments, particularly from the Pittsburgh region. Cargoes are fewer than the vessels offered for loading.

COLUMBUS

Domestic demand is increasing rather rapidly as dealers are stocking up for the rush of domestic business. This is the best feature of the trade as there is no perceptible increase in steam demand. Railroads are taking a larger tonnage, indicating a better freight movement. The lake trade is steady.

There is a better domestic demand from all producing sections in Ohio. This is due largely to increased orders from retailers, who are stocking up for the rush which is expected some time in August. In fact there is quite an appreciable increase in domestic business reported from all sections of the state. The campaign, fostered by the National Coal Association, urging the public to lay in its coal supply is bearing fruit and as a result all producing sections have been benefited.

Retail stocks are not large although there is a general movement to increase them. Orders are being placed not only for the so called fancy fuels but also for Hocking, Crooksville and Pomeroy grades. Pocahontas is in good demand and prices range high. Smokeless is also moving well and splints are selling rapidly. In fact there are no domestic sizes that are a drag on the market as was the case several months ago. Good preparation is required but there is generally a market for all lump produced.

The steam trade does not show the strength that has developed in domestic sizes. Screenings are still a drug on the market and some extremely low prices are reported. Mine-run is not as strong as it might be under the circumstances. In fact the steam trade does not share the strength of domestic and there is little in the immediate future to encourage producers. While reserve stocks are not large in any section, still there is a disposition on the part of purchasing agents to wait. Some contracts have been made recently and prices show a distinctly higher tendency. But nevertheless there is a good deal of cheaper coal that can be had on the open market and this has the effect of depressing the entire trade.

The lake trade is rather active, considering conditions in the upper lake region. A considerable tonnage is moving from Ohio and West Virginia mines to the Northwest. Vessels are plentiful and the movement off the docks in the upper lake ports is good. Vessel rates and prices are unchanged from early in the season.

CINCINNATI

Each week brings about a better demand from domestic consumers, with all other lines continuing to show improvement. No particular change in prices is noted. Local dealers regard general conditions as satisfactory.

The demand for domestic coal has been quickened to a very perceptible extent within the past week especially, and is reflected in heavier buying by the retailers, who are insisting that there be no delay in shipments. The increased demand for domestic coal, especially of the better grades, is attributed to the nation-wide advertising campaign of the National Coal Association and also the local dealers who are using the daily press more liberally than in the past. Several local dealers are advertising smokeless coal for all uses, with prompt deliveries.

Most of the local dealers are confident that the warnings sent broadcast about the possibilities of a coal shortage have been heeded in all sections, and that there need be no cause for worry over any serious consequences such as were experienced in the winter of 1917-1918. Coal men read with interest the reports of the heavy demand for coal in the West Virginia districts, where mines are kept busy in an endeavor to meet requirements, and were relieved to hear that there will be no serious delay in shipping coal from the mines, having been assured that the car shortage that has existed for several weeks past soon will be relieved.

LOUISVILLE

Steam demand showing some steady improvement, with domestic coal in strong demand at high prices. Prospects for steady advance in coal prices. Car shortage becoming serious and causing considerable uneasiness.

The general demand for steam coal is showing steady improvement, shipments into the South going ahead nicely, while the lake region and Northwest shipments continue good. Retailers are buying all the good domestic coal that is offered, while mines in many instances are not offering any block coal at less than $4 a ton for good eastern Kentucky grades except on regular accounts, where the price is around $3.75. However, domestic coal is slightly easier to secure due to better demand for steam, but car supply is interfering with all deliveries.

It is conceded that from now until after the first of the year the outlook is for continual car shortage. Operators south of the Ohio River are pulling wires in Washington with hopes of some improvement, but according to figures of traffic experts the eastern Kentucky mines in the Harlan, Hazard and Southern Appalachian districts are not getting much over a 50 per cent. supply.

BIRMINGHAM

Fair demand for best grades of steam coal, the poorer quality moving slowly. Lump and nut maintain strong position. Car and labor shortage hindering factor in operations.

There is a fair demand for the better grades of steam fuel in this market, but the lower grades are experiencing a slack demand, and little tonnage is being disposed of outside contract requirements, the major portion going to the railroads. Railroad contracts have about all been disposed of except the Central of Georgia and A. B. & A., which are still negotiating for fuel. Spot business is confined to small tonnage. Prices range from $2.45 for Big Seam and similar grades of mine-run to $3.86 for Cahaba prepared sizes.

Domestic continues strong with prices ranging from $3.50 to $5.25 and $5.50 for lump and nut sizes. Dealers are accumulating stocks very slowly, due to the production being below normal at the mines which are operating.

Shortage of equipment cut the production in this field last week, mines on the L. & N. losing much time on this account, and there was also a lack of adequate supply on the Southern Ry. lines. Owing to the fact that consumers cannot much longer stay out of the market, it is predicted in coal circles that there will be a very strong buying movement in the near future, to which an ever-increasing car shortage and also insufficient labor supply will add great difficulty in supplying. Under present operating conditions the mines cannot care for anything like a normal demand for fuel. Production for the week ending July 19 totaled 243,875 tons as reported to the Coal Operators Association.

Coke

CONNELLSVILLE

Spot furnace coke easier than foundry. Little difficulty in car supply. Increased production from furnace ovens, merchant production being unchanged.

Spot coke is easier as to furnace grade and stiffer as to foundry grade. The minimum price that can be done on foundry coke is up 25c., while best brands are held at the same level as formerly. The easiness in spot furnace coke is represented by a larger supply available rather than by offerings at lower prices. Quite a large tonnage of coke, running into hundreds of carloads, has accumulated on track, in face of there being no demand for spot or prompt or spot shipment. Doubtless the furnaces ought to accumulate stocks against probable interruptions in service next winter, but it is probable that many have already done so. Others are probably waiting for bargains, but they are not seeking bargains by making bids, except in one or two instances in which the furnace intimates it would buy some coke for stocking at $3.60 or $3.75, the regular asking price being $4.

Coke operators are experiencing little difficulty in the matter of car supply, shipments being held down more by lack of shipping instructions for loaded cars than by lack of empties, but prospects are rather poor for the operators receiving large supplies of coal cars should the coal market prove able to absorb much Connellsville coal. Box cars for loading foundry coke are almost a rarity, and even the old-line operators are shipping a great deal of foundry coke not simply in open top cars but in hoppers, gondolas being scarce likewise. Foundry coke is in good demand, and brands formerly available at $4.75 can no longer be had at that figure, while makers of favorite brands who were quoting $5.25 and $5.50 are still selling at those prices. The market is quotable as follows: Spot and prompt furnace, $4; contract, $4.25@4.50; spot and prompt foundry, $5@5.50; contract, $5@5.50, per net ton at ovens.

The *Courier* reports production in the Connellsville and Lower Connellsville region in the week ended July 26 at 190,025 tons, an increase of 25,805 tons on the part of the furnace ovens, merchant production being unchanged.

Buffalo—The coke trade is firm with prospect of further improvement indicated by liberal sales of iron ore lately, which will also keep the lake fleet active. The local furnaces mostly use byproduct coke, made in this vicinity. The prices are regulated by beehive coke at $7.60 for 72-hr. Connellsville foundry, $7.25 for 48-hr. furnace and $7 for off trade, per net ton f.o.b. Buffalo.

Middle West

MILWAUKEE

Coal market dull and movement slow. Stocks piling up. Anthracite, soft coal and coke advanced in price.

The first of August witnessed the customary monthly advance of 10c. per ton in anthracite, with the exception of buckwheat, the price of which remains the same as was fixed at the opening of the season. All soft coal was marked up 25c. per ton and coke 50c. The cost of carrying in coal from trom truck to bins was made 75c. per ton, or an advance of 25c. The market continues dull, with a slow outward movement. Docks are becoming well stocked up. Receipts by lake up to this time aggregate 396,750 tons of anthracite and 1,613,177 tons of soft coal, a gain over the same period last year of 125,734 tons of the former and 256,628 tons of the latter.

ST. LOUIS

The local condition is precarious. No steam market. No cars, poor movement and few men. Domestic demands far exceed supply.

The local situation is gradually becoming the most serious that has confronted St. Louis since the early days of the Fuel Administration. For the past few weeks the situation in the Carterville field has been bad, and as this continued to grow worse it began to affect the other fields, with the result that the Standard field today is in as bad a shape as it could possibly be. Up to the present the supply of domestic coal has been equal to the demand, but this cannot continue for long unless conditions in the operating end change radically shortly.

In the Carterville field of Williamson and Franklin Counties the screening situation is beyond the operators. There is no apparent remedy for the present trouble that can be made effective at this time. Mines that can pile screenings on the ground have done so, and the railroads are now ruling that unless all coal is billed out no cars will be furnished for work the following day.

The cutting of prices on the steam sizes apparently has had little effect in moving them, and the steam market is at a standstill, with many mines idle because they cannot move these sizes. The mines that can move the steam sizes are handicapped on account of lack of equipment. The mines that have been working are beginning to lose men who are going back to better places in the mines that are now opening up again after many months' suspension, and the condition is an unsatisfactory one from every angle.

Similar conditions prevail in the Du Quoin field, but prices there are not being maintained. The car situation there is extremely bad.

In the Mt. Olive field conditions seem to be better than in any of the other fields in Illinois. There is better working time, car supply is better, and for some unknown reason the steam sizes from this district seem to move more readily than from the other fields. A great deal of this tonnage moves to Kansas City, Omaha and Chicago. The railroad tonnage still keeps up from this district and in a general way conditions are quite satisfactory.

In the Standard field the car supply has been the source of the greatest worry the past week. When a mine did succeed in cleaning up the steam sizes, it would have to remain idle for two or three days before it got any more equipment. Some of the mines have been idle for a week because they cannot move the screenings, and some mines have gone to loading mine-run for the railroads rather than separate their coal. This has caused a decreased tonnage of domestic sizes, and if this is going to continue when the demand for Standard gets good, as it will a little later, then the problem will be a hard one to solve.

The market for Standard screenings is practically nothing at the present time. As the demand for lump continues to grow, the demand for screenings seems to decrease. The race riots and the numerous strikes in Chicago have shut off entirely a good supply of Standard screenings, with the result that the market went down to as low as 90c., and for a day or two no domestic sizes were offered and those that were offered did not seem to increase much in price. The operator in this field does not know what is ahead of him, and it is a case of where it is impossible to look ahead or to anticipate anything.

Locally, the domestic demand for coal is good, especially on Carterville coal. The Mt. Olive tonnage is increasing, but up to the present there is no unusual demand for Standard. This will come a little later.

The supply of anthracite is limited, with little coming in and no smokeless at all. A little Arkansas has been booked, but up to the present has not moved. The local supply of coke, which has been plentiful, is rapidly decreasing, it being shipped west and northwest.

The country demand is good for higher grade coals for domestic purposes. There is no steam demand at all.

The retail price on coal advanced 25c. per ton on the better grades. The circular price for August, sidewalk delivery, is: Carterville, $6.25; Mt. Olive, $5.50; Standard, $5; Pennsylvania egg and grate, $12.75; stove and chestnut, $13; smokeless lump and egg, $19.75; gashouse coke, $8; byproduct coke, $9.75.

The present prevailing prices are, f.o.b. mine:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$2.85*@3.05	$2.55	$2.25@2.50
3x6 egg	2.85*@3.05	2.55	2.25@2.50
2x3 nut	2.85*@3.05	2.55	...
1¼x2 nut	2.85*@3.05	...	...
Mine-run	2.10*@2.35	2.35	1.60@1.70
Screenings	1.50*@2.20	2.05	.90@1.00
2x6 egg	...	...	1.90@2.00
2-in. lump	...	...	1.90@2.00

* Indicates prices on Independent coal.

Williamson-Franklin County rate to St. Louis is $1.07½; other rates, $0.92½.

Coal and Coke Securities

New York Stock Exchange Closing Quotations Aug. 4, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burna Brothers, Com	(BB)	135	145
Burns Brothers, Pfd	(BB)	110	115
Central Coak & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	40	47
Colorado Fuel & Iron, Pfd	(CF)	....	125
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	38	39
Elk Horn Coal, Pfd	(EH)	....	47
Island Creek Coal, Com	(ICR)	39	....
Island Creek Coal, Pfd	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	63	....
New Central Coal of West Va	(NCC)	5	....
Pittsburgh Coal, Com	(PC)	69	70
Pittsburgh Coal, Pfd	(PC)	93	96
Pond Creek Coal	(PD)	19¾	19½
Virginia Iron, Coal & Coke	(VK)	62	65

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	96¾	....
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	75¾	....
Colorado Fuel & Iron, Gen. 5s, 1943	89¾	89½
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	77¾	80¾
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	88
Jefferson & Clearfield Coal & Iron, Sec. Mort, 5s, 1926	96	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99¾	100
Lehigh Valley Coal, Gtd. 1st. Red. to 4½, 1913	77¾	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F., 5s, 1928	80¾	....
Pocahontas Coal & Coke, Joint 4s, 1941	83	84
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	83¾	87
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	93	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	....	80¾
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	89	91
Utah Fuel, 1st Sinking Fund 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	84	85½

COAL AGE

Volume 16 New York, August 14, 1919 Number 7

Worker Against Worker

By R. Dawson Hall

WELCOME indeed are all tendencies toward solidarity and brotherhood in the labor unions, in the trades and between nations. Yet it must be remembered that there is a natural antagonism which arises out of the fact that whatever one man gets, another has to do without. Out of the fund of things produced every producer must look for a reward for his labors. If one worker takes two awards, others must go short; for making more coupons will not add to the booty to be divided.

When, therefore, a labor union decides it wants an increase in wages, it must expect that increase to come out of the wages of other workingmen. The union does not help labor as a whole by making its demand. It is merely taking from other workingmen a higher rate of compensation than its services have hitherto commanded. It is raising the price of the labor of its members at the expense of everyone who buys what is produced by that labor.

Solidarity is shown, therefore, not by large demands, but by a just appraisement of the worth of one's labor. If one class of workmen with an increase in cost of living of about 50 per cent. asks for a 200 per cent. increase in wages, it is trying to profiteer from other workingmen to the extent of 150 per cent. If the increase comes to an individual by the ordinary process of competition, he may be well justified in taking it, believing that he would not get it if he were not entitled thereto; but if it comes as the result of combination and violence, he is taking an unfair advantage of other workers.

On April 1, 1914, the Indiana "bituminous" inside day laborers received $2.84 per day of eight hours. The outside day laborers received $2.24. Under the terms of the Washington Agreement, November 1, 1917, these day laborers were awarded $5 and $4.35 per day of eight hours respectively, an increase of about 76 per cent. to the inside men and 94 per cent. to the outside men above the scale of 1914.

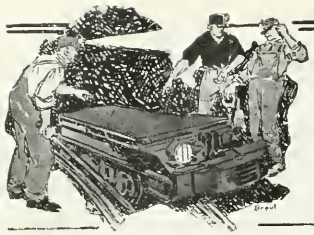
Recently these Indiana mine workers met and demanded a $7 per day minimum with a six-hour day. This would be an increase in wage to the inside day laborer of 40 per cent. and to the outside day laborer of 61 per cent. per day on the wage of November 1, 1917, and increases of 146 and 212 per cent. respectively on the daily wage of April 1, 1914

Taking, however, into consideration the shorter working day of six hours demanded at the same time, the two classes of wage earners are found to be seeking an increase per hour of 87 and 115 per cent. respectively over the rate paid at the present writing, or an advance per hour of 229 and 317 per cent. respectively over the rate paid in 1914.

Clearly, the Indiana mine workers are not trying merely to meet the increased cost of living. They are seeking rather to get more of the other fellow's hours than they are willing to give him. They are endeavoring, in short, to profiteer in the sale of their labor. They cannot protest against the cost of living for they, themselves, have done more than any other persons to cause that increase

In fact, the figures given above are not really representative of the probable increase in cost of coal, for the mine worker has kept down his rent charges to a pre-war level and has provided that the increase in the cost of his coal shall be less than the increase in the cost to the operator. He is also trying to provide for time-and-a-half for overtime and double-time for Sunday work, and to prevent production on Saturday afternoon and for two hours each day. All these extra charges and novel restrictions in the use of the plant will add to the cost of the coal, and this cost the consumer must inevitably pay.

No one can say that this grasping for larger pay shows a sense of obligation to the interests of labor. It is a felonious attempt to hold up the workingman by a threat that if he does not come across with the goods he will be compelled to be idle till he is less obdurate. Perhaps the union men do not view their action in that way, but however excellent their intentions the result is the same.



IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Device for Dumping Rock Cars at the Rock Bank

By Ralph W. Mayer
California, Penn.

Various methods are employed at coal plants for dumping the cars of rock and slate resulting from mining operations and coal preparation. When schemes are used for dumping cars which necessitate frequent extension of track the labor item tends to increase the cost of refuse disposal unduly. It was to simplify matters in this respect that the device here described was planned.

To facilitate the dumping of refuse, the car containing it is run up on a portable frame or truck, one end of which overhangs the rock bank and thus readily permits the dumping of the car. This equipment can be made at any mine and its construction is as follows: The main frame of the dump is made of 10- by 10-in. timbers which carry the cross ties and track. This frame is supported on two 4-wheeled trucks; one truck is about at the middle of the frame and the other is near the end where the car is started up on the frame. Ordinary car wheels are used for the trucks.

The wheel base of the front truck is about six feet. The truck is made of 10- by 10-in. timbers tied together and braced by iron rods. On top of this frame, carrying the axle journals, are two pairs of 10- by 10-in. cross timbers supporting a platform of 4-in. plank. One foot from each end of this platform is bolted a 1- by 6-in. iron plate, the ends of which are bent down over the 10- by 10-in. timbers. These iron plates furnish a sliding surface for a similar reversed platform bolted to the under side of the main timbers carrying the track of the dumping contrivance. A king-pin pivots the truck to the main frame and allows the dumping equipment to round curves on the track laid on the rock bank.

The wheel base of the rear truck is as short as practicable. This truck supports the lower end of the dumping equipment near the end touching the track on the rock bank. The axles of this truck run in journals bolted to angle-irons to which are bolted other angles carrying a 10- by 10-in. timber; this top timber forms the bolster of the rear truck and carries the load. A king-bolt pivots this truck to the main frame.

FIG. 1. SIDE VIEW OF THE DUMPING DEVICE

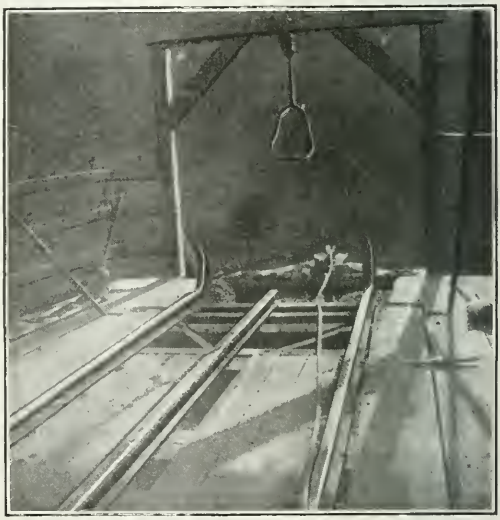


FIG. 2. VIEW OF DUMP, SHOWING KICKBACK

The dumping device is about 60 ft. long over all. The rear end has 30-ft. track stringers which are carried by the two trucks; the rear end of these stringers just clears the rails of the rock-bank track. Ten- by 10-in. cross timbers are bolted to the under side of these stringers to act as bolsters to rest on the truck bolsters. Fig. 1 shows these inclined stringers rising from the rock bank track to a point over the truck near the center of the dumping device; the track on the dump is carried forward by horizontal stringers, the forward ends of which are supported by 1½-in. iron rods as clearly shown in Fig. 1. These rods are fastened to cross timbers under the track stringers and pass over a frame about the middle of the dumping device.

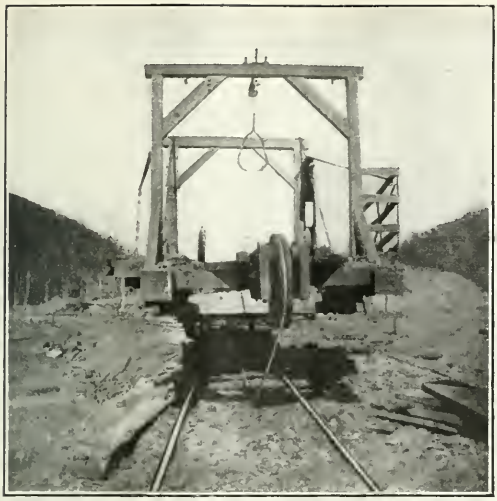


FIG. 3. VIEW FROM THE FRONT, SHOWING SHEAVE

To facilitate the movement of the rock-car onto the dumping device, the rails at the bottom of the incline are beveled at their ends which are so flattened out and the sides bent down as to form a channel fitting over the rock bank track thus holding them in position. A clevice bolted through this movable rail and under the rail of the rock bank track also helps to hold the dump rails in position.

An ordinary kickback dump is placed at the forward end of the track as is clearly shown in Fig. 2. A frame is erected over the track at the horns of the dump, from which a ring is hung to engage the hook on the end of the car door. This ring raises the car door when the car is tilted.

Arrangement is made to pull the rock car upon the dump by a cable. A motor and drum are attached to the under side of the track stringers near the rear truck as shown in Fig. 1. The cable passes forward under the track out to a sheave supported by timbers extending out from the track timbers as shown in Figs. 1 and 3. From the sheave the cable passes back between the track rails, supported on rollers. A small shed made of corrugated iron houses the controller and resistances of the motor and protects the man who runs the hoist in stormy weather.

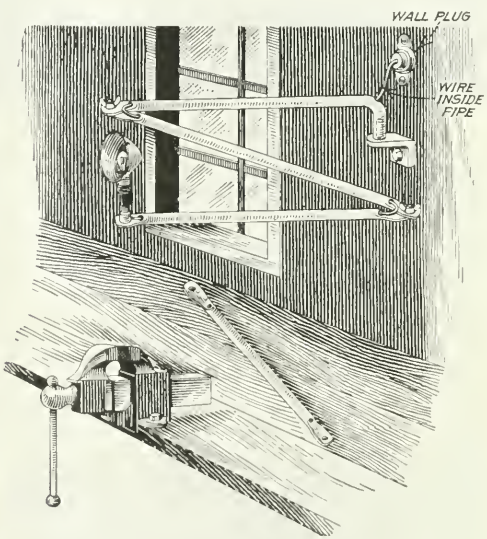
FIG. 4. GENERAL VIEW OF DUMP AND ROCK BANK

In operation the rock is dumped from this device until the bank is extended and filled up level with the bank track sufficient to permit of another section of track being laid. The dumping device is then moved forward and the process is repeated as often as the rock gets up to the level of the bank track. The motor and cable on the dump are also used to pull it forward when a move is made.

Handy Extension Wall Light

By Charles H. Willey
Concord, N. H.

A handy even though somewhat inartistic wall-light fixture may be made from short lengths of old brass pipe as shown in the accompanying illustration. The first section has one end bent for a short distance at right angles. The other end is flattened, as are also the ends of the next section. These ends, after being



WALL LIGHT MADE FROM OLD BRASS PIPE

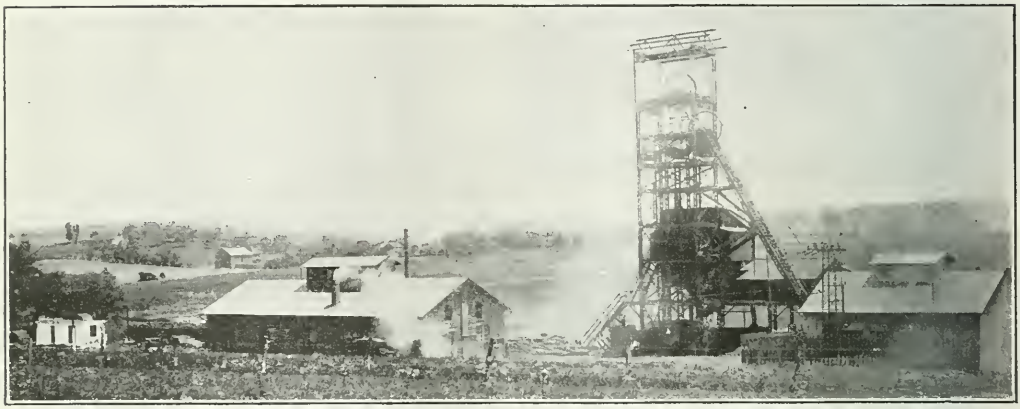
flattened, were drilled for bolts. Holes were drilled so that the light cord could be drawn through the pipe. The angle bracket on the wall is provided with a round pin or stud over which the bent end of the pipe is slipped. The light socket is fitted to the end of the pipe in such a way that it can be revolved at any angle.

A NEW USE has been discovered for gas masks. Word comes from Indiana that these masks are in demand for threshing and shipping wheat infected with Australian take-all. All grain is so saturated with formahdehyde that the workers cannot stand the fumes.

St. Vincent Mine of the Mount Pleasant Byproduct Coal Co.

An Electrically Operated Mining Plant, with an Ultimate Capacity of 1500 Tons a Day, Was Sunk in a Hurry. The Water Encountered in the Shaft Is Used for Domestic Purposes. Consumption of Current Is So Regulated as to Avoid Peak Loads as Far as Possible.

By P. B. Rule
Greensburg, Penn.



GENERAL VIEW OF THE SURFACE PLANT AT THE ST. VINCENT MINE

THE St. Vincent mine of the Mount Pleasant Byproduct Coal Co. is situated about 7 miles east of Greensburg, Westmoreland County, Pennsylvania. The coal produced is mined from the famous Connellsville basin of the Pittsburgh seam and is adapted, as the firm name implies, to byproduct oven consumption. The coal acreage was bought from the Benedictine Society fathers, who conduct a college and seminary. On account of the necessity of erecting the surface plant of the mine in close proximity to their school buildings, it was stipulated by the fathers that steam would not be used for operating the mine. Electric power, purchased (from the West Penn Power Co.) on a demand basis, is and will be the only kind of energy used in the operation.

The contract for sinking the shaft was let to H. F. Stark, of Greensburg, Penn., and on June 12, 1917, the first shovelful of dirt was moved. The main and air shafts are of concrete construction, elliptical in form. About 30 ft. of lining was put in place at one time; 8 in. to 10 in. of sand was spread around the sides of the excavation, and upon this foundation the forms were built. These were made in six parts, two for each side and one for each end. Space was left between the side forms for a key made of $1\frac{3}{4}$ x 4-in. yellow pine and the same length as the form. After the concrete had set about 36 hours these keys were taken out, which allowed the forms to be removed. Each form before it was put in place was given a coat of tar on its outside surface so that the concrete would not stick.

A comparatively small quantity of water was encountered in the sinking of the main shaft. Wherever this occurred, corrugated sheet iron was placed in position so as to bring the water to one point, and a wrought-iron pipe was so placed as to conduct the water through the concrete lining so as to relieve any pressure upon its outer face. At a point about 60 ft. down in the air shaft a sump was driven into one end wall, in order to collect a flow of water of about 50 gal. per minute. Upon analysis, this proved to be free from impurities and it was decided to install a small pump station at this point and utilize the water for the house supply. No water rings were built in either shaft, all water being carried through the lining by drainage pipes and carried to the bottom through one large column to which all drainage pipes are connected. All buntons in each shaft are of white oak, fitted into notches made by the form construction in the concrete lining.

Coal, 7 ft. 9 in., was struck about Dec. 1, 1917, at a depth of 240 ft. in the air shaft and 250 ft. in the main shaft. This was considered to be quite fair time, considering the scarcity of labor and the trouble experienced in getting in supplies. A sump, concrete lined and floored, was sunk below the coal in the main shaft. A concrete arch 12 ft. wide, 10 ft. high and 20 ft. long for the main airway and two smaller ones 8 ft. wide, 7 ft. high and 12 ft. long were constructed at the bottom of the air shaft. At the bottom of the main shaft, concrete arches 13 ft. high, 18 ft. wide and 30 ft. long were constructed on both the loaded and empty track sides. The arch on the loaded side will probably be extended when the necessity arises.

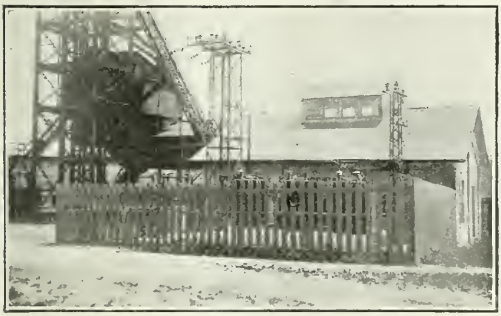
One Harris 7 x 10-in. triplex pump of 250-gal.-per-

minute capacity, driven by a 20-hp. alternating-current motor handles all the water at the present time. Further permanent installations will probably be centrifugal, discharging through a borehole to the surface. Animal haulage is used at the present time, with electric in view. The system of mining will be the modified concentration with 100-ft. blocks. This system has been used with great success by the affiliated companies of the Mount Pleasant Byproduct Coal Company.

Fifteen acres of surface area were leased from the Benedictine Society for the surface plant. The siding is 2800 ft. long, 1400 ft. of single track above the center line of the main shaft and 1000 ft. of double track below this point. A descending grade of 1.5 per cent. above the loading shed, 2 per cent. for 300 ft. at the loading shed and 1.25 per cent. below this to a point distant about 400 ft. from the main connection, assures easy handling of both loaded and empty railroad cars.

An interesting incident in the construction of the siding was the unusual angle of the skew bridge across a small stream. It was not possible to change the course of the run, so the bridge was designed with the center line at an angle of only 15 deg. 15 min. from the center line of the creek channel.

There are only three buildings—the hoisthouse, shop building and fanhouse—in the near vicinity of the surface plant. All of these are of hollow tile and cement plaster construction. The hoisthouse is 34 ft. wide and 40 ft. long and contains the hoist, control board and switchboard, with room for a future motor-generator set installation. The shop building is 32 ft. wide, 77 ft. long, 60 ft. of which is occupied by the blacksmith and carpenter shops, while the balance is taken up by the lamphouse and supply room.



EXTERIOR OF 22,000-VOLT SUBSTATION AT ST. VINCENT MINE

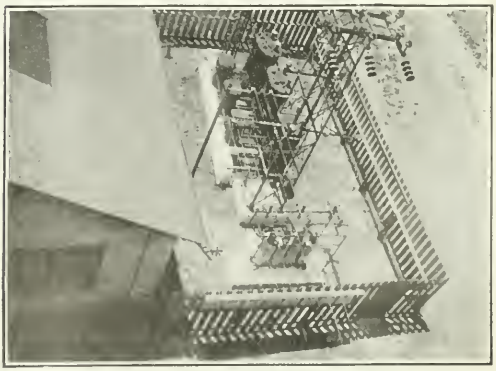
Edison storage-battery lamps are used by all employees except the mine bosses. The lamphouse is equipped with a small motor-generator set, racks and switchboard for charging, and all necessary supplies for repairing and handling the lamps. The fan is a 7 ft. by 3 ft. 6 in. Jeffrey double inlet, blowing with a normal capacity of 125,000 ft. at 200 r.p.m. and 2-in. water gage. It is arranged for a belt drive from a Westinghouse 25-hp., 220-volt, three-phase, 60-cycle induction motor. A hospital and first-aid building is planned for the near future. It will contain hospital bed, operating chair, stretchers, first-aid cabinets, and in fact everything essential to a first-aid station.

All outside equipment, as has been stated previously, is electrically operated. On account of the stress of the times (summer of 1917) the West Penn Power Co. was not in position to construct a branch line to the plant, and so this work had to be undertaken by the coal company. A line 4600 ft. long was constructed, tapping the main 22,000-volt West Penn line. The substation was designed by the Railway Industrial and Engineering Co., of Greensburg, Penn., and consists of a steel tower terminal, air switch, choke coils and horn gap lightning arresters; busbars extend from this tower to a crossbar on a steel pole. Three 150-kw., 22,000—2200-volt Pittsburgh transformers, and three 50-kw., 2200—220—110 Westinghouse transformers bring the current down to the desired voltages. On account of severe lightning conditions in this vicinity, General Electric aluminum-cell lightning arresters were installed this spring.

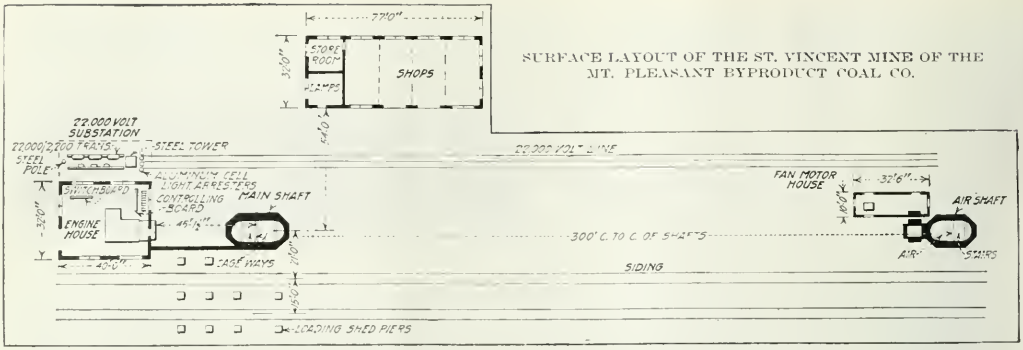
FAN USED AT MINE IS A 7 FT. BY 3 FT. 6 IN. JEFFREY

The headframe and loading shed were designed by the W. G. Wilkins Co., of Pittsburgh, Penn., and fabricated and erected by the Memphis Steel Construction Co., of Greensburg, Penn. They are built integral and are of the end brace type. The cages are self-dumping, constructed by the Diamond Manufacturing Co., Monongahela City, Penn. The hoist is a Vulcan. It is a self-contained, electrically operated machine equipped with one straight-faced grooved tight drum 7 ft. in diameter, coiling 1¼ in. wire rope, steel machine-cut gears of the single reduction Falk herringbone type, flexible coupling, device for the prevention of overwinding and overspeeding and motor-driven compressor for the air brake. The motor is a Westinghouse 200-hp., 2200-volt, three-phase, 60-cycle, 500-r.p.m. machine.

The hoist and motor are designed to make two hoists per minute of the following loads: Coal in car, 5000 lb.; empty car, 2000 lb.; cage, 6000 lb. The hoist controller is a Westinghouse type "F," form "D," No. 219.



BIRD'S-EYE VIEW OF THE 22,000-VOLT SUBSTATION



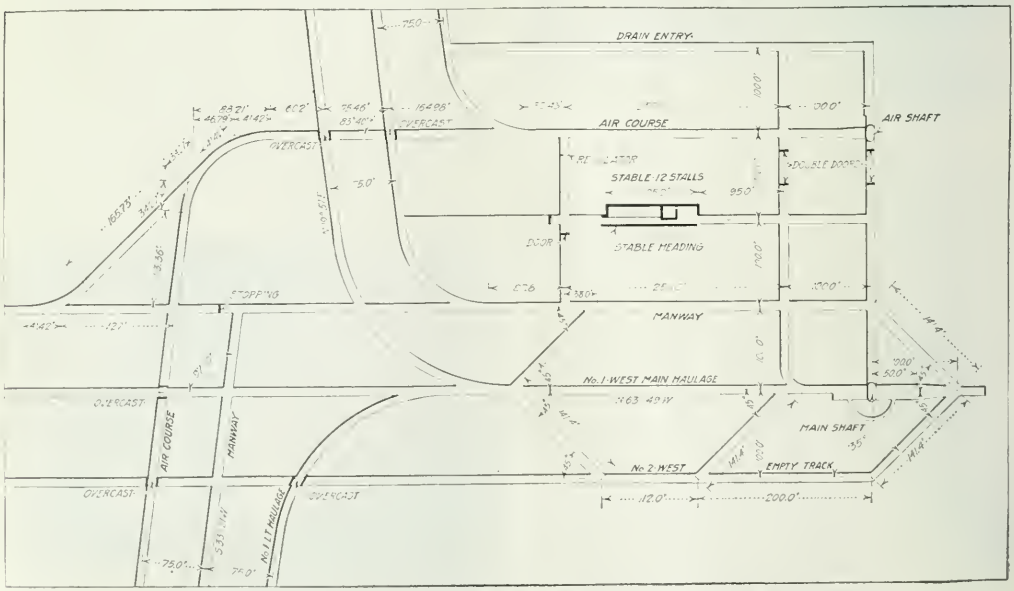
The resistance grids are mounted on a pipe rack and are so placed that any one of them can be removed without disturbing any of the others.

The four-panel switchboard is of the latest Westinghouse construction with oil switching apparatus and remote mechanical hand control. One panel is provided for the incoming 2200-volt line, one feeder panel for the 2200-volt line to the hoist, one feeder panel for the 2200-volt line to the fan, and one feeder panel for 220 volts to the mine. Mounted on a swinging bracket is a 3000-volt scale voltmeter. On each panel are mounted ammeters of suitable scale.

On the incoming feeder panel is mounted a graphic alternating-current watt meter, and a type "C," polyphase, switchboard-type, watthour meter. On each panel is also mounted type "C" overload relays with adjustable definite inverse time elements. Mounted apart on pipe frames are oil circuit breakers, three-pole, single-throw, 300 amp., 4500 volts, automatic in connection with the relays already mentioned. Each panel is equipped with current and voltage transformers. Disconnecting switches on marble bases are so placed at the rear as to be readily accessible.

The graphic watthour meter on the incoming line panel charts the operation of every motor at the plant. The demand is taken directly from these charts, and by watching these diagrams corrections in operating conditions can be made that will materially reduce the kilovolt-ampere demand. These charts are sent to the office every day for careful analysis. Any unusual conditions found are either rectified or explained so as to avoid, if possible, a recurrence thereof.

For instance, one chart showed several instantaneous peaks in one hour. Upon investigation, it developed that several heavily loaded cars of slate had been hoisted in this particular period. It was decided that it would pay not to load so much slate in any one car, but instead to hoist many more cars of rock and in this fashion keep down the instantaneous peak so that it would at least be below an approximate predetermined value.



PROJECTION OF SHAFT BOTTOM AND ENTRIES, ST. VINCENT MINE

SOME OF THE MINERS' HOUSES AT THE ST. VINCENT OPERATION

The West Penn Power Co.'s demand is figured from the significant peak, which will be the "amount of power equivalent to the maximum average kilovolt-amperes drawn for a period of five consecutive minutes during any billing month, plus (here is where the instantaneous peak comes in) 50 per centum of that part of any single operating peak created during the same billing month which is in excess of 150 per centum of such maximum average for a five-minute period." Thus it can be seen that one high peak will have a material effect on the demand.

In conclusion, it might be stated that in operating a plant that is dependent entirely upon purchased electric power, the principal thing to consider in the use of such energy is the operating peaks during the peak hours. All pumping, if possible, should be done during off-peak periods—that is, from 5 p.m. to 7 a.m.—all cutting machines should operate during the same period. All bosses should be instructed how to keep the demand down to as low a point as possible, consistent with good operation. The Randolph-Means Co., of Pittsburgh, Penn., were consulting engineers on the electrical machinery and equipment. Matthew S. Welch, of Greensburg, Penn., was the constructing engineer on all electrical equipment. J. U. Kuhns is president of the Mount Pleasant Byproduct Coal Co.; C. J. Kline, treasurer; D. C. Cramer, mine superintendent, and Joseph Sperko, mine foreman.

Superheaters at British Collieries

By M. Meredith
Liverpool, England

Recent experience in Great Britain has served to emphasize the fact that in nearly every case where steam power is employed considerable economy in coal may be effected by superheating the steam. This is particularly the case at collieries, where long steam lines are to be found, and where, in consequence, serious loss arising from condensation and trouble from the presence of water in the pipes are liable to result if the steam is not superheated. It is thus not surprising that the question of applying superheaters both to new and existing boilers is one of much interest to all engaged in the production of coal.

Much has been written on superheating from the point of view of economy, but there is little information available on the practical design and operation of superheaters. The following remarks should therefore prove interesting.

There unfortunately exists a somewhat common impression that superheaters, in most cases, are a source of considerable trouble and annoyance in operation, and are constantly requiring attention and repairs. This belief is quite erroneous. It is true that in numerous instances trouble from leakage at the joints, warping of the tubes and similar difficulties have been experienced almost from the start, but in nearly every case the trouble has been the result either of inferior design and construction of the superheater or of carelessness and neglect on the part of those responsible for the operation of the plant. If a superheater be well designed and constructed, and placed under the charge of a skilled attendant, there is no reason why it should give trouble. There are indeed large numbers of superheaters working today that have never required anything in the way of repairs since the day they were installed, years ago. On the other hand, when the design and the conditions of working have been unsatisfactory, superheaters have been a constant source of trouble and annoyance, and in some instances they have been taken out and scrapped after working but a few months.

Construction Materials Must Be of the Best

It is of the first importance that the materials used in the construction of superheaters be the best obtainable. Steel of high tensile strength should be used throughout, and the tubes should be drawn from the solid. Cast iron, at one time largely used for headers, is quite unsuitable because, apart from its brittle nature, it deteriorates after continued exposure to high temperature steam. Cast steel is more suitable than cast iron, but inferior to wrought steel. Welded tubes are objectionable because of their liability to fail at the weld; but, owing to the present difficulty in obtaining solid drawn tubes, they are being extensively employed.

Simplicity of construction and acessibility are essential features in design. It must be remembered that the temperature of the gases in which the superheater is placed is seldom less than 900 deg. F., while it is often as much as 1500 deg. Thus the conditions of working are severe, and if an occasional leakage, or even failure of a tube, should occur it can scarcely be wondered at. It is obvious that every facility should be provided for reëxpanding or replacing defective tubes, and hence the importance of accessibility. In some designs it is necessary to disconnect the steam pipes and remove a large bolted cover in order to render the tubes accessible, and this has to be done every time a tube requires reëxpansion or replacement. In others, small openings, covered by screwed plugs, are placed opposite the ends of the tubes, and it is supposed that these are quite sufficient to make the tubes accessible. A superheater can be regarded as satisfactory only when it is designed in such a way that any tube can be made thoroughly accessible in a minute or two either for expanding, plugging up, or replacing, and when, in addition, the tubes can be cleaned externally

under working conditions. The latter provision is important, because the external surfaces after a time become covered with soot, which seriously interferes with the free passage of heat through the tubes from the hot gases to the steam.

An important feature in design is to arrange the joints and attachments of the superheater so that they are not directly exposed to the action of the hot gases, thus minimizing leakage and other troubles. The ends of all the tubes should be bell-mouthed or beaded over to obviate the possibility of the tubes being drawn out of the plates or boxes into which they are expanded.

Various troubles are experienced in the working of superheaters, but of these overheating of the tubes is undoubtedly the most important. Under normal conditions of operation when the steam is flowing freely through the tubes, the trouble in question is not liable to arise, because the heat from the gases is being constantly carried away by the steam. During the periods of raising steam, however, the furnace gases are passing through the superheater chamber, but there is no steam flowing through the tubes. It is at such times that overheating is most liable to occur. Much will depend upon the temperature of the furnace gases.

In the case of a Lancashire boiler, the type mostly used at collieries in Britain, the superheater is placed in the downtake at the rear end, where the temperature is not unduly high, and the water of condensation which collects during stoppages generally serves to protect the tubes against overheating. If, however, the temperature be excessive, it becomes necessary to safeguard the tubes. This may be done either by bypassing the gases (when this is possible) until steam has been raised, or by flooding the tubes with water.

It is not advisable to resort to flooding unless the water is free from sedimentary matter, because of the tendency of the tubes to become coated with deposit. This would lead to the very trouble it is desired to prevent. A further objection to flooding is that it involves a certain amount of risk of explosion, because if the bulk of the water be not afterward removed, it will be carried forward into the steam pipes, where it is liable to set up dangerous water-hammer action.

Priming of the boilers has in some instances led to overheating of superheater tubes, which in consequence of the priming have become partially choked with deposit. An explosion occurred in this way some time ago at a colliery near Durham. Because of the boilers having to be continually forced, priming resulted, and scale to a thickness of $\frac{1}{16}$ in. formed in the tubes, one of which became overheated and reduced to such an extent that it could no longer resist pressure.

When overheating occurs, it causes rapid oxidation and wasting away. It should be borne in mind that the tubes are comparatively thin, and a slight amount of wastage will seriously affect their strength. They will, in consequence, be liable to fail under pressure sooner or later. Hence it is important that every precaution be taken to prevent this trouble. Frequent examination should be made with a view to discovering any evidence of overheating. As a rule the external surfaces of tubes which have suffered from overheating are covered with a reddish-colored oxide, while such tubes show signs of warping. The extent to which wastage has taken place may be ascertained by measuring the external diameter of the tubes at a number of places and comparing with the original diameter.

Occasionally the ends of the tubes projecting beyond the plate into which they are expanded become wasted. The effect of such deterioration, in serious cases, is to reduce the hold of the tubes in the tube sheet, and so involve risk of the affected tubes being drawn out. For this reason it is advisable to withdraw any tubes found to be considerably wasted away at the ends, cut away the wasted portions (afterward annealing the new ends) and then reëxpand the tubes into the plate, a suitable bellmouth being, of course, formed.

To insure safety in operation the question of draining off water of condensation should receive careful consideration. Facilities for draining both the steam pipes and the superheater boxes should be provided, since large accumulations of water at any point may lead to water hammer and explosion.

Suitable draining arrangements, besides safeguarding the superheater and the steam pipes against water hammer, will also prevent wasting of the tube ends, since this trouble is mostly caused by accumulation of water in the superheater boxes. Leakage past the ends of the tubes and the tube plate is common, especially in superheaters of inferior design or construction. It should always be remedied by expanding the tube ends at the first opportunity, because if neglected the scouring action of the escaping steam will cause serious thinning of the tubes.

It is sometimes stated that superheater tubes become generally wasted internally as well as externally, but experience does not appear to bear this out. It is, however, a fact that internal "pitting" is sometimes found at the bends of the tubes, this being the result of accumulations of water of condensation. This defect may be discovered by careful hammer testing.

As a safeguard against explosion, a safety valve should be fitted to the superheater. This may be either of the dead-weight or the spring-loaded type. If a dead-weight valve be used, it is important that suitable stop pins be fitted to obviate the possibility of the internal valve being blown off its seat; if a spring-loaded valve be adopted, suitable appliances should be fitted for the purpose of testing the valve.

American Institute of Mining and Metallurgical Engineers

Charles Schwab will be a speaker at the banquet of the American Institute of Mining and Metallurgical Engineers to be held in Chicago, Sept. 22 to 26 inclusive. Elaborate plans for both the technical and social side of the meeting have been perfected. Engineers who make the trip to Chicago for this meeting are assured of one of the most interesting annual meetings which the Institute has held. In addition to some hundred and fifty papers which have been prepared for the meeting, trips to the zinc-smelting districts, the steel works at Gary and the refineries at Whiting and East Chicago are included. A boat trip on the lake together with numerous social events have been arranged for the ladies. The Fifth Annual Exposition of the Chemical Industries will be held in Chicago at the same time as the meeting of the American Institute of Mining and Metallurgical Engineers, and members of the Institute are cordially invited to attend the exposition and become better acquainted with the allied industries.

Results Obtained from the Use of the Cement Gun at the Cadogan Mine

By Fred Norman*
Kittanning, Penn.

It is seldom that illustrations bring out a point in a more striking manner than do those accompanying this article. They might almost be published as a series of pictures without words, and still tell the story. However, the writer of the article enlarges on the situation at the mine in question, states the difficulties in operation, on account of a bad, friable top rock, and notes how such difficulties were overcome by the use of the cement gun. Valuable cost data also are given.

QUITE a troublesome condition often met with in bituminous coal mines is what is known by the miners as "buckwheat slate" roof. This name is rather more descriptive than scientific, but conveys the idea accurately. It is a condition of the roof and consists of a broken slate that rapidly disintegrates by the action of the air currents and falls in small particles.

This is a continuous performance, and not alone affects the roof directly above the entry, but the slate breaks sharply at the ribs and this in turn allows a larger arch above the entry. Thus still more surface is exposed to the deteriorating action of the air and the amount of "buckwheat slate" falling is increased.

To timber against this condition is both costly and ineffective. Aside from the dangerous results, weakening of pillars and falling slate, the cost and inconvenience of maintaining men to clean the tracks is obvious, and delays to transportation from dirty tracks is quite a factor. It is seldom that large enough pieces fall to cause direct accidents, but the blocking of the tracks from fallen slate may cause wrecks to locomotives and cars. To sum up, a condition is created which is hard to handle; furthermore, it is dangerous and also puzzling to the mine officials.

The Cadogan mine of the Allegheny River Mining Co. is six miles south of Kittanning, Penn., along the west bank of the Allegheny River. Here conditions were encountered in the "B" (or Lower Kittanning) seam, through large sections of the mine, which for some time almost completely baffled the mine officials.

The constant falling of slate made it necessary to employ men, during the night, to load up the débris that fell after working hours, in order to keep the tracks clear for the locomotives in the morning. Difficulty was also experienced in keeping trolley hangers in place. After idle days this source of annoyance was especially severe and something had to be done quickly to relieve the situation.

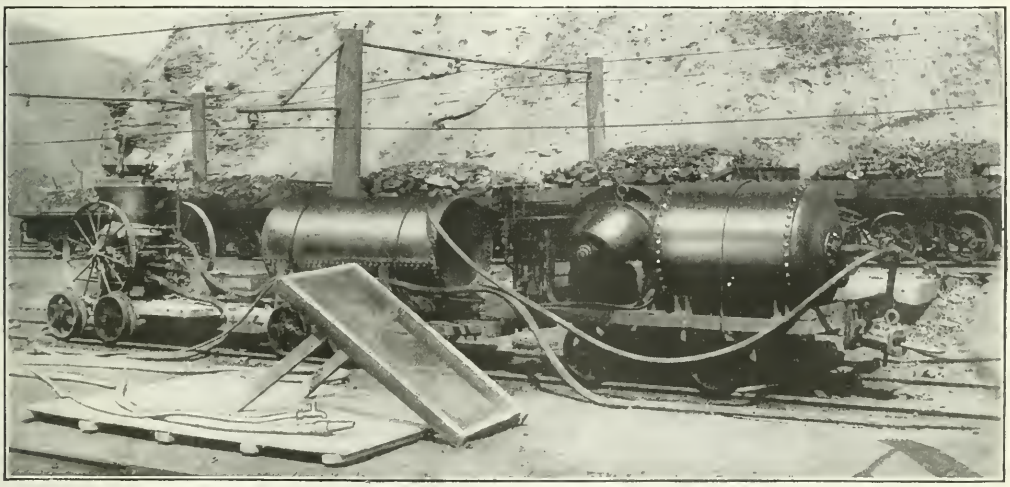


FIG. 1. CEMENT GUN OUTFIT MOUNTED ON TRUCKS

At the instance of the superintendent of the mine, an investigation of the work of the cement gun at the Bruceton Experimental Mine was made, with the result that the company decided to give this cement apparatus a tryout. To this end the necessary equipment was purchased and put in working order. The outfit consisted of the cement gun, water tank and motor-driven air compressor and receiver (all mounted on trucks), together with a mixing board and sand screen, shown in Fig. 1.

To operate this outfit six men were employed as follows: One nozzleman, one gun operator, two attendants to screen and mix sand, and two men to prepare the

*Chief engineer of the Allegheny River Mining Company.

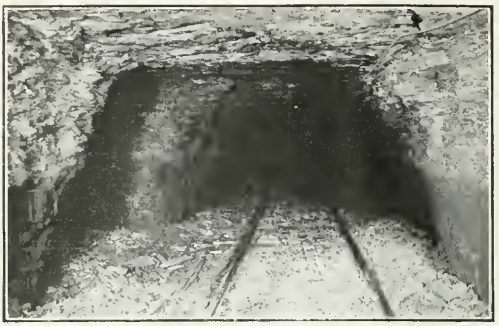


FIG. 2. AN ENTRY BEFORE TREATMENT

top and sides of the entry. All loose material must be carefully trimmed off before cement is applied, to insure a good job. As high as 120 lin.ft. of entry have been cemented in one eight-hour shift, but the average run falls short of this, and actually is, by computation of several months' work, 85 lin.ft. per shift.

The gunite (or cement and sand mixture) consists of one part cement and three parts sand; it is blown against the rock face which is to receive treatment with about 30 lb. per sq.in. pressure. The cement penetrates the small crevices and interstices to a considerable depth and the surface coating of gunite over the rock will average about $\frac{3}{4}$ in. thick.

Great care must be exercised to remove all loose and disintegrated material, so that the gunite can get a good grip on solid rock; the necessity of this is easily seen by inspecting Fig. 2, which shows an entry before treatment. Note the "buckwheat" on the track and the ragged appearance of the slate of the roof and the sides. This entry, however, has not reached the stage where the rock deterioration actually extends over the coal; but such would be the case in a short time if the rock were left without treatment. The débris on the track is the accumulation of a day and is an average of conditions met with.

Fig. 3 shows a view of a main-haulage entry treated with a cement coating which speaks for itself. Fig. 4 shows the junction point of two haulage entries treated with the cement coating. In this last illustration the tracks are littered with coal shaken off the cars rather than slate from roof or sides.

The cement gun outfit at this mine was put into operation Sept. 12, 1918, and worked mostly during night shifts for sixty-four eight-hour shifts, up to the time statistics were computed. During this period 5482 lin.ft. of entry, or approximately 87,700 sq.ft. of surface, was coated.

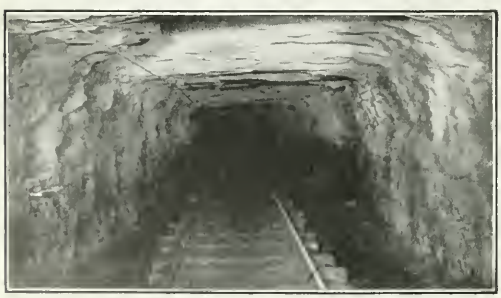


FIG. 3. ENTRY TREATED WITH CEMENT COATING

The average work per eight-hour shift was 85 lin.ft. of entry, or 1370 sq.ft. of surface, covered with a $\frac{3}{4}$-in. thick cement coating. An accurate account of the cost of this work was kept, as follows:

Labor	$2176.03
Sand, 264 tons, at $2.65	699.60
Cement, 502 bbl., at $2.52	1265.04
Total	$4140.67
Cost per lin.ft. of entry	$0.7553
Cost per sq.ft. of surface	.0472

The labor costs include: Loading sand, cement and water outside; trimming of entry; mixing sand and cement by hand; the operation of the cement gun; also the training of men for the work.

Up to the present time the cement coating of the entries has proved quite satisfactory and neither breaking of the coating nor signs of slacking behind the coating have been observed in work about eight months old. Thin places will show up in time and must be recoated.

For brattice work the outfit also proves efficient; breakthroughs walled up with rock or slate are given a coating of cement and sand—gunite—which, by the force of the gun, penetrates every little crevice and effects an air-tight and quite satisfactory job.

FIG. 4. JUNCTION POINT OF TWO HAULAGE ENTRIES TREATED WITH CEMENT COATING

The cement gun can be utilized for many other purposes; when not in use the compressor is kept busy blowing out motors and generators, operating pick mining machines for entry driving, or furnishing power for air drills or rivet hammers if such work is demanded on a construction job or special work of any kind.

Mining Company May Resume Night Schools for Employees

For a number of years the Lehigh Coal and Navigation Co., with headquarters at Lansford, Penn., has conducted a free night school for employees at Nesquehoning. Here was taught mining, mechanical and electrical engineering, English and naturalization. Primary classes were also conducted. Under stress of war conditions the work was cut down in 1918, until only the mining class remained. Now the company is considering the reëstablishment, for the coming year, of all the classes on the old basis, and possibly the extension of the work, in order to give the men a more thorough training than ever before.

Some Truths About Anthracite

So many conflicting reports have been spread regarding the threatened scarcity of fuel, that the public is at a loss to understand the true facts in the situation. To clear up some of the confusion, the Anthracite Bureau of Information, of which Edward W. Parker is director, has compiled some interesting data that disclose the exact state of affairs insofar as hard coal is concerned. The report issued by the Bureau is reproduced for the enlightenment of *Coal Age* readers.

THERE is every reason to believe that there will be sufficient supplies of anthracite for domestic use next winter, provided there is no marked diminution of labor supply, and also provided that next winter is not of undue severity and that consumers continue to spread their orders so the mines may work steadily during favorable weather. A continuous flow of coal from the mines is the best guarantee against any shortage next winter, and a continuous flow of coal depends upon continuous purchasing.

Total shipments of anthracite for the first three months of the current coal year, beginning Apr. 1, were 16,556,221 tons, against 15,713,658 tons in the corresponding period of the last normal year, 1916, an increase of more than 800,000 tons.

The coal years, beginning Apr. 1, are the only periods from which accurate production and consumption comparisons can be made. Coal mined in January, February and March of this year, for instance, belongs to last winter and was burned last winter. Any loss of output in January does not affect supplies after Apr. 1. The principal decrease in this *calendar* year was in February and March, and it was due to the abnormally mild winter which enabled householders, who had bought heavily last summer and fall, to go through the whole season without additional purchases and even, in some cases, to have some coal left over and available for next winter.

Falling Off Principally in Steam Sizes

Total shipments for April-May-June in the years 1916, 1917, 1918 and 1919 have been 15,713,658 tons, 19,558,861 tons, 20,123,298 tons and 16,556,221 tons respectively. The apparent falling off this year is about 3,500,000 tons, but most of this apparent decrease is due to the falling off in the production of steam sizes from washeries, which contributed a considerable tonnage in 1917 and 1918.

The actual falling off in shipments of domestic sizes, that is pea coal and larger, is about 900,000 tons for the first quarter of this coal year as comp red with 1918.

Miners are taking more holidays this year than they did during the war. The total number of generally observed holidays this year, from Apr. 1 to June 30, was 12; last year there were 9 in the same period. The lost output for these three extra holidays would nearly have made up the 900,000-ton decrease in shipments of domestic sizes. Local celebrations in honor of returning soldiers have been numerous, and have had the effect of reducing output by shutting down temporarily the nearby mines or at least diminishing the working force.

Coal consumers, who last year took any domestic size they could get, are more discriminating this year. They want chiefly nut, egg and stove sizes. Pea coal has been neglected and is going into storage. There are considerable tonnages of pea coal, which is a first-class range fuel and even useful in furnaces, available for immediate shipment. As the result of temporary indifference to this size, the amount in storage at the end of January, approximately 38,000 tons, grew to approximately 213,000 tons by the end of March and to about 390,000 tons by the end of June.

Anthracite is not a single commodity. It is three commodities. Broken coal and the sizes larger are metallurgical and gas-making fuels. Sizes from egg to pea inclusive are essentially domestic fuels. Sizes below pea are steam fuel, in which most householders have no direct interest, though self-feeding household furnaces in which buckwheat No. 1 and even buckwheat No. 2 can be economically and satisfactorily used are now available.

"Mountains of Coal" Not for Domestic Use

In mining coal and in crushing it for preparation in the breaker, a large quantity of small coal is unavoidably made. This constitutes the steam coal, of various sizes. It amounts to about 35 or 40 per cent. of the whole production.

If no steam coal at all were shipped there would be a heavy "coal shortage" shown on paper without lessening the available household supplies one pound. The "mountains of coal" referred to in unauthoritative communications from the hard-coal region are made up of such sizes. Their presence or absence has no bearing on the fuel available for ordinary domestic use.

There were approximately 160,000 workers in the anthracite mines in the first three months of the coal year beginning Apr. 1, 1916. There are approximately only 146,000 today, but the 146,000 in April, May and June of this year produced over 800,000 tons more than the 160,000 produced in the corresponding period three years ago. Labor supply may show some increase later on, as soldiers and munitions workers get back to the coal region.

Anthracite prices have advanced less, so far as the operator and wholesaler are concerned, than almost any other commodity entering into daily life. This statement applies to the whole period since the European war began. There is no large industry yielding less average return on the capital invested in it than the mining of anthracite.

The *Monthly Labor Review*, published by the Bureau of Labor Statistics, United States Department of Labor, in its issue for June, 1919, page 95, has carried index numbers of wholesale prices by commodity groups up to and including April, 1919. Taking the 1913 price as 100, it shows that fuel and lighting, which includes coal, advanced 79 points. Farm products advanced 133, food 107, clothes and clothing 115, house furnishings 151, miscellaneous commodities 116, and all commodities 103.

The same publication, in its May issue, pages 144-146, carries wholesale prices for individual commodities up to the end of March, 1919. On the basis of 100 as the 1913 price, this official Government report finds that these advances have been made: Cattle, 118.3; bacon, 140.2; butter, 94.2; milk, 117.1; flour, 144.6; granulated sugar, 104.7; cotton, 113.3; bleached muslin, 126.8; clay worsted suitings, 127.9; oak sole leather, 81.5; women's

shoes, 123; Bessemer pig iron, 89.9; run-of-mine bituminous coal, 81.8; chestnut size anthracite, the most expensive size, 50.6. Only seven commodities in a total of 51 show smaller percentages of advance than anthracite. These are: Heavy native packer hides, 50; copper wire, 4.2; pig lead, 18; spelter, 12; waterwhite refined petroleum, 47.2; motor gasoline, 45.8; and electrolytic copper, which shows no advance whatever but is 3.8 points below the 1913 price. Most of these have shown much larger advances during the war period (spelter, for instance, at one time having advanced 279.3 per cwt., and pig lead 159 per cwt.) but have declined since the signing of the armistice.

White ash nut coal, in the week of Feb. 20, 1919, sold for $6.20 a ton at the mine. In the week of July 19, 1919, the circular was $6.50 at the mine, an increase of 4.84 per cent. If it advances to $6.70 by Sept. 1, it will be 8.06 per cent. higher than in the week of Feb. 20. The index price of 31 foodstuffs, as reported by Bradstreet's, was $4.60 in the week of Feb. 20. In the week of July 19 the index price was $5.22, an increase of 13.47 per cent. over Feb. 20 and 18.1 per cent. greater than in the corresponding week of 1918.

Dr. H. A. Garfield, Federal Fuel Administrator, in his statement of Jan. 31, 1919, lifting restrictions on anthracite, said:

For the purpose of arriving at a fair increase in price to cover the increase in wages recommended by the War Labor Board last October, an examination was made to determine the costs of the various anthracite producing companies. The result of this examination showed that the general increases in the price of materials and labor had raised the cost of mining anthracite to such an extent that many of the companies were not receiving a fair return and that some producers of necessary coal were actually sustaining a loss on the sale of coal at the Government prices. . . . Had the Fuel Administration's active control over maximum prices on anthracite coal been continued, the cost examination above referred to shows that it would have been necessary, on the basis of the present wage scale, to raise these maximum prices possibly as much as 50c. a ton.

Governor W. C. Sproul, of Pennsylvania, as the result of his study of the anthracite situation and prices, on Apr. 4, 1919, issued a statement in which he said:

I am convinced that Dr. Garfield's judgment in this matter was correct and that the action of the producers in announcing a gradual increase of 10c. per ton for five months, beginning May 1, is justified, considering all the conditions confronting the trade. . . The Federal Fuel Administration's experts showed that the cost of mining and preparing anthracite coal has increased 52 per cent., while the price at the mines has increased only 30.5 per cent.

This statement was based on a report on costs and prices made prior to the wage advance in November, 1918, which added $1.05 a ton.

R. V. Norris, engineer for the United States Fuel Administration, prepared a paper on anthracite mining costs, read before the American Institute of Mining Engineers in New York in February, 1919. It contained tables of prices and average costs, together with graphic charts showing the cost of production as a whole and increased labor costs. It also showed that in one instance, Dec. 1, 1917, a war labor bonus was granted which increased the production cost 76.3c. a ton, against which an increase of only 35c. in the maximum price of coal was allowed. The charts and accompanying tables showed that not less than 25 per cent. of the anthracite output during the period covered by the paper had been produced at an actual loss on operating costs alone. This paper specifically stated that the cost of production had increased 52 per cent., while the selling price had increased but 30.5 per cent. over pre-war figures.

Capital investment in anthracite mines, the United States Fuel Administration notes, runs as high as $11 per ton of output, with the average investment $7.50 to $8 per ton. Based on the actual production for the calendar year 1918, which was 88,237,575 tons, and taking $7.50 per ton as the average capital investment, the total capital investment of the anthracite industry is almost $662,000,000. To allow 6 per cent. interest on this investment would mean a margin of about 50c. per ton after all costs, overhead, selling expenses and other details of upkeep and maintenance had been paid.

Testimony taken by the Sub-committee of the United States Senate Committee on Manufactures in January, 1919, showed that the oldest anthracite company, which produces between 4,000,000 and 5,000,000 tons a year, had an actual margin of 6.89c. per ton between cost of production and selling price for the whole 1918 output. This margin of 6.89c. was expected to care for administrative salaries, interest, Federal taxes and dividends. The actual margin in November, 1918, was but 5.6c., while December showed a loss of 2c. per ton.

During February and March of this year, when trade was dull owing to the mild winter and to the fact that people had generally stocked up as much as possible in 1918, a considerable tonnage of the larger domestic sizes—nut, stove and egg—was stored. After Apr. 1 this coal began to move from the storage yards and its place has been taken largely by steam sizes, which have not been moving freely. It is these piles of steam coal which constitute the "mountains of coal" in unofficial reports from the coal region. The largest "mountain" in Schuylkill County, where those reports emanate, is a stock yard with about 1,000,000 tons capacity.

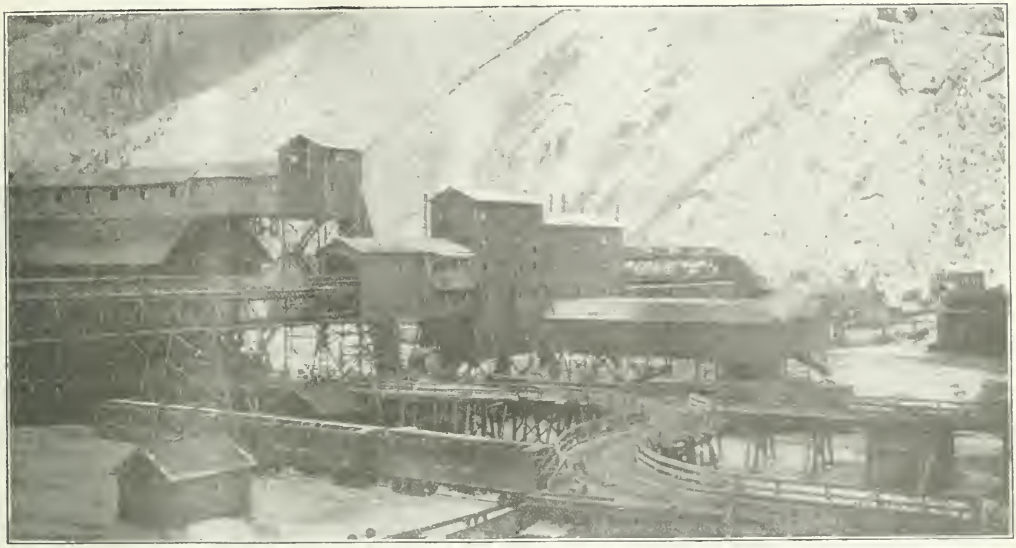
Distribution of domestic sizes has been moving satisfactorily, on the whole, since Apr. 1. The City of Washington, for example, under the United States Fuel Administration allotment system, in April and May of last year received 81,011 tons from a group of companies. This year, in the corresponding period, the same companies have shipped 87,890 tons to the city. Some of the larger producing interests report that their tonnages to important consuming districts are practically on a par with last year's shipments.

Advances in Overhead Line Material Likely

Constant increases in costs are reported by various manufacturers of mining overhead line material who fear that another general advance in selling prices will soon have to be announced.

As an instance of present conditions, it is stated that shellac which sold in the neighborhood of 14c. per pound just prior to the war, has lately been quoted at $1.10 per pound. During the last two weeks malleable iron in small castings has been advanced, on an average, 15 per cent., owing to the high wages which the foundries have had to grant to the molders. The general increase in the wages of labor used in the manufacture of overhead material, will average about 30 per cent.

During the early part of the year the prices of ears and other bronze goods were reduced, to accord with the reduced market price of copper, but the continual advance in the copper market, plus the increased cost of labor, will probably put the cost of this class of material up where it was during the war, or possibly even higher. Apparently, no relief is in sight.



SURFACE PLANT OF THE NEW NO. 8 MINE AT MICHEL COLLIERY

Plants of the Crowsnest Pass Coal Field

By Robert Dunn
Victoria, B. C.

SYNOPSIS—*The mountainous country of the Crowsnest Pass district necessitates some complicated means and methods for getting the mine product into the railroad car. In some operations compressed air is employed both for haulage and for cutting. This requires the installation of much machinery in the power plant.*

THE accompanying illustrations give a good idea of the plants of the Crow's Nest Pass Coal Co. at Michel and Coal Creek. The tipple and storage bin, No. 8 mine, Michel Colliery, was installed in 1913, the old No. 8 mine having been sealed off in 1911 following the outbreak of fire and a new entry to the same bed being driven above the old one and some 535 ft. above the floor of the tipple.

From the pit mouth of the new No. 8 mine a double-track tramline, having a grade of ½ per cent. in favor of the loads, circles the hill for a distance of 930 ft. The coal is hauled along this road to a Phillips crossover dump, where it is discharged into a bin. To convey this coal to the tipple below, a double-track standard-gage gravity incline, 1130 ft. long, has been constructed. This incline is equipped with a 1¼-in. Acme rope and a pair of counterbalanced skips having a capacity of seven tons each. These are operated from a pair of 8-ft. drums controlled from the top loading station. These skips are designed and arranged to automatically discharge into a bin provided at the bottom, and are capable of handling 300 tons of coal an hour.

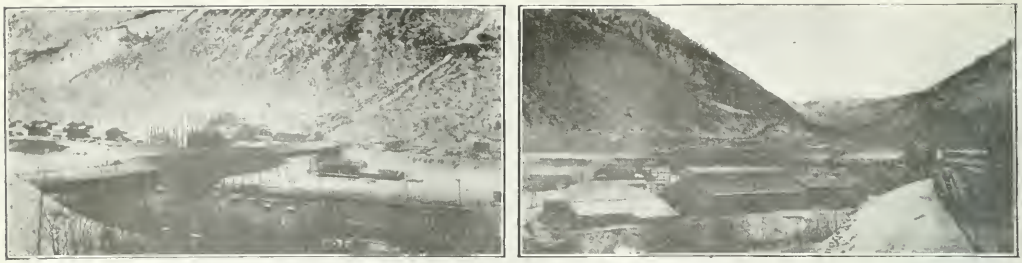
In order to control the landing of a full skip on the bottom grade, it being 63 per cent., while the top averages 43 per cent., a double compound brake operated in connection with two vertical 7-ft. wheels was installed, the one brake being constantly in use while the other is used for emergency purposes only.

The coal lowered by these skips is loaded out of the bin into the mine cars and taken to the tipple by endless-rope haulage. This was a portion of the plant as it existed six years ago and there have been no important changes. One innovation, however, is the Edison safety electric lamp, which is in use throughout the Michel mines in place of the Wolf safety lamps, the latter having been discarded recently. G. W. Williams is the mine manager at Michel Collieries.

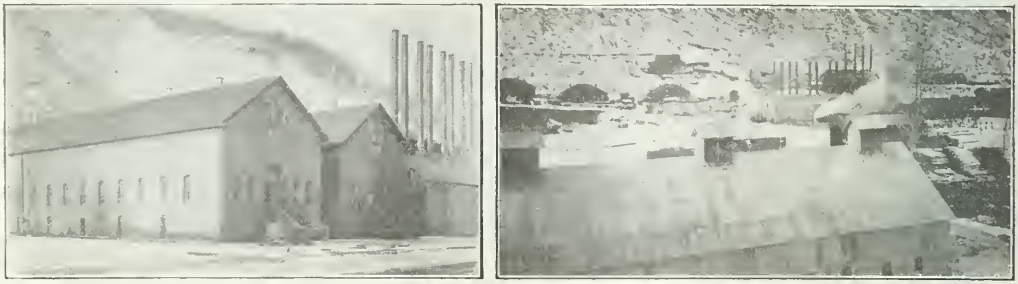
One of the most striking portions of the plant at the Coal Creek Collieries, where Bernard Corfield is the mine manager, is the steel tipple. This is over 900 ft. in length. It has a three-track approach on either side and is electrically operated. It is equipped with rotary dumps and has screening and picking tables, operating on Nos. 1 and 2 sides. There are two sets of hydraulic box-car loaders, which will tip an ordinary 40-ton box car to a 45-deg. angle.

The main power plant has a battery of 13 boilers, capable of developing over 2000 b.hp.; also one high-pressure Ingersoll-Rand three-stage compressor, supplying air for the underground air locomotive haulage; one Walker Brothers "Wigan," and one Rand straight-line low-pressure compressor for supplying air for the underground hoists, pumps, etc. Three electric generators provide power for the operation of the tipple machinery and the lighting system of the town of Fernie.

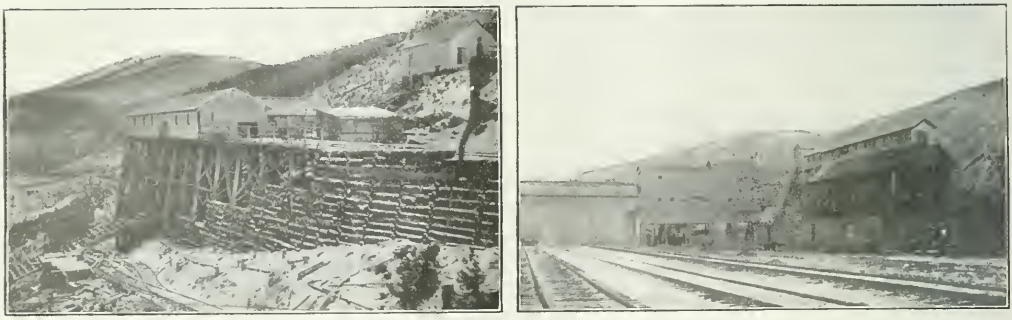
Alterations have been made in the ventilating fans at "B" North and No. 1 South mines in connection with



COAL CREEK COLLIERY AND A VIEW OF THE TIPPLE



VIEWS OF THE MICHEL COLLIERY POWER PLANT AND COAL CREEK POWER PLANT



TIPPLE AT THE NO. 8 MINE OF THE MICHEL COLLIERY AND A VIEW OF THE PLANT FROM THE EAST

the rearrangement following the improvement of the ventilation systems. Here, too, the Wolf safety lamp has been entirely replaced by the Edison electric safety lamp, except that the firebosses use the old lamp for testing purposes. Both at Michel and at Coal Creek the Burrell gas detector has been adopted, there being four of these instruments at the Michel mines and eight at Coal Creek—one for each of the latter mines and a spare. At Coal Creek the company's rescue station is equipped with five sets of two-hour positive-pressure Draeger apparatus, two pulmotors and the necessary spare parts and equipment, while the same in every respect is kept in readiness at the adjoining camp at Michel.

While on this subject it is pertinent to observe that the government's rescue station at Fernie, B. C., is modernly equipped and in constant readiness for emergency calls. It is in charge of J. T. Puckey, who recently went through a special course of instruction in the use of the Gibbs apparatus, which was installed by Dudley Michel, of the first-aid branch of the Department of Mines. The equipment here consists of six sets of the Gibbs apparatus; six sets of two-hour Draeger apparatus, positive pressure; one pulmotor; one oxygen inhaler, and the necessary spare parts and equipment.

W. R. Wilson, the general manager of the Crow's Nest Pass Coal Co., has his residence in Fernie, B. C., while Robert Strachan, who has had long experience as a coal-mine operator, is the inspector of mines for the district.

It is of more than passing interest to know what the temperature is in a furnace and how heat is distributed throughout the boiler. As the temperatures in the firebox are, roughly, 2500 to 2750 deg. F., a permanent installation of a heat-recording instrument at this point is out of the question. In the last passes of the boiler the temperatures often average about 1000 deg. F. The stack temperatures are frequently from 400 to 600 deg. F. These latter temperatures are an indication of what we may expect the temperature to be in the firebox. Close attention to these temperatures may indicate irregularity in firing, which may then be corrected before a change in pressure in the boiler occurs. Also, if the flues are dirty, much heat from the furnace passes up the stack.

DEPARTMENT OF HUMAN INTEREST

Fifth Annual Kansas State First-Aid Meet

By J. J. Rutledge*
McAlester, Okla.

The fifth annual Kansas State First-Aid Meet was held on the athletic grounds of the State Manual Training Normal School, Pittsburg, Kan., June 7, 1919. The event this year differed from previous ones in that there was no contest in first-aid work and there were no judges on the field. The teams simply demonstrated the first-aid problems assigned to them. There were 104 persons on the field giving demonstrations in first-aid work. Twelve one-man events and two team events were demonstrated. The miners were given printed programs listing the events, and were allowed a certain length of time to work out the problems.

A miniature mine tunnel had been built on the grounds near the place where the first-aid demonstration was given, and after the first-aid work had been concluded an explosion was caused to occur which destroyed a portion of the tunnel. Miners equipped with breathing apparatus entered the tunnel, filled with smoke and noxious gases, in order to illustrate how mine-rescue work was carried out in mine workings after an explosion.

In the evening following the contest (or demonstration) there was a banquet in the Normal School, with 400 persons present. Three to six minutes' talks were made by President W. A. Brandenburg, State Manual Training Normal School, Pittsburg, Kan., toastmaster; W. D. Ryan, mine safety commissioner, U. S. Bureau of Mines; W. L. A. Johnson, commissioner, Southwest Coal Operators' Association; Alexander Howat, president, District No. 14, United Mine Workers of America; John H. Crawford, state commissioner of labor for Kansas; J. A. Fowler, secretary, Pittsburg Chamber of Commerce; W. P. Hawkins, president, Western Coal and Mining Co., St. Louis, Mo.; W. T. Morris, inspector of mines for Associated Companies; Ira Clemens, president, Clemens Coal Co., Pittsburg, Kan.; Dr. J. J. Rutledge, U. S. Bureau of Mines, McAlester, Okla.; Joseph Fletcher, general superintendent, Jackson-Walker Coal and Mining Co.; Philip H. Callary, attorney at law, Pittsburg, Kan.; James Sherwood, assistant commissioner of labor (chief mine inspector); and William Harkes, superintendent, Central Coal and Coke Company.

After the banquet the mine representatives of the various teams met together and elected representatives to attend the National First-Aid Contest at Pittsburgh, Penn., Sept. 30 to Oct. 1, 1919. In this way a team of six men and one substitute was provided for, and it is believed much feeling engendered by the ordinary first-aid contest was avoided.

*Mining engineer of the Bureau of Mines in charge of McAlester mine rescue station.

The first-aid teams were composed of two men each. The following coal companies were represented:

	Coal Companies	No. of Teams
1.	Western Coal and Mining Co.	19
2.	Wear Coal Co.	10
3.	Central Coal and Coke Co.	7
4	Jackson-Walker Coal and Mining Co.	5
5.	Clemens Coal Co.	4
6	John M. Young Coal Co.	5
	Total	50
Young men's teams		1
Boys' teams		1
	Total	52

The following towns furnished men for the demonstration: Pittsburg, Arma, Franklin, Yale, Frontenac, Girard, Cherokee, Ringo, Dunkirk, Fleming, Daisy Hill and Washer Camp.

Alabama Mines Hold First-Aid Meet and Barbecue

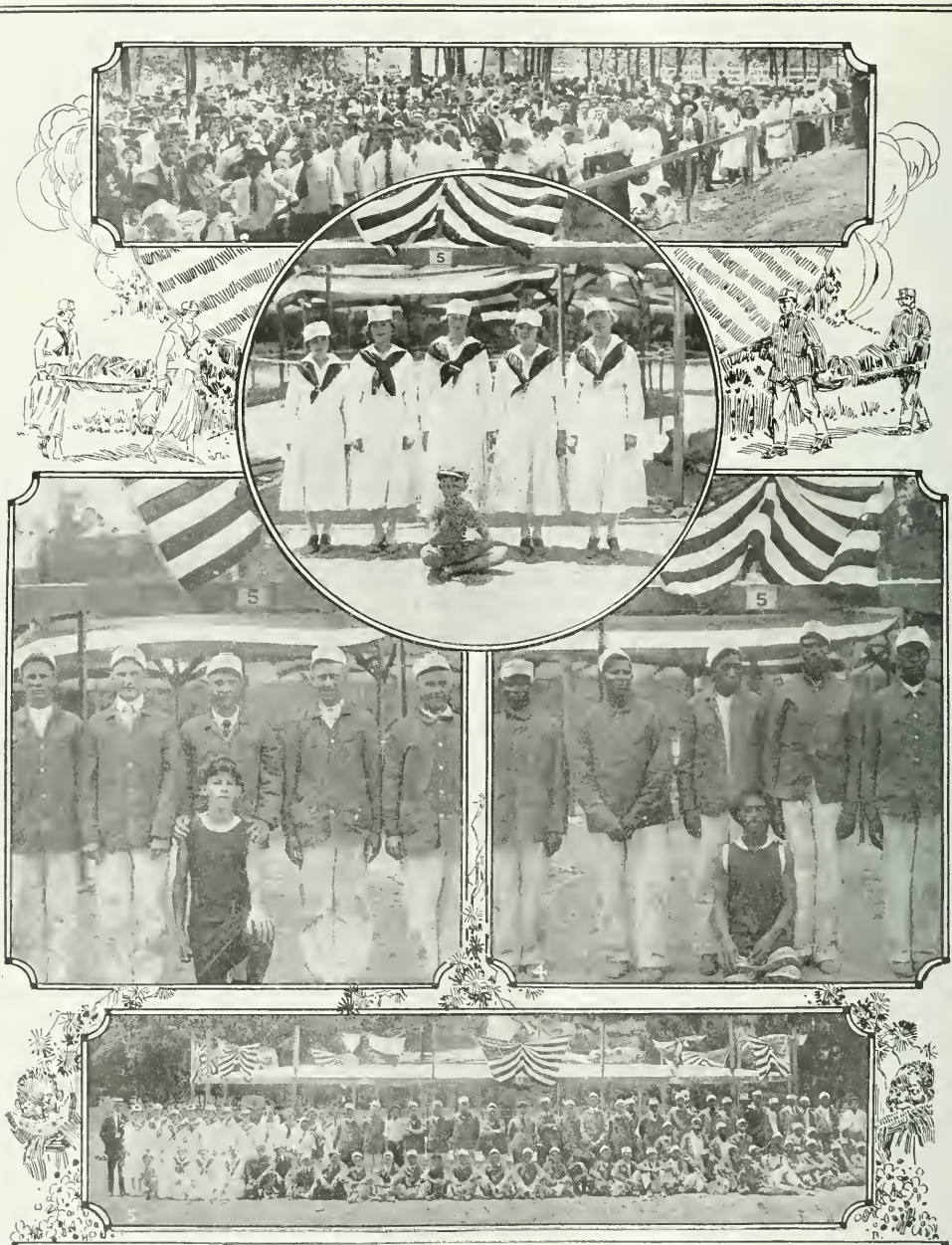
By F. R. Bell*
Margaret, Ala.

One of the most interesting events to many mining people of Alabama was the first-aid field meet of the Alabama Fuel and Iron Co. employees, which was held at Acmar, Ala., on July 4, under the auspices of the U. S. Bureau of Mines. The marked success of the meet was due in large part to the untiring work of James M. Cobb, foreman miner and instructor of the U. S. Bureau of Mines Station, West End, Birmingham, Ala., and to the suggestions and advice of W. B. Plank, district engineer of the U. S. Bureau of Mines, both of whom through their unselfish efforts and pleasant contact, secured admirable coöperation of the men and officials. Although only teams from the mines of the company were permitted to compete in the contests, many mining men of prominence in the state were present as guests and officials.

Fifteen teams competed in the meet, and these were divided as follows: Six teams of white men, six teams of colored men, and three of women, representing the operations at Acmar, Margaret, Acton and Colgate. All the teams were given six events to work out, the problems given the women, however, being different from those given the men, though they were scarcely any easier. The percentages made show that the women did equally as well as if not better than most of the male teams.

Prizes to the amount of $150 in gold were given to the teams finishing with highest average percentages, the respective awards being as follows: Best white male team—$60 in gold—won by Acmar Team No. 1, percentage 95⅝; best colored male team—$60 in gold—won by Acmar Team No. 3, percentage 93¼; best female team—$30 in gold—won by Margaret Team No. 11, percentage 96¼.

*General superintendent, Alabama Fuel and Iron Company.



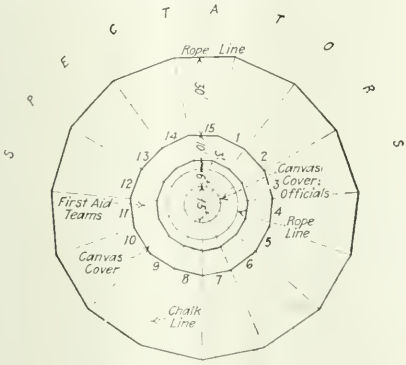
Winning Teams at the Alabama First-Aid Meet

1—Part of the crowd at the barbecue dinner. 2—Winning team of ladies. Left to right: Minnie Guest, Ella Mae Ackridge, Olivia Lilley, Effie Hagan (captain), Annie Mewbourne, Raymond Eddy (patient). 3—Winning white male team. Left to right: Gady Holloway, Wallace Pyles, Robert Hartley (captain), George Hutchins, Joe Hartley, Will Martin (patient). 4—Winning colored male team. Left to right: Jesse Sanders, John Smith, W. Brown, Jeff Washington, Ellis Jones (captain), Dan Davis (patient). 5—Assembly of first-aid teams.

All teams were trained by the standard 1917 method of first-aid instruction for miners, originated by the U. S. Bureau of Mines, and all the judges understood and graded the participants according to this method. The decisions were eminently just in every instance, and the awards met with the general approval of both the spectators and the contestants.

The accompanying illustrations afford an excellent idea of the arrangement of the field, which was found to be most convenient for the teams, officials and visitors.

While this meet was considered by all a delightful success, it is not the first of its kind held by



HOW THE FIELD WAS ARRANGED

employees of the Alabama Fuel and Iron Co., which has always taken a leading part in safety-first and first-aid movements in the state. The Acmar teams have in their possession now two silver loving cups won at the last first-aid field meet held at Birmingham, Ala., in 1916.

In addition to the first-aid contests, all present enjoyed a "barbecue dinner" and other refreshments shortly after the noon hour. In the afternoon there were baseball games between both the white and colored ball teams from the respective mining camps. Dancing also was engaged in by many of the younger folk, and only that weariness that comes to those who have had their fill of pleasure and are willing to call it a perfect day ended the festivities.

Statewide First-Aid Contest Held in Norton, Virginia

Quite a goodly gathering witnessed the first-aid contest held in Norton, Va., the afternoon of Saturday, July 26, 1919, under the auspices of the U. S. Bureau of Mines and the Virginia Coal Operators' Association. Fifteen teams participated, coming from operations in all parts of the state, and the performances of both individuals and teams reflected in great measure the thoroughness of the training they had received.

In the one-man event, which was the first on the program, Team No. 5, from the Stonega plant of the Stonega Coal and Coke Co., captured first prize with a score of 100. Three additional awards were offered for second, third and fourth places, and these went respectively to Team No. 10, Keokee plant, with a score of 100; Team No. 14, Pardee plant, with a score of 100; and Team No. 9, Wilder plant, with a score of 98.

Next came the two-man event, the winners in which were as follows: First, Team No. 2, Roda plant; second, Team No. 7, Clover Fork plant; third, Team No 9, Wilder plant; fourth, Team No. 11, Cranes Nest. All the winners in this event tied on the score, making 100 per cent. The prizes were decided by draw.

In the three-man event, which followed, six teams made an average of 100 per cent. As only two prizes were awarded, these were drawn for, the lucky winners being as follows: First, Team No. 6, Sutherland; second, Team No. 3, Osaka. The other four teams were from Arno, Roda, Wilder and Stonega.

Nine prizes were awarded in the last contest of the day, in which the full teams took part. Two problems were given. Teams Nos. 5 and 15, Stonega and Exeter, tied for the state championship and will therefore jointly hold the championship cup offered by the Virginia Coal Operators' Association. Both teams scored 100 points. The first prize went to Team No. 15, Exeter plant, by draw; second, Team No. 5, Stonega plant; third, Team No. 12, Arno plant, with a score of 99; fourth, Team No. 2, Roda plant, with a score of 98; fifth, Team No. 13, Dorchester plant, with a score of 98; sixth, Team No. 4, Norton Coal Co., with a score of 98; seventh, Team No. 11, Cranes Nest, with a score of 97½; eighth, Team No. 9, Wilder plant, with a score of 97; ninth, Team No. 8, Glamorgan plant, with a score of 96½. The teams from Roda, Dorchester and the Norton Coal Co. tied for the fourth prize, each making an average of 98 per cent., the prize being drawn for. Team No. 5, Stonega, was awarded the special prize of $50 in gold, donated by the Atlas Powder Co. and du Pont Powder Co. for the highest average in all events, making a total of 99⅗ per cent.

The Stonega Coal and Coke Co. was well represented at the meet, seven teams from as many different operations of the company being entered. The Clinchfield Coal Corporation entered three teams, while two teams represented the Wise Coal and Coke Company.

Playground Made in Record Time

The Kingston Coal Co., by clearing, equipping and dedicating a playground at Courtdale, near Wilkes-Barre, Penn., between sunrise and sunset, is believed to have established a record for the anthracite region. On a Friday evening General Manager F. E. Zerbey casually pointed out a vacant plot to a Councilman as a good site for a town hall. The Councilman said it would be better for a playground. "We'll equip it tomorrow, and dedicate it tomorrow night," said Mr Zerbey.

By 7 o'clock Saturday morning workmen were on the ground, wagons hauled up half a dozen swings, material for sand pits, teeters, horizontal bars and rings, sliding boards and other playground paraphernalia. By 5 o'clock everything was finished, a flagpole had been erected and painted, and the flag was flying. Couriers notified the townsfolk of the dedication and got a drum corps into service, and the dedication was held at 7:45 that evening, when the coal company formally turned over the ground to the children of the town.

STATISTICS COMPILED by a large insurance company show that the recent influenza epidemic cost insurance companies $240,000,000 and resulted in the death of 450,000 persons. The figures given cover the autumn and early winter of 1918.

Artificial Gas and Byproducts in 1917

Sales of artificial gas in the United States in 1917 amounted to 342,151,129,000 cu.ft., according to a report compiled by C. E. Lesher, statistician of the U. S. Geological Survey. During the last few years byproduct coke-oven construction made great progress. This is evidenced by the substantial and regular increase in byproducts from such ovens during the years 1915, 1916 and 1917, as shown in the table. Thus the sales of gas from byproduct coke ovens increased 20 per cent. in 1917 over 1916, and 55 per cent. over 1915.

During the same period gas sold from coal-gas plants

The sales of coke from coal-gas plants in 1917 showed an increase of 12 per cent. in quantity and of 52 per cent. in value over 1915. The sales of byproduct coke in 1917 showed an increase over 1915 of 59 per cent. in quantity and of 186 per cent. in value. The sales of tar from all the types of plants noted in the year 1917 increased 41 per cent. in quantity and 38 per cent. in value over sales in 1915. The ammonia produced in various forms has been computed as its equivalent in sulphate for convenience in comparison. Coal-gas ammonia showed a decrease in 1917 under the production of 1915 in quantity and a small increase in value for the same two years, respectively, whereas byproduct coke oven ammonia showed a large increase in both quantity and value for 1917 as against 1915.

ARTIFICIAL GAS AND BYPRODUCTS MARKETED IN 1915, 1916 AND 1917

Product	1915 Quantity Sold	1915 Value of Sales	1916 Quantity Sold	1916 Value of Sales	1917 Quantity Sold	1917 Value of Sales
Gas (M. cu.ft.):						
Coal gas	43,747,432	$40,257,108			42,927,728	
Water gas	124,129,569	112,281,956			153,457,318	
Oil gas	13,971,333	12,668,169			14,739,508	
Byproduct gas	84,355,914	8,624,899	110,061,607	$10,779,208	131,026,575	
	266,204,248	173,832,132			342,151,129	
Coke (net tons):						
Coal gas	1,662,552	7,198,377			1,857,248	$10,953,693
Byproduct	14,072,895	48,558,325	19,069,361	75,373,070	22,439,280	138,643,153
	15,735,447	55,756,702			24,296,528	149,596,846
Tar (gal.):						
Coal gas	47,863,192	1,555,363			53,318,413	1,774,326
Water gas	51,381 911	1,118,656			59,533,208	1,258,683
Oil gas	64,433	4,268			727,556	32,682
Byproduct	138,414,601	3,568,384	185,506,024	4,865,921	221,999,264	5,566,302
	237,724,137	6,246,671			335,578,441	8,631,993
Ammonia sulphate or equivalent (lb.):						
Coal gas	103,842,035	1,329,651			91,540,590	1,362,125
Byproduct	394,256,000	9,867,475	470,530,547	14,152,243	560,792,322	17,903,864
	498,098,035	11,197,126			652,332,912	19,265,989
Light oils (gal.):						
Coal gas	526,651	39,004			770,298	448,855
Water gas	788,876	59,840			6,420,717	1,655,204
Oil gas					205,475	74,035
Byproduct	16,600,857	7,337,371	43,714,429	30,003,360	54,427,266	28,655,264
	17,916,384	7,436,215			61,823,756	30,883,298
Crude naphthalene (lb.):						
Coal gas	222,925	3,565			383,349	9,584
Water gas					16,548	103
Byproduct	465,865	46,959	8,820,405	289,688	17,276,044	569,449
	688,790	50,524			17,675,941	579,136

PRODUCTION OF ARTIFICIAL GAS AND FUELS CONSUMED IN ITS MANUFACTURE

Fuel	Coal Gas	Water Gas	Oil Gas	Byproduct Gas
Anthracite (gross tons)		1,486,305		
Bituminous (net tons)	4,960,297	7,815		31,505,759
Coke (net tons)		1,448,173		
Oil (gal.)	*a* 106,627	684,620,637	137,484,874	
Cannel (net tons)	*a* 1,296			
Product (M cu.ft.)	47,525,148	174,357,536	17,552,855	337,728,251

a Used as enricher

decreased in quantity; the sales of oil gas increased only slightly. The total coal gas produced in 1917—sold as well as lost or used by producers—amounted to 47,525,148,000 cu.ft., the manufacture of which consumed 4,960,297 tons (net) of bituminous coal, 106,627 gal. of oil, and 1296 tons (net) of cannel coal; the oil and cannel coal being used as enrichers. The total water gas produced—174,357,536,000 cu.ft.—required the use of 1,486,305 tons (gross) of anthracite, 7815 tons (net) of bituminous coal, 1,448,173 tons (net) of coke (most of it produced by the same operators in coal-gas retorts) and 684,620,637 gal. of gas oil. The quantity of bituminous coal charged into byproduct coke ovens was 31,505,759 tons (net), which produced 337,728,251,000 cu.ft. of gas.

A striking situation is shown in the case of light oils, evidencing the extent to which this industry was stimulated by the wartime demand for the raw materials required for high explosives. The sales of light oils in 1917 showed an increase of 245 per cent. in quantity and 315 per cent. in value over 1915. The much larger portion of such oils came from byproduct coke ovens. As regards naphthalene, a phenomenal increase both in quantity and value of production was made in 1917 over 1915 from byproduct coke ovens.

THE STATE DEPARTMENT has relaxed the restrictions that have surrounded the issuance of passports to European countries, except enemy countries and Russia.

NEWS FROM THE CAPITOL

BY PAUL WOOTON

Résumé of the Anthracite Situation

Despite the increasing pressure being brought for a congressional investigation of the coal industry, as a part of the efforts to reduce the cost of living, it is understood that Republican leaders in the Senate believe the situation can not be improved by an inquiry at this time. The matter was gone into exhaustively at a private conference at the home of one of the senators, it is understood. The senators seem to be impressed with the evidence, laid before them informally, which purports to show that current prices of both anthracite and bituminous are justified. No attempt has been made to justify Pocahontas prices, but all understand that that is an international matter.

There are, however, in addition to Representative Huddleston, several members of Congress who insist that no satisfactory answer has been given to their question as to why prices go up with the mines working at half time.

Control of distribution, as advocated by the President, is thought here to reflect Dr. Garfield's conclusion that the country must adopt Federal supervision of the distribution of necessities. Among the documents which have been submitted to the Republican leaders studying the coal situation is the following résumé of the anthracite situation:

When the Coal Production Committee under the Council of National Defense undertook in June and July, 1917, to modify prices no changes were made in the then existing prices on anthracite. These prices had not risen abnormally as the result of the wild demand of the preceding winter. Therefore, there was no good reason why they should be reduced. This opinion by Mr. Peabody's committee was concurred in by the Federal Trade Commission.

When, in August, 1917, the Federal Trade Commission recommended its schedule of permissible coal prices to the President, it made sweeping reductions in bituminous, but suggested no change in anthracite prices.

It was not until the miners were granted a further wage increase as of Nov. 1, 1917, that any modification in anthracite price was made. This advance allowed on the prepared sizes was more than the advance to the miners, being in recognition of the fact that the prepared sizes always carry the losses sustained by the sale of the smaller or steam sizes. Therefore, the price advance on the prepared sizes had to carry the full burden of the increased wage given to the miners.

The United States Fuel Administration, which was then in control of price policies in coal, also recommended that the independent anthracite operators—those grouped in the Anthracite Coal Operators' Association—should be allowed to charge 75c. per ton more for the prepared sizes than the railroad coal companies were allowed to charge. This was on the theory, then expressed, that it cost the independents more to produce coal than it did the railroad coal companies. Since all mines were needed, some could not be sacrificed for lack of proper revenue.

These were the only adjustments made in the anthracite prices. The Engineers' Board of the United States Fuel Administration took over, early in 1918, the cost-accounting work done theretofore by the Federal Trade Commission. It made careful and detailed study of the cost of producing all anthracite coal. It obtained complete data from all of the companies. It made a calculation to determine the "bulk line" in anthracite, the same as it had in each bituminous district. It submitted its report and findings in due time to Dr. Garfield.

This report is understood to have shown that 100 per cent. of the mines in the anthracite field were necessary to supply the urgent demand. Under the consistent practice of the Engineers' Board, this should have meant that the approved cost returned by the highest cost mine in the anthracite field would have fixed the price for the field.

However, the basis which was being used consistently in fixing prices in the bituminous field was not employed, for some reason, in the anthracite field. The reason why Dr. Garfield changed his policy upon receipt of this report and why this report was never made public is not known.

However, R. V. Norris, one of the members of the Engineers' Board, read a paper last winter before the American Institute of Mining Engineers. In it he showed that many of the anthracite companies had been operating steadily at a loss under the United States Fuel Administration's prices. The figures upon which his statement rested were representative of the industry before the last increase in wages—that of the late fall of 1918—was granted the anthracite miners.

Anthracite Miners Receive Wage Increase

With the fact of that loss known in the office of the United States Fuel Administration, the anthracite miners were, late in the fall of 1918, granted an increase in wages because it was said their earnings were out of line with those of the bituminous miners.

Although many of the anthracite operators were losing money before this increase, and although it was estimated that this concession would mean an increased cost of producing the prepared sizes of $1.05 a ton, no covering increase in anthracite prices was allowed.

It was not until three months later and when about to relinquish control of all coal prices, that Dr. Garfield made an admission that anthracite should be advanced in price. According to Mr. Norris, many of the anthracite companies were losing money before the last increase in the wages of miners

According to the estimates of the United States Fuel Administration officials and others, the cost of the last anthracite wage increase should add $1.05 a ton to the price of the prepared sizes. According to Dr. Garfield's statement of Feb. 1, 1919, the resultant plight of the anthracite operators should have been relieved, in February, by an increase in price of at least 50c. a ton. That is the situation under which the anthracite trade emerged from price control by the United States Fuel Administration.

In April, 1919, the railroad coal companies in the anthracite field announced their "circular" prices for that month. They were the same as the last prices named by the President, namely:

	Per Ton F.o.b. Mines
Egg	$5.85
Stove	6.10
Chestnut	6.20
Pea	4.80

Beginning with May 1, 1919, these prices were all increased 10c. per ton per month. Thus the August, 1919, price is 40c. a ton higher than the price announced in April, 1919, making the present prices at the mines as follows:

	Per Ton F.o.b. Mines
Egg	$6 25
Stove	6 40
Chestnut	6 60
Pea	5 20

The independents did not adopt any uniform policy with respect to their prices when no longer under regulation. A part of them immediately met the competition of the railroad coal companies and waived their differential of 75c. a ton. They continued in this course for four or five months, regardless of the fact that they were losing money at the rate of from 75c. to $1.25 a ton. When, within the last two months, the buying again became keen, these companies decided to recover their losses by charging as large premiums as they could get. At first, they charged a premium of 50c.; then 75c.; later $1; and now in some instances, they are getting premiums of $1.50 per ton.

Other independent operators continued to charge 75c. a ton more than was charged by the railroad coal companies. That is still their policy.

Even so, they are now losing more money than they did under the Fuel Administration prices. That is, on the prepared sizes they are getting the last price named by Dr. Garfield plus the 40c. a ton which they have added since the first of May. But, while the prices on prepared sizes have advanced they are not able to sell their steam sizes for as much as was obtained for them under the Fuel Administration. The following table will show the decline:

Size	Garfield Company Price	Garfield Independent Price	Present Price
No. 1 Buckwheat	$3 40	$4 15	$3 15@3 25
No. 2 Buckwheat	2 40	3 15	1 75@2 00
No. 3 Buckwheat	2 40	3 15	1 40@1 50

To sum up the price situation in anthracite: If the report of the Engineers' Board of the Fuel Administration had been used as the basis of prices in anthracite, as it was in bituminous, anthracite coal would have been much higher priced during the war.

If the increase given to the miners in the fall of 1918 had been followed by a covering increase in the prepared sizes of anthracite, the price would have gone up at least $1 a ton. Or if, in lieu of that, Dr. Garfield had followed his own inclination as of Feb. 1, the price of anthracite would have been increased at least 50c. a ton in February, 1919.

None of these things occurred. Instead, the anthracite operators postponed making any advance at all until May 1. Then they added only 10c. a ton. They followed this by other increases of 10c. a ton in June, July and August, making the total advance to date 40c. a ton. Thus the anthracite operators, as a whole, have taken seven months to do what Dr. Garfield said should have been done in February.

As the report of the Engineers' Board indicates, the prices charged even now do not meet the last advance in the wages of the miners given nine months ago. This indicates that the entire anthracite industry is still losing money. This loss is increased by the fact that the anthracite operators are selling their steam sizes for less than they did formerly.

To arrive at the selling price of anthracite in the various markets, it is only necessary to add the mine price, the freight rate and the gross margin of the retailer. This, in the major eastern cities, gives this result—using stove coal as a basis:

City	Mine Price	Freight Rate	Retail Margin	Delivered Price
New York	$6.50	$2.68	$2.50	$11 68
Boston	6.50	3 29	2.25	12.04
Philadelphia*	6.50	2.06	2.50	11 06
Baltimore*	6.50	2.68	2 60	11.78
Washington*	6.50	2.68	2 75	11 93
Buffalo	6 50	2 68	2.55	11 73

*Gross tons.

To explain certain prices above these which are occasionally quoted, there must be added: (1) The premium charged by independent operators. (2) Any unusual charges for railway service. (3) Any charges for carrying coal from the curb to the bin.

The total cost of mining anthracite of the independent anthracite operators for April, 1919—not including selling expenses or overhead charges such as interest on investment, income or excess profit taxes or charges for improvement—was $5.309 per ton. The average realization—the money which the miners obtained for all of this coal at the mine—was $5.02 per ton. The average loss to the operator, therefore, was 28.9c. per ton.

Sufficient Coal If Transportation and Labor Do Not Hinder Output

Coal is coming in for much scrutiny in the frenzied efforts being made by officials in Washington to gain information having a bearing on the high cost of living. The best estimates place the country's fuel needs for 1919 at approximately 500,000,000 tons. For the first seven months of the current year, production totals 250,500,000 tons. While that figure is somewhat lower than it would be in a normal year, in which 500,000,000 tons would be produced, production usually speeds up during the latter five months of the year, and it is admitted that it will be comparatively easy to end the year with a full 500,000,000-ton production, provided labor and transportation difficulties do not hamper production to an unexpected extent. The curve of production already is pointing encouragingly upward, and the tendency among coal specialists here is to look at the situation optimistically.

With the realization that transportation plays a very important part in the coal situation, the Senate has passed a resolution by Senator Pomerene of Ohio, calling on the Railroad Administration for the following information:

"First. Give the total number of coal cars now in use in the transportation of coal and the number of empty coal cars belonging to the several railroad companies under the control of the Director General of Railroads which are suitable and available for the transportation of coal.

"Second. State whether the coal cars belonging to the railroads and under said control are now sufficient or have been during the past six months to meet the demand therefor.

"Third. State the number of coal cars which have been constructed or purchased for the account of the Director General of Railroads which are under his control and which have not been sold or transferred to the several railroad companies, and, if they have not been sold or transferred to the several railroad companies, give the reasons therefor.

"Fourth. State fully the methods adopted by the Director General for the purpose of supplying the producers of coal with the necessary cars for transportation of coal to the consumers.

"Fifth. State what, if any, further action by Congress is required in order to meet the demands for the transportation of coal."

IT WAS RECENTLY announced by the Treasury Department that a new credit of $157,549,000 was established for France, making a total of $3,010,026,800 advanced to that country. The total United States loan to all the allies is now $9,615,400,927.

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Fitting Industry with a Flywheel Fund

THERE is an old story—so old that it is almost a legend—that there once lived a man who had a leaky roof on his house. He and his wife used to keep an old door under the bed so that they could get it out quickly and hold it over themselves whenever the downpour within the house became unbearable. When his neighbors asked him why he didn't repair the roof, he replied that "When it rained the weather was too bad for him to go out and drive nails, and when it didn't rain the roof didn't leak." Modern industry works upon a somewhat similar principle.

In the spring of this year a manager declared that he wished he had put in a large order for machinery during the war because since the armistice the company could be induced to buy nothing. He knew that if he had ordered the machines during the conflict he would not have received them, but, at least, they would have been ordered and they might possibly have been delivered after the armistice and before the president of the company countermanded the order. He was greatly in need of them both before and after the conclusion of the war; but, the war once ended, the company would order nothing. Neither low price, quick delivery, the patriotic duty of buying nor the advantage of preparedness would move it to grant permission.

In the war period, when profits were good, the operators, many of them, schemed all manner of plans of welfare work and mine improvement but were compelled to abandon them by reason of the lack of men to put the plans in operation and because of the difficulty in getting material. They deliberately laid aside these plans hoping for a better time later. It would have been preferable to have made appropriations at that time to cover these plans, so that the management as part of its set policy could expend the money when times became less brisk.

The trouble with the public is that it is fiercely anxious to do its work just when every activity is at its height and nothing can be obtained. It stampedes at that time, and yet the moment that business falls off it will buy nothing. The country is in sore need of companies which will not engage in the scramble for men and materials at the busy season but will establish Flywheel Welfare or Improvement Funds to be expended when times begin to slacken and when they have a lot of men idle.

Nothing will do more than this to carry the nation over its deplorable dead centers and keep it going with as nearly even a torque as is afforded by an eight-cylinder motion. A company that will establish such a fund and expend it with due discretion will strengthen its hold on its men, make them more happy and prosperous, save quite a little money and do much to keep the industries of the nation moving steadily. A few years from now our whipsawing way of working ourselves into a frenzy for some months and then resting for some months will seem childish and wasteful of human energy.

Welfare expenditure is quite usually charged to regular mine expense and not to a special account. It goes into the current cost of coal, which is wrong. When a mine is working at full tilt, for lack of men, no improvements are made. Yet there is abundant production to carry the charge. When the mine is working slack the improvements cannot be made because of the small volume of tonnage against which to charge the cost. As a result the work is quite frequently abandoned.

When a man seeks to quadruple his wages above prewar levels and at the same time to multiply his privileges so that his labor becomes costly in an indirect, as well as in a direct, way, how can he find any fault with the cost of living which is now far less than four times as great as before the war?

Putting Welfare Into the Mine Office

OFTEN the last man to receive that consideration which is now being given all mine workers is the mine clerk. The mine office, that busy ganglion of the whole nervous system of the colliery, is frequently the least regarded institution in the mining village. The mine clerk sometimes works from early dawn till late at night in surroundings that are far from pleasant and has to dress in habilaments that show that he expects at times to bill railroad cars, crawl over the top of them and wade through seas of mud.

Sometimes his official supervisor wonders that the clerk allows himself to be surly to those who call to find fault with their semi-monthly statements, but no one can be surprised that the clerk's long hours and harassing duties at times embitter him and prevent him from being that embodiment of good will which all critics of mining conditions call on him to be.

It is common to say that about half the trouble around many camps comes from the clerk's discourteous treatment of the mine worker. There is truth enough to justify that statement, but what has been done to give the mine clerk a chance to show such an exuberance of good will as is expected of him? What care has been taken to indoctrinate him in the peacemaker's art? On the contrary the lack of attention that is shown him induces him to show the same scant attention to other people.

Any man whose welfare is overlooked will overlook the welfare of others. The man who is lightly regarded will lightly regard other men. He takes his cue from the boss and his surroundings, and what kind of a cue can he hope to get from a discourteous superintendent or from an office covered with mud, with unwashed windows and dusty shelves, a room into which everything is brought to be unpacked or stored or where mine clothes are hung up and miscellaneous rubbish dumped into the corner?

It is impossible to keep many of these offices clean, for the building is surrounded by mud and dust. Every stranger tracks in a part of the soil of the village, the visitors strew carbide, lime and oil on the floor, and oftentimes water on the desks. On dry days the dust enters in volumes through open windows, and though there is plenty of electricity available, an office fan is not installed.

In some offices women clerks are employed, and the

change is certainly for the better. No one expects from these the late hours which have been too often the portion of the mine clerk. Every one realizes that there should be a degree of cleanliness and order. But better yet, women above all others can explain the deductions made on statements, quietly and pleasantly. If such explanations do not leave the workman in a quiet strain of mind, the male clerk can then take his place at the window.

In some offices the bookkeeping force has the very poorest of equipment. Adding machines, card indexes, pencil sharpeners and other like aids are unknown. In the larger companies payrolls should be photostated and not copied. Give a thought to the mine clerk; it will certainly pay to do so.

There are many up-to-date offices; sometimes one sees them where the mining camps are far from perfect and where welfare is not considered at all. Some little mine offices are like pretty houses, with vines and trellises. Other mine offices are brick buildings with modern furniture and equipment, clean, bright, cheerful places to work in.

Why cannot all mine offices conform to one of these two patterns? and could not it be arranged that the mine clerk restrict himself largely to purely office duties? Then perhaps he will find a way to hang up his hat when he enters the office, wear house clothes instead of overalls and in general dress the part of an office worker. Perhaps also he will keep the office as neat as his books and make his language to the men at the pay window conform to the general well being.

The miner who is willing to work a full turn is entitled to have an attempt made to supply him with all the cars he can use during the working hours; and he should have them, unless the union purposely and viciously restricts the number of his cars to the number the most listless man on the job is willing to load.

Good Roads in Mining Towns

IT IS by no means an infrequent experience to leave dusty, rutty or muddy roads behind on entering a mining town, for the streets in such villages are quite usually private property and being such are under the care of the superintendent of the mine who is usually a traveled man, the owner of one or more motor cars, and an engineer. He is therefore more likely to know how to maintain roads than the road supervisors of a county, who are quite usually men who have made farming an unsuccessful experiment and now try roadmaking because it pays a sure though small return.

The mine superintendent, moreover, employs men at current wages and not at wages below the market rate, nor does he have to take men on such days only as they are willing to spare for that work, whereas the road supervisor often has to accept farmers to work out their poll or road taxes at such times as suit them. As the roadworkers on country roads elect their employers, the class of work they do, unless they are put on the highway which leads through their farms or from their farms to the railroad station, post office or store, is not apt to be of the most energetic character.

But there are larger causes for the comparative excellence of the roads around the mine village. If the grades are bad there is always rock for a fill easily available. If there is a sink hole or a spring bog to be crossed plenty of sandstone rocks can be found to prevent vehicles being bemired at such places. Tons of ashes and of bone coal, both excellent road materials can be obtained at mines without cost and with only a short haul.

Hence, if the roads in a mine village are bad there is little excuse for it, and it is a sign that the wrong man is in charge of the mine. A mine road should be reasonably free of mud or dust at all times, not only in order to make hauling practical, easy and cheap, but also because no villagers can be clean themselves or have a clean house when, to cross the road, they have to wade through a mud morass. Yet such roads are sometimes to be found in mining towns. Even when the fowls cross such roads they fly high to escape the inevitable wetting the crossing on foot of such wagonways involves in the wet season.

But on the whole the road at the mines gets more intelligent treatment than the country roads and, being in the hands of a better supervisor it is often better than a state road, the work on which is directed by an absentee. The work is done by men better in hand, at times which suit the supervisor and in places that please him. The ballasting is done with better material. These things being so the finished road is well suited for motor or truck delivery.

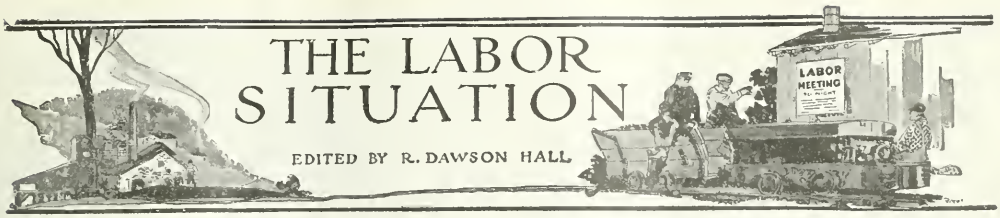
In the United States alone some twenty millions of tons of coal are delivered to the point of consumption without the intervention of the railroad car. This is a prodigious quantity of material and much saving in its transportation would be effected if the motor truck were in general use. There are many other materials besides coal to be transported around the mines and all can be better handled by motor truck than by a mule- or horse-drawn wagon.

One mine intensively worked is worth a dozen spread over a large territory. Some men take pride in the extent of their workings and others in the skill with which they make one or two produce all the output for which they have market.

Who Are the Profiteers?

THE PUBLIC readily groups under the common appellation of "Profiteer" the active and passive recipients of benefits from the public need. The active type consists of those who combine to raise prices; the passive type, of those who are importuned to sell and so name a large figure for their product or are actually offered an exorbitant figure and accept it.

However, the public discriminates somewhat strongly between those who merely quietly combine and those who, like the mine workers and railroad men, combine with bluster and often with violence, who threaten to close business, their own and other, and who prophesy a revolution. The latter, whom the man from Mars would call the more criminal, are, in common thought, very respectable people. It will, however, be impossible for us to call them other than ultra-active profiteers whenever, of course, they seek excessive reward. Thus we have three classes, the ultra-active, the active and the passive profit takers. Strange to say, of late, the ultra-active profiteers have been giving the more passive class the hardest of hard names.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

A peaceful outcome of the election dispute, mentioned last week, is quite likely now that Judge E. C. Newcomb of the Lackawanna County court is to preside over the counting of the ballots. When injunction proceedings were started by the insurgents, whose candidates were declared defeated, Judge Newcomb, who was asked to provide the injunction, which would restrain the officers of the union from exercising their functions, suggested that a recount be made under his supervision. This satisfied the contending parties and a recount started on Wednesday, Aug. 6, the results of which are not yet known. Enoch Williams of Taylor hopes to be president, George Isaacs to be vice president and William Brennan, international board member, if the judge finds that the insurgents have been defrauded of their rights. There are 147 locals in the district and the vote of 20,000 men has been registered, so the inspection of the ballots is no small job. The Locust Gap mine has returned to work. In last week's issue it was explained that its 1000 men had gone on strike to compel six men who were loading their own coal to desist from that practice. The strike was concluded on Aug. 1, it being agreed that the six men should remain idle till the grievance was adjusted.

The miners of sub-district No. 1, of district No. 7, of the United Mine Workers of America assembled in convention at Mauch Chunk on Aug. 6 and adopted a resolution to compel coal companies to pay employees on the 15th day and the last day of each month; asking the coal companies to keep their explosives in 25-lb. instead of 50-lb. boxes, alleging that the latter boxes were too heavy to carry; asking for a complete check-off system; a 50 per cent. increase in wages; an eight-hour day for all fan-, compressor- and pumpmen; a special rate of wages for all men fighting fire in the mines and a uniform rate of wages on all contract mining. They demanded also that all men using powder be paid miners' wages and that the Government appoint a commission to reduce the high cost of living. They placed the length of the working day at six hours, with time and one-half for overtime and double time for Sunday work and demanded an agreement with the operators not to extend over two years. The anthracite men apparently ask more than those in Indiana.

In our issue of July 17, an account was given (p. 125) of a severe explosion at No. 4 mine of the Lehigh Coal & Navigation Co. The cause of the explosion is not known. The officials of the United Mine Workers have been trying to find out if there is any way by which a recurrence of such accidents may be avoided, the whole question of the ventilation of the mines in the Panther Creek region being under discussion. The higher officials of the union have conferred with the local officials of the company. The inquest was put off by Coroner Ira Freyman, so that some of the still-living victims of the recent disaster might attend.

The strike at the mine of the Potter Coal and Coke Co., at Coral, Indiana County, central Pennsylvania, is to be aided by the loan of 50 tents to be shipped from Colorado. They were used by the mine workers at Ludlow during the southern Colorado strike.

> THE policy committee of the United Mine Workers, it was reported Aug. 8, had prepared recommendations to be presented to the convention of the union at Cleveland in September. Among these is one for the nationalization and so-called democratization of the industry. The committee reports as follows: "We concur in the recommendation of President Hayes and declare for the nationalization and democratic management of all coal mines in the United States. We recommend that the three resident international officials be empowered to draft or have drafted for presentation to the international convention when convened a tentative draft of a bill to be presented to congress and providing for nationalization of all coal mines."

It will be remembered that the mine workers with other working men were asked to strike for five days each month so as to compel the release of Thomas Mooney, an Industrial Worker of the World who has been incarcerated in California as being guilty of having caused a violent explosion among the spectators of a procession in San Francisco. At few of the mines throughout the country, as far as can be learned, were men found so foolish as to strike on behalf of Thomas Mooney. The Fort Pitt mine, Bellaire, Belmont County, Ohio, a mine of the Central Coal Co., with some mines in the Belleville district of Illinois, was one of the notable exceptions. When the time came to go back to work the small radical element which adhered to the Industrial Workers of the World had decided that there would be no more work at Fort Pitt mine for a while. Some of the men were not of that mind but they were intimidated into staying away from work.

On Aug. 5, Sheriff John W. Osborne, of Belmont County, swore in a score or more of deputies and armed them with riot guns. He stationed 15 deputies at the mine mouth and ordered them to shoot to kill, in the event of any serious outbreaks. The mine employs about 400 men, a large majority of whom are foreigners. Some of them made up their minds that as they were striking for Thomas, they might as well strike for their own interest—higher wages and a six-hour day.

About 250 men seemed to favor this combination of large pay and smaller service or were little disposed to disagree with the radical leaders, who numbered about 15. Strange indeed it must have seemed to some of them that 150 men preferred to keep a long-standing union promise, which put them under an obligation not to strike or seek a new agreement till the President signified that the war was over. But these men sought to go back to work nevertheless and the vigorous action of Sheriff Osborne made it possible. Let not this trouble be charged to the United Mine Workers. That body did its utmost to enforce the terms of the contract on the striking men. A lot of the men are now working, though many of the strikers have refused to do so.

On the evening of July 25, the men at the Webb mine, at Shadyside, just south of Bellaire and on the banks of the Ohio River, Belmont County, Ohio, the largest mine in the county, employing 600 men, decided to go on strike, claiming that the scales did not register the true weight. Two weeks ago the men quit work because a number of men

claimed their pay was short. On that occasion the difficulty was settled. Then Saturday, July 19, a terrible storm swept the Wegee Valley killing 9 persons and putting the mine out of commission. On Thursday, July 24, the mine resumed, being again in shape to work, but on the Saturday following the mine was laid idle by the strike.

Ratification of the recent New River contract between mine workers and operators was, up to Aug. 8, meeting with stormy opposition at the mine workers' convention of District No. 29, called at Beckley, W. Va. The difficulty seems to lie in the fact that no increase in wages was provided by the contract. In fact, it was intimated that the new agreement made a slight reduction in the scale at several mines.

The mine workers also appear to be objecting to the provision of the new agreement making eight hours' work in the mines mandatory and also to the provision under which strikes are prohibited until grievances have been submitted to a board of arbitration. While it is believed that the miners will ratify the new contract when they once understand it, yet the prospects were on Aug. 8 that the convention would not reach a decision until the present week.

The biggest wage increase ever announced in the Pocahontas field became effective on Aug. 1. Men at some of the operations received little slips telling them of their good fortune, and at one place only was a notice of the increase publicly posted, but neighboring operators requested that these be taken down, the desire seeming to be to notify the men personally.

The wages as increased are said to exceed the wages now paid in any of the competitive fields, being 30c. higher, according to reports, than the union scale in other sections of the state.

Pocahontas Gets an Eight-Hour Day

Furthermore, the eight-hour day has been adopted in the Pocahontas fields. It went into effect on Friday, Aug. 1. It was reported that some of the operators in southern West Virginia were contemplating a 44-hour week in addition to meeting the wage increases announced by the Pocahontas operators.

The action taken was voluntary, but many believe it was taken to forestall the attempts of the United Mine Workers to unionize the field. It is stated that the new rate of wages now obtaining in the Pocahontas coal fields is higher than the wages paid in any field east of the Rocky Mountains, and that it will insure, its promoters hope, an adequate labor supply to the region. It is also stated that it will add about 32c. per ton to the coal cost.

Operators of the Tug River field, who have their association headquarters in Bluefield, were in session Saturday afternoon, Aug. 1, discussing the situation and making preparations to announce a like increase to adjust their wage scale to meet that of the Pocahontas field. The agreement was finally made and the miners in the Tug River field will get a like increase to those in the Pocahontas.

It is said that the change in scale was made so as to offset the increased cost of living and that the additional pay is a scientific adjustment to meet this increase. The decrease in hours will not affect the miners as a class, for they rarely work in the Pocahontas district, or in any other region of the United States, for a full eight hours, but quit when they please. Only a few now work as many as eight hours a day.

Although the mine workers and operators of the New River field in District 29, United Mine Workers, have agreed on a new wage contract to become effective on Sept. 1, subject to ratification by the operators and miners of the New River field, the mine workers of District 17, embracing both the Kanawha and the northern West Virginia field, have so far taken no steps toward formulating their demands for a new scale to replace the one now in force. It will not expire until Mar. 31, 1920, and the mine workers will not determine on what they will ask till they hold their convention at Charleston in September. At that time members of the scale committee of District 17 will be named by the delegates to the convention and the sense of the delegates sounded as to what wages should be paid and as to the general provisions of the new contract.

After the demands of the scale committee are formulated and presented to the operators of the territory embraced in District 17, it is expected that counter proposals will be made by them and that from the proposals and counter proposals a new agreement will be evolved.

Failure to recognize their status as members of the United Mine Workers led about 150 miners employed by four different companies at Adrian in the heart of the Upshur County field on the Coal & Coke Ry. to go on strike on Monday, July 28, but the strike was of short duration as to three of the four companies, the miners returning to work after being out a day or so. The companies at whose plants the miners walked out were the W. H. Greene Coal Co., the Veneer Coal Co., the Baker Coal Co. and the Masontown Coal Co. Miners employed at the Buckhannon River Coal & Coke Co. at Adrian went on strike recently for a similar cause, but with the recognition of the union the miners at that time returned to work.

Adrian, W. Va., Field Returns to Work

President Keeney returned to Charleston from Adrian on Aug. 4, having been in conference with operators at Buckhannon and Adrian in connection with a new contract which was drawn up and signed. As the result of the strike referred to, Keeney was recalled to Adrian, where most of the operating companies agreed to sign the wage contract. Several hundred mine workers were affected by the agreement, all of them returning to work with the exception of those at one mine, the owners of which had refused to sign an agreement.

Another section of the United States where interest was shown in, and support extended to, Thomas Mooney was the turbulent Belleville district across the river from St. Louis, Mo., and therefore, of course, in Illinois. On July 5, mine workers to the number of about 3000 went on strike to compel the state of California to release Tom Mooney. They were fined, as the terms of their contract required, $3 for the day they were idle.

On Aug. 1, they went on strike to recover the $3 and, just as at the Fort Pitt mine in Belmont, they combined their demands anent the Mooney matter with the demand for a new wage scale. They contended that the end of the Fuel Administration marked the end of the contract because the body which promulgated the contract had come to an end, because prices were freed and because the war which made restriction necessary had been brought to a conclusion, as was clearly exhibited by the termination of the work of the Administration.

Fuel Administration Still Doing Business

But the mine workers err, for the Administration is not at an end. The Lever Act provides for its continuance till the end of the war. It may resume its functions actively at any time and become as vigorous as ever, and it intends even now to keep wages at the level it has established.

Twelve hundred mine workers of the Southern Coal and Mining Co., and between 500 and 600 of the St. Louis and O'Fallon Coal Co. are among those on strike. The only mine in the Belleville district unaffected is the Avery mine.

In all there are 48 locals in the strike including those of the Orient mine in West Frankfort and of the mines of Nokomis, Centralia, Breese, Beckemeyer, Troy, Marissa, New Athens, Coulterville and Sparta. These towns are scattered, one being in Franklin and others in Marion, Clinton, Madison, St. Clair, Montgomery and Randolph Counties.

Approximately 1500 miners have been idle in Franklin County, Illinois, as a result of a walkout of men from the mines Nos. 10, 11 and 12 of the Old Ben Coal Corporation at Christopher. The main objection is the "bug," or closed, lights which the company has required the men to use. Two fatal explosions in the last year or so in which 21 men were killed are largely responsible for the strike. Both explosions were said to be caused by sparks from the trolley wheel, and the men maintain that as long as the mine is electrically equipped, the "bug" lights are a detriment rather than a safeguard.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Lawful Examination of a Mine

Letter No. 2—I want to offer a few comments on the letter of Steve Gosnell, *Coal Age*, July 3, p. 18, who very properly criticizes the Illinois State mining law, in its relation to the examination of a mine by the mine examiner (fireboss).

For the sake of safety, it is not sufficient for the mine examiner to comply merely with the wording of the law. It is the duty of that official to locate any dangerous conditions that may exist in the mine or section of the mine in his charge. If, as has been suggested by a previous writer, the mine examiner promptly removed any gas that he might find in a working place, and did not leave the work to be done later, I firmly believe that this would serve a double purpose: First, the gas would be removed at once and there would be no danger of men running into it because they are heedless or careless. Second, the work would be done when few men are at work in the mine.

In my experience the mine examiner may comply with the letter of the law and yet not perform his work in a manner that will insure safety. To my mind, what is necessary is for the state mine inspectors to prescribe rules and regulations for each particular mine or district, according to the conditions that he knows exist in such mines and districts.

For example, most of the mines, in the northern part of this state, are not troubled with gas to the same extent as the mines in the southern districts. There is not the same danger, therefore, in the former as in the latter mines; and the same urgent necessity may not exist for the mine examiner to visit each working place within three hours of the time when the men enter the mine for work.

Danger May Develop in a Brief Time

Experience proves that, in the gaseous mines of southern Illinois, a dangerous condition may develop in any working place, in a short time, and it is necessary that each place be examined carefully, within three hours of the commencement of each shift. For this reason, I believe it is important that the district mine inspectors make such rules and regulations as will apply in each case, and see that they are strictly enforced.

Now, referring to the Illinois statutes and the requirement (Sec. 21) that the mine examiners shall examine the underground workings of the mine, within eight hours immediately preceding the time the dayshift goes on duty each day that the mine is operated, let me say that it is my belief that all state laws should require every mine in the state to be examined by a certified mine examiner within three hours of the time the dayshift goes on duty.

I fully agree with the suggestion made by Robert A. Marshall, in his letter on "Firebosses as State Officials," page 31, of the issue to which I previously referred. Mr. Marshall advises that one set of mine examiners should be employed the entire eight hours of the nightshift, in examining the mine and removing the dangers found therein; and that another set of examiners should enter the mine when the dayshift goes to work and remain throughout the eight hours of that shift.

In the present system of firebossing, the time allotted for the examination of mines is far too short and the territory in charge of each examiner generally too large for him to examine and find out its condition and remove any dangers that may be present, or fence off such places so that no person will enter them unwarned.

Having a smaller number of men in his charge, each examiner would be able to perform his work more faithfully, and this suggestion regarding dayshift examiners would probably avoid the necessity of employing assistant managers (assistant foremen), who cannot be expected to have the same capability for examining a mine, as a mine examiner. GASTON F. LIBIEZ.

Peru, Ill.

Unpractical Examination Questions

Letter No. 1—It was with surprised amusement that I noticed in the issue of *Coal Age*, July 24, p. 165, a few examination questions that, from a practical standpoint can only be classed as "freaks." Such questions, certainly have no place in any properly conducted examination for coal-mining positions.

An examining board that would give them out should be made to publish what they consider the proper answers, at the close of each examination. Then, if the answers so published are not correct, or if they are of such a nature that they cannot be expected from the average intelligent candidate, the board should be removed to make way for persons who can conduct an examination with a little common sense and along practical lines conforming with mining practice of today.

The second question given on page 165 is a fair example of a foolish question. It can only be worked, I believe, by approximation and the result would be out of all reason in its practical application to mining conditions. For example, take an airway having the shape of a trapezoid, say 6 ft. wide on the top, 10 ft. wide on the bottom and 8 ft. high. As this airway is as high as its average width and has a practical shape for a mine passage, it gives about the maximum area for a given perimeter, which is, in this case, 64 sq.ft. to 32.48 ft. of perimeter.

We must now find a shape with the same perimeter and an area of two thirds of the 64 sq.ft., or 42.67 sq.ft., since on the face of the proposition it is impossible to increase the area to 96 sq.ft. and retain the perimeter of 32.48 ft.

After a number of trials, it is possible to arrive at a trapezoid 10.22 ft. wide on the top, 14.22 ft. wide on the bottom, and 3.49 ft. high, which has the required perimeter of 32.48 ft. and an area of 42.65 sq.ft. and is near enough. But, let me ask, Of what earthly use is the answer, now that we have it? Is it not time that examiners were required to give sane examination questions.

R. A. SMITH, Superintendent.
Kingston, Penn. The Kingston Coal Co.

Violations of Mining Laws

Letter No. 1—Referring to the letter of W. J. Heatherman, dealing with the subject of common violations of mining laws, *Coal Age*, June 26, p. 1159, no one doubts the truth of the statement he makes, namely, that many accidents occur as the result of the laws being violated in mines.

Few mining men however, will agree with the statement that "frequently mine foremen may be found who do not realize the gravity of their duties. They are content to go from place to place, begging a cigarette here and some carbide there." In my 10 years of experience as mine foreman, it has been my invariable custom to seek and obtain much information and advice from our state mine inspectors and, Mr. Heatherman is the first inspector whom I have known to underestimate the qualities and standards of mine foremen.

Of all others, the mine foreman is the chopping block of the mine, or the anvil of the mine law. He is the arbitrator between labor and capital; he it is that must stand the blows when the mining laws are violated by men in his charge. Under the high pressure that prevails in the mines, today, there is no time for a foreman to loiter in making his rounds of the mine. On his shoulders rests not only the responsibility for the safety of his men, but likewise, the burden of getting out the coal; and these duties cannot be compared with the conditions that existed 25 or 30 years ago, when the work in the mines was within a short radius of the shaft.

Responsibility for Accidents Rests on the Foreman

No one feels the burden of the responsibility for violations of the mining law more than does the foreman, and no one feels worse than he when an accident occurs by which a man is injured. This is shown by the way in which the foreman hastens to the scene of an accident and cares for the victim, after which he seeks to impress on his men how the accident might have been avoided, with more care and a better regard for the mine regulations and the mining laws.

A short time ago, E. C. Curtiss, inspector, ninth anthracite district, referred to the danger zone, at the working face in a mine, as being winthin a line drawn 15 or 20 ft. back from the coal face where the miner works. For this reason, he urges that extra precaution should be taken by the men when within this danger zone. Mr. Heatherman's idea of having a standard rule established, requiring each miner to set props in a systematic manner in his place, is a suggestion that every practical mining man will endorse.

Systematic timbering has produced good results in the mines of Great Britain where I was formerly employed. Some coal companies insist on a foreman or his assistant remaining in a miner's place until the posts he orders to be set are stood and the roof made secure. My idea is that the discipline, in every mine, should be such that this would not be necessary. The order once given should be sufficient and, if disobeyed, the man should be promptly punished for violating the same. The lack of discipline in mines is a direct cause of many accidents.

Reference is made by Mr. Heatherman to the average foreman closing his eyes to boys and men riding huddled between loaded coal cars. This may be true in exceptional cases; but the uptodate mine of today has traveling ways and manways that make these occurrences rare and punishable when detected by the foreman.

The suggestion that coal operators "assist in organizing a mine foremen's institute, to be held as often as is necessary to allow each mine foreman in the state to attend and hear qualified men lecture on the duties of a mine foreman," attracted my attention particularly; as I have been wondering if it was intended seriously. Do the mine foremen of West Virginia need to be instructed as to their duties? It occurs to me that they would be more apt to listen to a lecture on methods of increasing the tonnage and lowering the cost of production. It is safe to say that few superintendents or managers would place a foreman in charge who did not know his duties.

Let me say, in closing, that the mine foreman, having the miner on one hand and his employer on the other, must be a pretty level-headed gentleman to keep things running properly in the mine, today. The success of the operation depends on the good or bad judgment of the foreman in charge. It is his ability and skill that keeps the coal moving and the mine safe, and no one knows better than the foreman that this cannot be done where the mining laws and mine regulations are violated.

RICHARD BOWEN.
West Pittston, Penn.

Efficiency of Mine Workers

Letter No. 6—After reading the letter of "Equality," June 19, p. 1136, which contrasts conditions in the mines of Great Britain with those of this country, in reference to the suggestion of a 6-hr. day and a 5-day week, I am led to offer a few comments from my own experience in English mines where I worked before coming to this country.

At that time, in England, it was the custom for the diggers to be allowed 7½ hr. bank to bank, or from the time they descended the shaft until they reached the surface again. All daymen were allowed 8 hr. in the mine; and, in my opinion, that time was necessary in order for the average dayman to give a fair return to the operator for the wages paid him.

It is quite true that mining coal in Great Britain is much more arduous than in this country, owing to the deep mines and the low coal. It must be remembered, also, that all work had to be done with safety lamps, as naked lights were seldom used in those mines. Under these conditions, the ventilation of the working places was frequently poor and the conditions far less favorable for good work.

There is never any doubt but that a good digger can load enough coal in 6 hrs. to enable him to make good living wages, provided he can get the cars to load. He is paid by the ton, and the more coal he loads the more money he makes. The result is that he works hard and loads quickly what cars he has in sight. On the other

hand the dayman knows he has 8 hr. to perform his task and he works accordingly.

Now, in regard to there being a greater demand for coal in the winter than in the summer season, let me say that the consumer is largely to blame for this condition. If consumers would buy their winter's coal during the summer, it would help to equalize the demand throughout the year. This applies, of course, more particularly to the coal required for domestic use. The majority of households, however, fail to lay in their winter supply of coal before it is needed. The result is that, as winter approaches, there is a rush for coal and what should be mined in six months must be gotten out in three months or less.

Naturally, the suggestion of cutting down the time in the mines to a 6-hr. day and a 5-day week does not appeal to the operator, as it would be difficult for the mines to meet the demand for coal during the rush season, if the time is to be thus shortened. The capacity of the mine would be reduced, and there would be a general howl for coal such as was heard in 1917, and the price for fuel would soar. TIMOTHY GOLDON.

Clinton, Ind.

Letter No. 7—Referring to the letter of "Equality," *Coal Age*, June 19, p. 1136, it appears to me that its writer is not well informed in respect to the standard of mine ventilation in the coal mines of Great Britain. After an experience of 12 yr. in those mines, and an equal number in the anthracite mines of Pennsylvania, let me say that, while the methods of mining coal in different states and countries may differ, the principles of ventilation when reduced to their essential elements are the same everywhere.

In the bituminous coal field of South Wales, the mines are worked on the longwall system and their ventilation is very simple. There are no such things as leaky stoppings and crosscuts half-filled with rubbish that retard the circulation of air, but the coal being mined in a single face, the air has but one course to travel, and it is natural to suppose that the ventilation is good.

VENTILATION OF LONGWALL MINES COMPARED WITH ROOM-AND-PILLAR WORKINGS

The ventilation of a longwall face is quite different from the ventilation of room-and-pillar workings, where the air must pass up one chamber and enter another chamber through a narrow crosscut, in that manner circulating throughout the mine. Notwithstanding these unfavorable conditions in mines in this country, especially in the anthracite region where the coal is mined on steep pitches, the mine foremen and superintendents in charge have shown their capability by providing good ventilation at the working face.

Now in respect to the relative efficiency of mine workers in Great Britain and this country, it should be remembered that the workers in the mines of Great Britain are born miners. They understand an order given them and know it must be obeyed. Contrast this condition with what prevails in the mines of this country where mine workers speak every language and many fail to understand and obey the orders given them. The majority of our mine workers are like the man from Missouri who must be shown and, even then, he is apt to go wrong.

Again, more attention is given by the miners of Great Britain to seeing that the mining laws and mine regulations are kept and there is less violation of the rules than in this country. Some readers may not know that, in Great Britain, a committee of miners is chosen each month and charged with the duty of visiting all parts of the mine and reporting the condition of the ventilation, timbering, manways and working places.

The report of the committee is published and posted at the head of each shaft and in other places and informs the management of any defects that may exist and conditions that are unsafe. This idea of the inspection of the mine workings by a committee chosen by the miners from their own number is certainly a good one and must tend to encourage the thought that everything possible is being done for the good of the workers.

EFFECT OF VENTILATION ON EFFICIENCY OF WORKERS IN THE MINE

To my mind, one of the most important matters affecting the efficiency of mine workers is the proper ventilation of the workings. Show me a mine that has a large production of coal per man, and I will guarantee that that mine is well ventilated. On the other hand, when one finds a mine that has poor ventilation he is quite safe in concluding that the tonnage per man, in that mine, is below the average.

It goes without saying that good ventilation is essential, both from an economical and a humane standpoint. A miner will produce double the amount of coal in a well ventilated place than he can load when compelled to work in bad air. Neither will he be as exhausted at the end of the shift if he has had good air to breathe throughout the day.

To increase the efficiency of the workers in mines, therefore, give them good air and make their places safe and sanitary. The free atmosphere of heaven is the only thing that the poor share equally with the rich. Let us see, then, that the gloom and smoke of the mine is driven out by an ample current of pure air fresh from the surface.

It is my opinion that mine examining boards should ask more questions bearing on the ventilation of mines than usually appear in the examination of mine officials. It would inspire candidates to increase their knowledge of the principles of ventilation and make "Ventilation First" the slogan in mining practice. If ventilation is first safety will surely follow.

West Pittston, Penn. EFFICIENCY.

Turning Rooms Without Sights

Letter No. 4.—I have been interested in the different methods suggested for turning rooms and entries, without setting sights by the use of an instrument, and will mention a method that has been in use in our mine and which possesses the advantage of requiring a more portable outfit than what has been described previously. A small pocket tape is all that is necessary in this case.

Assuming that the two last instrument points, established on the entry, are in place, the first step is to locate a point on this line or its extension, at a convenient distance, say 3, 4 or 5 ft. from the instrument point, where it is desired to make the deflection. The location of this point must be carefully made so that it will be exactly on line with the instrument points. Under a good slate roof, it will often be found easier to first scratch the arc of a circle, using the tape as a

radius and taking the last intrument point as a center. This will give the proper distance and the new point is then easily marked where the instrument line intersects this arc.

Having located the first point in the extension of the instrument line, the next step is to lay off a right angle with that line, at the point just located. This is most easily done, by the use of a tape in the usual manner, taking the side of the right triangle as 3, 4, 5. Reference is now made to a table of natural tangents. The tangent of the desired angle is multiplied by the distance of the located point from the instrument point, which gives the distance to be measured on the perpendicular to the instrument line extended. A spad is now driven in the roof and the distance, from the point first located to the spad, is carefully checked by measurement. The line from the instrument point to this spad gives the required sight line.

This method, of course, is only used where great accuracy is not important; for example, when extending sights in rooms that have gotten off center, but have not much farther to be driven. The use of the method saves bringing up the instrument and making another set-up at the face of the room. The same method is also employed in setting sights for short rooms near the crop.

Where a pair of entries have reached the proper distance and their direction is to be changed it is often inadvisable to put in the instrument sights, until the entries have been driven a short distance in the new direction. In that case, the method I have mentioned is employed to give sights on the new course and prevent the entry from running into the air-course, which is turned in the same dierction.

WALTER H. DUNLOP, Division Engineer,
Kingston, W. Va. Solvay Collieries Co.

Outlook in Coal Mining

Letter No. 3.—In the issue of *Coal Age*, June 19, p. 1138, a correspondent asks for suggestions from those who are interested in the welfare of the coal industry, regarding what measures can be adopted that will help the many newly developed mines that were started during the war, with capital that was invested largely in a spirit of patriotism and are now handicapped by reason of the present depression in the coal market.

While it may be unkind to judge of another's motive, one can hardly refrain from holding the opinion that the majority of these newly opened mines started during the war were either efforts to make hay while the sun shines, or were misguided attempts of men inexperienced in the mining of coal. This opinion is based on my own personal observation in the southern Illinois coal field and on the statement of men of good judgment in mining matters, who have recently visited other fields.

Allow me to refer to the case of a certain mining town in the Franklin County field, in Illinois. Previous to the war there were, in that field, three well established mines averaging a daily output of 3000 tons and employing from 300 to 400 men in each mine. When the coal boom started, two "mushroom" mines sprang up in the same field, and employed between them about 100 men.

As time went on, it was not long before the larger mines lost a good percentage of their motormen, drivers, etc., by reason of the men volunteering or being drafted for service. They were mostly the young and energetic class among the workers; and every practical coal man knows that the loss of these men could not fail to cripple the output of the mines in a larger proportion than would be indicated by the number of men involved. It is not strange that the three established mines mentioned experienced a falling off in tonnage as great as 1000 tons a day.

Again, some of the few capable and energetic workers remaining decided, for various reasons, to go to work in the smaller mines. One inducement offered them was that the smaller mine is worked under a less pressure than a larger operation. As a result, we find hoisting engineers, top hands, cagers, trackmen, and others idly sitting about the "shoestring mine," waiting for a few diggers to produce from 300 to 400 tons of coal a day to "help win the war."

HANDICAPPED BY LACK OF EQUIPMENT

Can anyone deny that, had these few diggers, at work with a full complement of shift hands top and bottom, remained at work in the established plants where the output was seriously lowered by a shortage of men, they would have produced more coal and fulfilled their patriotic duty better, because those mines were equipped for putting out high tonnages, to say nothing of the fact that their entire equipment was already installed and had stood the test.

In closing may I ask, Is the coal trade now to be burdened by the extra drag upon its resources, caused by the helpless condition of these small operations, that, because of their ill-directed efforts, added little or nothing to the coal supply, whatever may have been their motive.

It is even suggested that this plaint of the mushroom mine owners is a veiled plea for the government ownership of mines. In any case should those loyal operators, who kept up the industry through the long years preceding the war and have borne unmeasured burdens, accept of this additional burden now thrown on the industry without protest?

OBSERVER.
Duquoin, Ill.

Certification and Safety

Letter No. 14—I was much interested in reading the letter of John Rose, *Coal Age*, July 10. p. 68, regarding the need of the certification of mine officials. Like Mr. Rose, I believe that a certified mine foreman who does not continue to study along with his work, just as he did before he passed the examination, is not on his job and can expect accidents to continue to occur in his mine.

In my opinion, any man who takes a job as fireboss, assistant mine foreman or foremen before he has obtained his certificate, is not fit to look a certified man in the face. Here, in our town, we have men that are acting as assistant mine foremen, and, in some cases, night bossing, when they only hold fireboss papers. What seems strange is that if these men think they are capable of doing the work and taking charge of a mine, why do they not go before the examining board and secure their papers?

It is my belief that accidents in coal mines will not be reduced to a minimum until all bosses, from the superintendent down to the fireboss, are obliged to under-

go an examination every three years and to have had eight years' practical experience in the performance of all kinds of work required in coal mines, before they are permitted to take the examination.

The compensation law is a good law in the provision it makes for the injured and those dependent on a man who has been killed by an accident in the mine. It is time, however, that our mining laws provide better for the safety of the living, who may yet be injured by reason of the ignorance of men holding official positions and in charge of mining operations. It is a wonder to me that our mine inspectors and the better class of mining men do not get busy and move up about six notches in the matter of securing greater safety by compelling the examination of all men in charge of work undergound.

Speaking of firebosses, I claim that a candidate for that position should have at least eight years' experience in the mine. The fireboss is the guide to the safety of every man working below and on his intelligence and experience, their lives depend. Next to him comes the foreman, but that official is often not his own man, being compelled to follow the instructions and orders given him by his superintendent.

Young Superintendent a Stumbling Block to a Good Foreman

In one of the larger mines in Fayette County, in this state, the superintendent is a young man who never worked a day in his life underground, but was an engineer running a transit and educated in his line of work. It will be readily admitted by practical mining men that you cannot run a mine as you would run a transit, and a superintendent of that class can only prove a stumbling block to a good mine foreman.

What man who is familiar with mining work will say that such conditions are not the cause of six-tenths of the accidents occurring in our mines? For instance, the fireboss finds gas some morning when making his early examination of the mine and reports the fact in his book, with the result that the mine inspector takes the matter up with the superintendent and the poor fireboss loses his job. The superintendent then goes to the foreman and tells him to put John Smith to firebossing, who will probably be shrewd enough not to find the gas that the last fireboss reported.

Not long since, I worked in the place of a foreman who was away temporarily. The superintendent of the mine was of the class I have described. It will not be thought strange that I found the miners supplied with a cable and battery and firing their own shots at will. To my remonstrance, they replied that it was the orders of the bigboss.

Under such conditions, how can we expect safety in mines to be assured and the accident list grow less. Though a comparatively young man not yet 40, let me say to both firebosses and foremen, If you are bossing, be your own boss and guided by your own judgment.

Olyphant, Penn. John Wiley.

Letter No. 15.—Referring to the interesting discussion on this subject, allow me to express my opinion regarding the employment of *certified* mine foremen, and to say that none other should ever be given the charge of a mine. The certified man should be a thoroughly practical and experienced miner. It makes little matter what is his nationality, but he should be a man that can go with a miner and show him how to work a breast, drive a gangway, draw back a pillar, set timbers and do other work required in the mine.

At the present time I am holding a position as assistant mine foreman. Before I became a certified foreman, I had performed every kind of work done in the mine. Judging from that experience, I am convinced that a man can only become a thoroughly practical and competent foreman who has done work of all kinds. He may have started in the mine as doorboy, later becoming a driver and performing daywork as trackman, timberman, or mining and loading coal in breasts and gangways, till he has at last gained experience necessary to draw pillars with safety. Such a man, I consider is one capable of taking the examination and becoming a certified foreman.

Foremen Must Have Practical Experince

As showing the need of a thoroughly practical experience for a mine foreman, let me cite a little incident that occurred not long ago in our mine, which is worked on the room-and-pillar system. Two miners were engaged drawing back a pillar between a couple of breasts that had caved, the outside breast being full of coal and rock above the battery, which had been built 30 ft. up from the gangway. The pillar was cut through at that place, when it was found that the chute was full of coal and rock.

Having inspected the place carefully, I gave the men instructions to brace the rock with strong timbers, and then get down to the bottom and put in a hitch or foothold for setting a good timber in front of the rock. They started to carry out my instructions, and I left them. As was learned later, the work had progressed far enough to give some protection behind the timbers. But, suddenly, the coal started to run and cut off the escape of one of the men, who was left shut in behind the battery.

Foreman by Promp Action Saves the Life of an Entombed Miner

Word of the accident coming to me while at dinner, I at once ordered an empty trip and, reaching the place, found one man loading a car at the gangway, while another stood idle at the battery. In response to my question as to why he had not tried to make an opening, he replied that he could do nothing.

Calling for a pick and a bar, I at once set to work and, in a short time, had opened a place the size of a car wheel. I shouted to the miner to slide himself through, but he was afraid to make the attempt. By a few words, however, I convinced him it was his only chance and instructed him to put his feet through the opening first, which he did and was then pulled through bodily to safety, white as a sheet and scarcely able to speak a word, but not hurt. Coal was loaded from that place for the next five days.

Let me say, in closing, that a competent mine foreman will have little trouble with his men if he talks quietly with them and reasons with them. It is that kind of a foreman that gains the confidence of his men and is liked by them. No foreman will make a success who thinks he knows it all. A foreman can always learn something from a miner, and we all have much to learn.

Fern Glen, Penn. Jacob J. Skoff.

[This letter will close the discussion of "Certification and Safety."—Editor.]

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Electrically-Driven Fan

I am inclosing a sketch of the present fan installation at one of our mines, showing a 10-in. pulley on the armature shaft of an electric motor that is operated at a speed of 645 r.p.m. The 10-in. pulley *A* is connected by a belt with a 36-in. pulley *B*, mounted on a countershaft that carries another 22-in. pulley *C*, which is, in turn, belted to a 60-in. pulley on the fan shaft. The distance from the armature shaft to the countershaft is 11 ft., center to center; and that from the countershaft to the fanshaft, 13 ft., center to center. The fan is 16 ft. in diameter and makes about 70 r.p.m. under the present arrangement.

It is now proposed to replace the 10-in. pulley on the armature shaft with a 12-in. pulley and connect this

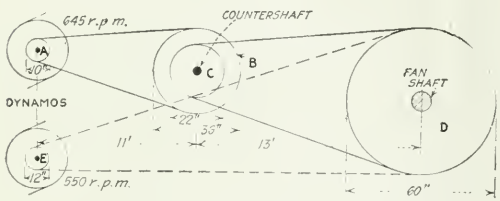


DIAGRAM SHOWING THE PROPOSED ELIMINATION OF COUNTER SHAFT

directly by belting it to the 60-in. pulley on the fan shaft, thereby eliminating the countershaft and its pulleys. Under the new arrangement, the motor will be operated at a speed of 550 r.p.m.

The original installation required a current of 40 amp. to operate the fan, and I want to ask, What current and what horsepower will be required in the new arrangement? In other words, What horsepower will be required to run the motor at the given speed (550 r.p.m.) and operate the fan, after the change is made, assuming no change is made in the circulation in the mine?

U. S. WILSON.

Briceville, Tenn.

The first step, in the solution of this problem, is to calculate the speed of the fan shaft, in the original installation, when the armature shaft is running at 645 r.p.m. Since the speed ratios of the consecutive shafts are equal to the inverse ratios of the diameters of their respective pulleys, each to each, we have for the speed of the fan shaft, under the first arrangement, the following:

$$\frac{x}{645} = \frac{10}{36} \times \frac{22}{60}; \text{ and } x = 65.7 \text{ } r.p.m.$$

The next step is to find the speed at which the fan will be driven after the change is made, the armature shaft of the motor then making 550 r.p.m. and carrying a 12-in. pulley belted to the 60-in. pulley on the fan shaft. Evidently, the first pulley having one-fifth the diameter of the second pulley, the speed of the latter will be one-fifth of the former; and the fan will now be operated at a speed of $550 \div 5 = 110$ r.p.m.

But, the power of the motor required to drive the 16-ft. fan at this increased speed is dependent on the mine potential, which remains unchanged. In other words, the resisting power of the mine is assumed constant, no change being made in the circulation in the mine. The quantity of air circulated by the fan, in that case, will vary as the fifth root of the fourth power of its speed. In other words, the quantity ratio is equal to the fifth root of the fourth power of the speed ratio of the fan.

Comparing these two installations, therefore, the quantity ratio is as follows:

$$\frac{q_2}{q_1} = \sqrt[5]{\left(\frac{110}{65.7}\right)^4} = 1.51$$

In other words, after the change is made, and the fan is operated at a speed of 110 r.p.m., the circulation in the mine will be increased 1.51 times, or slightly more than half-again the original volume.

In mine ventilation, however, the power on the air varies as the cube of the quantity of air in circulation. In other words, the power ratio is equal to the cube of the quantity ratio. Hence, in this case, the power required to operate after the change is made will be $1.51^3 = 3.44$ times the original power. But, assuming the voltage remains unchanged, the current will varry in the same ratio as the power and the current required to drive the fan at a speed of 110 r.p.m., after the change is made, will be $40 \times 3.44 = 137.6$ amp.

Therefore, disregarding the lesser frictional resistance, owing to having eliminated the counter shaft and pulleys in the second arrangement, the power comsumption will be increased 3.44 times, while the circulation will be increased only 1.51 times. This, however, is the natural result of any attempt to increase the circulation of air, in fan ventilation, by increasing the speed of the fan.

Whenever the circulation in a mine requires to be increased, every effort should first be made to clean up the airways, straighten air-courses, shorten the distance of air travel, enlarge breakthroughs and crosscuts and avoid sharp bends where it is necessary to deflect the course of the air.

Wherever practicable, the air should be split, which greatly enlarges the mine potential and decreases the mine resistance. To increase the circulation in a mine by increasing the speed of the fan is always an expensive use of power and should only be resorted to when other means are impracticable. This is particularly true in electrical operations where power must be purchased from a central station and it is necessary to minimize the amount of current consumed.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Indiana Mine Bosses' Examination, Held May 24, 1919

(Selected Questions)

Ques.—(a) Name the various devices used in conducting and distributing the ventilating air currents in a mine, giving the purpose or use of each. (b) What is the law respecting breakthroughs, air splits, trapdoors, and quality and quantity of air?

Ans.—(a) A *door* in a mine is used for the purpose of deflecting the air current from its course through one entry and causing it to circulate in another entry or section of the mine. A *canvas* or *curtain* is often used instead of a door, either to avoid the expense of building the latter, or when it is desired to deflect only a portion of the air current and allow the remainder to continue on its course by leaking through the curtain, which is divided at the center.

An *overcast* or *air bridge* is built over and across an entry or airway, for the purpose of conducting one air current across another, to enable the ventilation of a pair of cross-entries or section of the mine, by a split of air taken from the main current, without the use of doors on the main entry.

A *stopping* consists of a solid wall or partition built in a breakthrough or crosscut to prevent the air current from short-circuiting at that point and conduct it to the head of the entry where it passes through the last open crosscut and then returns through the back entry or return airway.

A *brattice* is constructed by setting a line of posts a short distance from and parallel to one rib of an opening, so as to form an air passage to conduct the current to the face of a heading or room. A stopping is sometimes improperly called a brattice.

A *regulator* is any device for regulating the volume of air circulating in an airway or section of the mine, its purpose being to divide the air in proportion to the needs or requirements in each section. A *box regulator* is a partition built in an airway and having an opening, the size of which is controlled by a movable shutter arranged so as to permit any desired quantity of air to pass through the opening. The box regulator is commonly placed on the return airway or back entry to avoid obstructing the haulage road. A *door regulator* is sometimes built at the mouth of an intake heading and locked in a position to divide the air in the desired proportion between that heading and the main airway when the haulage is performed on the return air current.

(b) Consult the mining laws of Indiana, which every candidate should study to become familiar with its requirements.

Ques.—In the absence of oxygen helmets, how would you proceed to enter a mine for rescue work after an explosion ? Explain in full.

Ans.—Having called for volunteers and sent for doctors, organize and equip the men selected because of their experience and familiarity with the mine workings, giving to each an approved and carefully assembled safety lamp and the necessary tools and other supplies, which have been brought together in the meantime.

Before the rescuers enter the mine, it is necessary to examine the ventilating apparatus and see that it is working properly, or make the necessary repairs to that end. At the first announcement of disaster, physicians and first aid men are summoned, and ambulances and the necessary blankets and first-aid supplies are brought together and made ready for use if required.

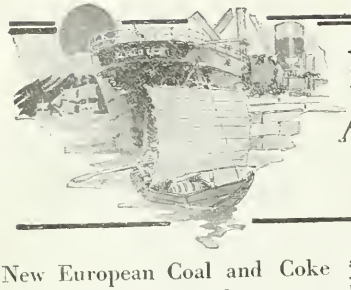
Divide the party into two divisions, placing each under a competent leader. The first and smaller division now enters the mine with the air current and proceeds with caution, not advancing ahead of the air. This party is equipped with one or more cages containing small birds or mice for the purpose of detecting the presence of poisonous gas, by observing its effect on the life in the cage. The work of this party is to examine and explore the entries and workings as rapidly as possible and rescue any victims that may be found, carrying them back to fresh air or to the surface and giving such first-aid treatment as may be required to restore consciousness.

The first party will also be able to give information that will assist the second party in its work. They are chiefly employed in rebuilding stoppings and erecting brattices to carry the air forward and restore the circulation in the workings. For that purpose this party is equipped with the necessary tools and supplies of canvas, timber, brattice boards, nails and other supplies.

Ques.—What are the dangers to be watched for and guarded against in a gaseous mine?

Ans.—The particular danger common to a gaseous mine is that due to the accumulation of gas in the workings or in abandoned places that are either improperly ventilated or have been partially sealed off. There is also danger of the possible accumulation of gas in crevices and pockets caused by the settlement of the roof slate over roads and in working places. Gas will occasionally accumulate, in crevices of the coal, under sufficient pressure to throw down a large section of the rib in an entry or working place. A similar accumulation in the roof strata will often cause a sudden and unexpected fall of roof. These occurrences are known as "outbursts" of gas and often prove disastrous.

The working of a gaseous mine requiring the exclusive use of safety lamps often proves dangerous owing to the permitted used of open lights on the haulage road. Gaseous mines are particularly sensitive to sudden barometric changes, especially where there are large abandoned areas containing accumulated gas. In a gaseous mine it is necessary to watch all ventilating apparatus and appliances for conducting the air current in the mine to insure their proper working condition.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

New European Coal and Coke Tariff Issued

A new European coal and coke tariff has been issued by the Shipping Board, covering shipments from North Atlantic ports and Charleston, S. C., effective Aug. 1, 1919. It is as follows:

To	Coal per Long Ton	Guaranteed Daily Discharge, Tons	Coke per Long Ton	Guaranteed Daily Discharge, Tons
Bordeaux, Havre, St. Nazaire	$22 50	700	$33 75	600
Cherbourg	22 50	700	33.75	600
Rouen	23.00	1000	34.50	600
Antwerp, Rotterdam, Terneuzen	22 50	1000	33 75	600
Gothenburg	24.00	1000	36.00	600
Landskrona, Malmo	25 00	800	37.50	600
Oxelosund	24 00	1500	36.00	600
Stockholm	26.00	800	39 00	600
Helsingfors, Sundsvall	28.00	800	42 00	600
Bergen, Christinia, Copenhagen	25 00	1000	37 50	600
Korsor, Ronne	26 00	1000	39.00	600
Trondhjem	27 00	1000	40 50	600
Lisbon	22 50	1000	33.75	600
Bilbao, Cadiz	23 50	1000	35.25	600
Barcelona, Cartagena	26 00	1000	39.00	600
Cette, Marseilles, Naples	26 00	1000	39.00	600
Civitavecchia	26.00	1000	39.00	600
Nice, Genoa, Leghorn, Spezia, Savona	26 50	1000	39 75	600
Piraeus	28.50	1000	42.75	600
Venice, Trieste, Fiume	31 00	800	46.50	600
Salonica	31 00	1000	46.50	600
Bari	30.00	1000	45.00	600
Constantinople, Constanza, Smyrna	31 00	1000	46.50	600
Algiers, Oran	26 00	800	39.00	600
Tunis	26 50	1000	39.75	600
Sax	27.50	1000	41.25	600
Alexandria, Port Said	31.00	1000	46 50	600

Discharge is as above indicated, with time counting 24 hours after arrival of vessel, whether in berth or not, Sundays and holidays only excepted. If discharge is not completed within the time specified, demurrage is to be paid at the rate of $1 per net registered ton per running day, payable day by day.

Coke is subject to the condition that vessel is to have the option of carrying not over 25 per cent. on deck at owner's risk.

Sheffield Coal Trade in 1918

The outstanding features of the Sheffield coal trade during 1918 was the shortage of supplies. According to figures published by the Coal Controller, the output up to the middle of September was over 15,000,000 tons less than for the same period in 1917, which with the increased requirements of certain of the Allies made an estimated shortage of 36,000,000 tons for the year. The position became so acute that the Coal Controller issued a household fuel and lighting order which went into full operation on Oct. 1. By this order supplies were rationed, the quantity allowed each householder being roughly 1 ton per room per annum, which could be used either in the form of coal, gas, or electricity. Coal prices have been strictly controlled; pit prices by the Prices of Coal (Limitation) Act; factors' profits by the wholesale coal prices order; and retail prices by local authority under the household fuel and lighting order. At the end of 1917, prices were 60 cents per ton higher than the standard advance of 96 cents allowed in 1915. During 1918 there were two further all-round advances—36 cents per ton in June and 60 cents per ton in July—which makes the present price $2.52 per ton higher than for the twelvemonth ending June 30, 1914.

A big strike of Yorkshire miners took place in June and resulted in a wage advance of 36 cents per day, by which the closing of a number of pits, which had given notice, was avoided. In the following month the miners obtained an increased war-wage bonus of 36 cents per day for workers over 16, and 18 cents per day for those under 16, which was in addition to a similar amount obtained in October, 1917. August saw more unrest, accompanied by strikes, at a time when the shortage of coal reached an acute stage. More than 170,000 men threw down their tools on this occasion, the grievance relating to the hours of surface men and laborers. The men won their case, the new arrangement being 51 hours' work per week instead of 54, or 8½ hours per day, with half an hour off for meals. It should be explained that th war-wage bonuses were given solely to cover the increased cost of food and are distinct from the various percentage wage advances and the war bonus given since the war.

Since the signing of the armistice demobilization has commenced, and men in the army who were formerly engaged in coal mining have been placed in the priority list. Already a good many thousands have resumed work. The coal shortage is, however, still acute, and it is generally conceded that more miners were taken away from the industry than was advisable, considering how much the success of the war depended upon the maintenance of an adequate supply of coal.

Coal and Coke Exports During May, 1919

Exports of coal as reported by the Department of Commerce for May, 1919, and the figures in May, 1918, in tons as finally revised, are as follows:

	May, 1918	May, 1919
Anthracite	425,110	398,890
Bituminous	2,119,700	1,429,612
Exported to:		
Italy	None	35,908
Canada	1,766,785	1,088,026
Panama	50,108	None
Mexico	14,181	6,810
Cuba	137,048	90,112
Other W. Indies	25,717	11,914
Argentina	14,750	22,589
Brazil	79,400	109,868
Chile	None	4,931
Uruguay	4,529	8,362
Other countries	27,182	51,092
Coke	146,740	33,299

Hoover Asked to Help in Coal Shortage Abroad

Shipping and fuel representatives of France, Belgium and Italy conferred with Herbert Hoover, head of the International Relief Organization, in Paris on Aug. 4 and decided to urge the Supreme Council of the Peace Conference to appoint a European Coal Commission to co-ordinate the distribution of European coal in an effort to avert what threatens to be a disaster.

The meeting was held as the result of a warning given by Mr. Hoover in an address at the recent conference in London of the Supreme Economic Council. He said that Europe's coal production was 25 per cent. below normal and that the United States could not offer relief because of the shortage of shipping. In his address Mr. Hoover said:

"The fate of European civilization now rests in the hands of the coal miners and coal mine owners of Europe to an equal, if not to a greater, degree than in the hands of the providers of foods and supplies during the next year."

At the meeting in Paris Mr. Hoover declined to accept the permanent direction of the proposed European Coal Commission, stating that he believed the problem to be strictly European and that the situation could not be relieved materially by the slight help which the United States could give.

Mr. Hoover said to the fuel representatives of the various Governments:

"The coal problem, with that of the approaching harvest and the solution of the immediate food pressure comes to the front as the greatest menace to the stability of life in Europe. This problem is domestic to Europe and is incapable of solution from the United States. Disregarding all other questions, an additional load of 1,000,000 tons monthly on American ports would, indeed, be a large tax, in the face of the trebling of the food exports of the United States above the normal prewar level. Furthermore, such a tonnage would entail a tax on the world's shipping which cannot but affect freight rates generally. With a shortage in production of 20,000,000 tons per month, the contribution of even 2,000,000 tons monthly from America would be of little importance."

Only a greatly increased coal production and an improved organization for its distribution could save Europe from disaster next year, Mr. Hoover explained, and he urged that some sort of fuel control be established which would greatly stimulate production and secure such distribution as would maintain essential services on which economic and political stability must rest.

According to figures gathered for Mr. Hoover by experts, England's annual production of coal has fallen from 292,000,000 tons in 1913 to 183,000,000 tons, the present production. Germany's decline is slightly greater. Europe, at the present rate, will produce 443,000,000 tons next year, while the amount needed is 614,369,000 tons.

Coal and Coke Exports from New York in June

There were increases in the shipments of anthracite and coke to foreign countries through the Port of New York during June of this year as compared with those of June, 1918, but a decided decrease in the export of bituminous coal.

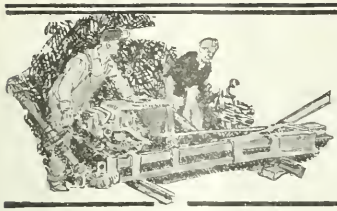
The reports show that 12 countries received 10,482 tons of anthracite during June of 1919 as compared with six countries receiving 6761 tons in June of last year, an increase of 3721 tons and an increase in the average price per ton of $1.91.

Twenty-five tons of bituminous coal at a cost of $10 per ton, all sent to Trinidad, were exported through this port during June, as compared with 6807 tons sent to five countries at an average cost of $7.45 per ton in the corresponding month of last year.

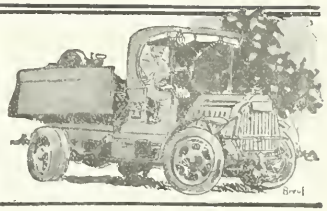
Nine countries received 2614 tons of coke in June as compared with 1605 tons sent to eight countries in June of last year at an average increase in cost of $3.61 per ton as compared with 1918 prices.

In the corresponding month of 1917 there were sent to foreign countries from the Port of New York 14,693 tons of anthracite valued at $106,173; 1939 tons of bituminous costing $14,466, and 3650 tons of coke valued at $49,646.

A London dispatch to the New York *World* quotes Secretary Damm, of the International Seafarer's Federation as saying that Rotterdam is crowded with American ships discharging coal, and that practically the entire coal supply of the Netherlands comes from America. No English coal for bunkering is available at that port. Scandinavian countries will also depend on America for coal supplies.



COAL AND COKE NEWS



Pittsburgh, Penn.

Coal men in secret conference.. Two-day meeting in Pittsburgh of Relations Committee of National Coal Association. Important business transacted.

An important industrial secret conference closed recently at Pittsburgh after a session of two days. The gathering included prominent coal producers from every section of bituminous territory of the United States. It was a meeting of the Government Relations Committee of the National Coal Association, whose central office has been opened in Washington, D. C.

It is stated that much business of importance, affected by the period of reconstruction, was considered, but no definite action was taken and will not be until the business and international situation is clarified. One of the problems discussed was the car supply situation which is to be met in the near future. A schedule of needs and requests was formulated in anticipation of the relinquishment of the railroads by the Government. The schedule embraces a program to be submitted to railroad officials, which it is hoped will bring about an equitable distribution of cars so that the trade will not suffer stagnation in some sections and overcrowding in others. The question of demurrage also is embraced. Nothing was given out for publication, the reason being that a report of the business transacted should go to Government officials before being made public.

Charleston. W. Va.

Lack of transportation in New River field limits production to 50 per cent. of capacity. Considerable smokeless goes west. Kanawha mines also limited to half time operation.

Not only was production still running far behind what market conditions would warrant but there was a prospect that little relief would be secured from the car shortage which has so greatly restricted production during recent weeks, when the month of August was ushered in, owing to the walkout of machinists throughout the country. With only one or two exceptions all the West Virginia fields were greatly handicapped during the week ended Aug. 2 in mining and shipping coal, cars available not being sufficient to permit of more than half the output of the weeks of the early part of July. This was especially true as to the Kanawha and New River districts. There was still an embargo on coal from the Kanawha field to tidewater; and, though New River field was not embargoed, strictly speaking, the tonnage moving to tide was extremely limited. Even though the strike of seamen had been settled, producers along the Chesapeake & Ohio R.R. did not anticipate any improvement in the car supply for a week or ten days, and the fact that so many shopmen went on strike may doom producers to further disappointment. Finding it impossible because of conditions at tidewater to ship much coal there, smokeless producing companies found a ready outlet for that kind of coal in western markets which have been unable to secure much New River coal in recent weeks owing to the strong export demand and the heavy tonnage being used by the Navy, the export demand still growing in volume.

Lack of cars curtailed the production of New River coal during the week ended Aug. 2 to as serious an extent as has been observed any time during the present year, the number of cars furnished being only about half of ordinary requirements, so that it is estimated there was not more than a 50 per cent. output in the New River field during the period just alluded to, as against an 80 per cent. about the middle of July. The shortage of cars and the absence of boats at tidewater were factors which limited the movement of New River coal to tidewater. As there was a strong demand for smokeless in the West, producers turned their attention to consuming areas in that section of the country which have been able to secure comparatively little New River coal recently. The Navy was a heavy consumer of New River coal, car shortage or no car shortage, and that tended to delay commercial shipments.

Although an unusually strong demand for Kanawha coals made itself felt during the week ended Aug. 2, nevertheless there was no way of meeting such a demand, owing to the pronounced shortage of cars in the district, there being, it is said, only about a 60 per cent. supply. Consequently, mines were limited to about half time in operation, this cutting down the output of the Kanawha field to about 110,000 tons. Under favorable conditions the mines of the district, or most of them, would have been able to operate on a full-time basis.

Hinton, W. Va.

All Chesapeake & Ohio mines shut down pending settlement of railroad shopmen strike. Unless transportation is restored quickly food shortage will result.

After Aug. 6 production of coal was entirely suspended at the mines in central southern West Virginia dependent upon the Chesapeake & Ohio R.R. for transportation facilities. Pending a settlement of the strike of the railroad shopmen, thousands of miners are thrown out of work. The Chesapeake & Ohio found it necessary to annul not only all freight trains operating west of Clifton Forge, Va., but all except through passenger trains, following a shutdown of all the shops on the system which completely tied up motive power except that necessary for through passenger service. Embargoes have been imposed on all classes of freight, including coal. The coal fields affected by the suspension of all freight traffic were the Big Sandy, Guyan Valley (including the Logan district), the entire Kanawha district (including Coal River, Paint Creek, Cabin Creek), the New River and the Winding Gulf districts; also all mines on the main line of the C. & O. But Kanawha mines on the Kanawha & Michigan R.R. north of the Kanawha River were still able to operate owing to the fact that the shopmen on this road had not gone on strike.

Not only were miners unable to work, but it was feared that innumerable coal camps in the territory affected would experience an actual food shortage unless service was restored within a short time. Inability of the mines to operate through lack of transportation facilities will tend to make a future coal famine a greater certainty.

Bluefield, W. Va.

Strike of railroad shopmen seriously affects Pocahontas and Tug River production. Working time of Kenova-Thacker mines cut down 100 cars.

The Pocahontas and the Tug River districts were most seriously affected by the strike of the mechanics of the Norfolk & Western R.R.; so much so that for the week ended Aug. 9 it was said that the car shortage loss would amount to about 40 per cent. of capacity. Even during the week ended Aug. 2 there was a serious car shortage, the loss in that respect leaping from 39,000 tons to 131,000 tons, an increase in a week of almost 100,000 tons; the lack of equipment was solely responsible for a decline in production from 237,000 tons to 282,000 tons, a loss of 55,000 tons in the space of a week. It was the car shortage alone which cut down production because both labor shortage losses and mine disability losses were reduced. Not only was there a loss in working time as compared with the week ended July 26, but there was an increase in the production loss of 94,000 tons. Coke also felt the effects of the coal slump, the tonnage of coal coked being only 5900.

During the week ended Aug. 2 the mines of the Kenova-Thacker district began to feel the effects of a car shortage to a greater extent than had been true during the last two weeks of July. The loss from such a source increased from 9000 to 21,000 tons, or from 5 to 12 per cent. The effect of such a shortage of cars was to cut down the working time of the mines of the district by about 100 cars and to reduce the output from 142,000 to 127,000 tons, or about 18,000 tons below the production for the corresponding periods of 1918. Both the labor shortage and the loss from mine disability were less. Quite material improvement was observed in the demand for coal from this district, the loss from no market running only about 1 per cent. Mines were producing up to about 72 per cent. of capacity.

Fairmont, W. Va.

Almost 50 mines shut down due to insufficient loading facilities in northern West Virginia. Supply of empties one-fifth of normal in Monongalia field. Coal tonnage for railroad use exceeds all previous shipments.

Prospects of a better supply of cars for northern West Virginia fields, indicated by a large number of cars on hand when the week began, were dissipated as the week ended Aug. 2 grew older; the supply of empties steadily diminished, though it is doubtful if the shortage was as serious as that with which producers had to contend during the week ended July 26. Not only small mines but the mines of the larger producing companies as well were affected, including the Consolidation and other companies. Almost fifty mines were shut down either at one time or another during the week because of insufficient loading facilities; in an effort to provide at least a few cars for all mines, the percentage system of distribution was resorted to. On the Monongahela Ry., which serves a number of mines in the Monongalia field, it is said that during a part of the week at least the supply of empties was only about one-fifth of normal. Northern West Virginia producers were hopeful of a large supply of empties soon, owing to a settlement of the seamen's strike, but realized that time would have to elapse before many cars could be unloaded and returned to the mines. Even with an embargo covering shipments to tide, the movement of coal to Curtis Bay and other piers was somewhat in excess of that for the week ended July 26, though still far below the ordinary flow of coal to such points. A large number of cars of coal consigned to railroads were shipped from the Fairmont district at the outset of the week, such shipments being in excess of all previous ones. There was a prospect that the Lake movement would be heavier than in recent weeks, but by the middle of the week Lake tonnage had dwindled to some extent. The market for all northern West Virginia coals developed further strength during the week, but full advantage of such an improvement could not be taken, owing to restricted shipping facilities.

Linton, Ind.

Mine hoisting engineers effect temporary organization. W. A. Bickel, of Chicago, gives interesting talk. Organization previously started expected to include all Indiana hoisting engineers in the society.

About 100 hoisting engineers from various points in the Linton mining district met in this city recently and took steps toward forming an organization of Mine Hoisting Engineers. There were representatives here from Dugger, Edwardsport, Hickwell, Clinton, Brazil, Terre Haute, Vincennes, Moonville, Jasonville and other

mining places and enthusiasm in the proposed organization was great. W. A. Bickel, of Chicago, was present and addressed the engineers. He gave an interesting talk and told why it would be to the interest of the men to get together in such an organization; asserting that the most powerful influence for the betterment of the condition of the engineers or any other craftsmen was education and constructive rather than destructive policies.

Other talks were given by local and visiting engineers, and at the conclusion of the addresses a temporary organization of the engineers of the district was formed. Lee White, of Bicknell, was elected president. Another meeting was scheduled to complete the work of the organization, headquarters of which will probably be in this city.

Mr. Bickel stated that there were 1500 mine hoisting engineers in Indiana representing a skilled vocation, all of whom were licensed and who held places of great responsibility. He said that efforts started only a short time ago had already resulted in the organization of 700 of them and that they would soon be 100 per cent. organized into their own body. The engineers enjoyed a banquet after the business session ended.

Terre Haute, Ind.

No headway made on making up tonnage lost during first half of year. Domestic demand shows some life. But warnings as to future fuel shortage not stimulating early buying sufficiently. Car supply fair.

Demand for coal from the Indiana field showed slight increases for the two weeks ended July 26, according to reports announced at the headquarters of the Indiana Bituminous Coal Operators' Association. Production which totalled 354,372 tons for the week ended July 2, was increased to 368,534 tons for the week ended July 26. The capacity of the field is approximately 750,000 tons a week, showing that no great headway has been made as yet in making up for the tonnage lost during the first six months of the year because of the lack of demand. Some mines have had orders for practically full time production, while many others have worked only a day or two a week. There is still a noticeable absence of orders for steam use. The domestic demand, however, has been showing more life, and there is a tendency on the part of dealers to fill their yards to capacity as fast as they can move the coal out to the householders. It is said by operators, however, that recent warnings as to the probable state of the fuel supply during the coming winter have not had the effect of stimulating early buying as much as had been hoped, and the most optimistic operators can not see any prospect of meeting the winter demand when it finally does come, in an adequate way. This will be particularly true if the winter should be a severe one, they say. Car shortages are still apparent in spots and on one or two railroads they have been aggravating. Thus, for the week ended July 19, there was a car shortage of 13.31 per cent. on the Monon and 10.76 on the Illinois Central. On the roads that serve the greatest number of mines, however, the car shortage has been quite slight.

Birmingham, Ala.

Wave of protest against state administration's coal and iron tax. Representatives of mineral districts fight unfair measure. Adverse sentiment against tax expressed by associations, clubs, labor unions and prominent citizens. Rate is cut and prospect of removal bright.

The administration forces of Alabama, headed by Governor Kilby, have received a check; their comprehensive program for legislation may be defeated. The appropriations, all of which have been withheld, pendin the adoption of a revenue measure, are now endangered, says the Birmingham *Age-Herald*. In the news columns of the July 31, 1919, issue of *Coal Age*, special features of this state's general revenue bill were noted; at that time the bill was still in the hands of a committee and the mine operators of Alabama were protesting against the proposed tax on coal and iron.

More recently this bill has been considered by the Alabama House of Representatives convening in committee of the whole. When that feature of the bill was reached which proposed a tax of 5c. a ton on coal and 3c. on iron ore, a storm of protest was raised by the representatives from the state's mineral districts. Coal and iron form the backbone of the commercial and industrial life of a number of counties of Alabama. And while a tax of a few cents may seem a small matter, yet that additional item of expense may lose many a mineral contract to Alabama it is thought—the straw that will break the camel's back. When contracts are lost mines may have to shut down; when the coal and iron output is curtailed, it is shown not only in the mine payrolls but also in many industries which are dependent upon coal and iron.

Among the representatives opposing this tax were some who had been recognized as administration leaders. Representative Arnold, of Jefferson County (the Birmingham district), charged Governor Kilby with trying to force through the Legislature bills which, he stated, would ruin the industrial section of the state. In addition to legislative action against this tax, there was a wave of protest by civic associations and other business bodies, including United Mine Workers. At a meeting of the Birmingham Civic Association, Senator Frank S. White stated that this proposed tonnage tax is the most unjust, unjustifiable and discriminatory tax ever proposed in Alabama.

One argument advanced in favor of this tax is that coal and iron represent permanent depletions of the state's wealth because the minerals are taken from the ground. Its discriminating character is even shown, says Senator White, by that very argument, for if coal and iron should be taxed for that reason then there should be a tax on every brick, every barrel of cement and lime—each sack of cement. Cotton, marble, lumber and graphite should be taxed. It would be a never ending procession. Discrimination and class legislation are contrary to the spirit of America and her institutions.

Prominent men of Alabama state that this fight does not belong to coal operators alone and should be taken from their shoulders; it applies to every citizen, and people should become thoroughly aroused. Mass meetings of citizens have been called in cities in mineral districts and other steps have been taken to impress the Legislature with the unfairness of the proposed measure. The preliminary test votes on the coal and iron tonnage tax at Montgomery while apparently showing a close division, are said to be highly encouraging. They show that the members of the House are convinced that it should not be imposed on Alabama's mineral district. A few members who opposed the tax of 5c. were apparently willing to vote for 2c. a ton. But the *Age-Herald* notes that they should bear in mind the principle involved—the discrimination, the sectional feature, the levy on the commodity itself.

It was stated that while the coal tonnage tax was retained in the general revenue bill as reported, it will be reported by the committee of the whole to the House of Representatives, it was at the reduced rate of 2c. a ton; the iron tonnage section was not changed. In fact so confident of this were the opponents of that form of taxation that they made no effort to reduce the rate on iron ore. It was predicted that the tonnage tax would also be retained in the bill when finally passed by both houses.

PENNSYLVANIA

Anthracite

Hazleton—The State Hospital here which receives the mine workers of the eastern middle anthracite field has received a state appropriation which will enable, its trustees, to erect a nurse's home.

Jeddo—A preminum is placed on mule disability at the mines of the G. B. Markle Co. The private stable of John Markle—the president of the company—has been moved from his private grounds and will be used as a mule hospital.

Audenried—The Lehigh & Wilkes-Barre Coal Co. has started driving an 1800-ft. drainage tunnel which will have its outlet near Brandonville. The tunnel will drain the Green Mountain and Honey Brook basins of the company.

Harrisburg—In 1918 there were 1050 fatal accidents in Pennsylvania coal mines, 494 in the bituminous region and 556 in the anthracite field, according to a report made to Commissioner of Labor Connelly on Aug. 4 by the Bureau of Statistics of the Workmen's Compensation Division.

Centralia—The Centralia colliery of the Lehigh Valley Coal Co. resumed operations recently after being idle about five months. During this idleness a new steel trestle was constructed from the slope to the breaker and extensive repairs were made to the colliery, including work on the slope. The colliery is short handed due to men having sought work elsewhere in the region during the long suspension.

Carbondale—The City Council here recently gave property holders permission to occupy certain sections of streets in the mine-fire portion of the city for the purpose of checking the spread of the fire in the mine workings. A steam shovel and other equipment will be used to strip the surface off the coal on Gilbert Street and Summit Avenue. A bond was exacted from the contractors who are to do this work to insure the streets being placed in good condition upon the completion of the work of checking the mine fire.

Scranton—Exoneration from the payment of taxes on its coal lands is being requested by the Scranton Coal Co., according to a communication to Mayor Connell, of Scranton, from James B. Smith, mine cave engineer, who states that the Scranton company intends to leave 50 per cent. of minable coal in the workings to insure surface support. Mr. Smith quotes Frank Wolfe, chief engineer of the Scranton Coal Co., as his authority for his statement as to pillars; in consideration of this, the company desires exoneration from assessment for the amount of coal which is to be left in the mines. No decision has been arrived at in regard to the matter, which will be given due consideration.

Bituminous

Connellsville — Indian Creek Valley coal operators are said to be rivaling in capacity requirements, the demand of wartime days. About 20 mines are reported in operation between Mill Run Junction and the Jones mill; a number of new openings are being made. July shipments of coal made a new record for the valley.

Pittsburgh—The executive board of the Coal Mining Institute of America met here during the week of Aug. 3. Plans for the activities of the institute during the coming year were outlined and the program for the annual meeting to be held during Dec. 3, 4 and 5 at Pittsburgh was decided upon. E. N. Zern, is president and H. D. Mason, Jr., secretary of the institute.

The central territory coal and coke committee of the United States Railroad Administration recently considered petitions for equalization of the freight rates offered in Indianapolis by southern Indiana coal dealers. The Indiana dealers pointed out that the freight charge in southern Indiana is 90c. per ton, while in western Kentucky it is 30c. per ton, giving the Kentucky men an advantage which swings an unfair percentage of the business their way. It was shown that the Louisville & Nashville R.R., serving the western Kentucky mines, charges 30c. per ton, while the Chicago & Eastern Illinois, serving southern Indiana, charges 90 cents.

WEST VIRGINIA

Huntington — Approximately 18,000 employees of the Chesapeake & Ohio R.R. are idle and 600 mines are closed in western Kentucky following an order to discontinue freight trains and cutting passenger trains 40 per cent.

Mabie—A new Y. M. C. A. building was opened recently at this place, in the Randolph County field. The building was constructed and will be maintained jointly by three companies for the use of their employees. The companies interested are: The West Virginia Coal and Coke Co., the A. Spates Brady Co. and the J. B. Jenkins Coal Co.

Weirwood—The Weirwood mine of the New River & Pocohontas Consolidated Coal Co., in Fayette County, was the scene of an explosion Wednesday night, Aug. 6, when seven miners were killed as the result of an accumulation of gas in one part of this shaft mine.

The explosion occurred in the seventh right cross heading off the Main East, about 3000 ft. from the shaft. The explosion was confined to that particular part of the mine and only those between the face of the heading and No. 2 room were killed, two machine runners making their escape.

Within an hour after the explosion District Mine Inspector Robert Lilly was at the mine and joined the rescue parties already organized. Chief W. J. Heatherman of the State Mine Department reaching the mine the next morning. It was found possible to penetrate to the part of the mine where the explosion had occurred within three hours after its occurrence when all but one of the bodies of the seven men killed were recovered, the last body not being located until late the following day under a pile of slate.

An investigation conducted by Chief Heatherman made it evident that gas had accumulated locally in the part of the mine referred to, owing to a door having been left open and that the gas had been ignited by the breaking of a cable wire used by the gathering locomotive. An inquest will be held during the present week.

The Weirwood mine has an annual capacity of about $35,000 tons. The company, on an average, employs only about 20 men at this mine, and there were said to have been 18 men in the mine at the time of the explosion.

KENTUCKY

Louisville — The Louisville Gas and Electric Co. is making numerous improvements at its mines in western Kentucky, including a large assembly hall in which moving pictures will be exhibited for benefit of employees. The company is considering several plans for welfare work.

TENNESSEE

Nashville — Governor Roberts of Tennessee suggested that the large state holdings near Petros, in Morgan County, may be developed for coal. He stated that surveys were being made to the center of the 10,000-arce tract for a railroad which could be quickly located should it be decided to start mining operations. Coal is now being mined on the state property near one corner of the tract under disadvantageous conditions as regards an underground haul of two to two and a half miles. In event of mining starting up in the center of the tract there is a possiblity of the railroad being built by a lumber company which will cut the timber and utilize this line to market it.

OHIO

Byesville—The tipple of the Little Kate mine No. 2 of the National Coal Co., of this place, is being dismantled and the tipple torn down. This plant has been operated for a number of years past with an average daily production of 1000 tons, it is said, the tipple being equipped with modern machinery to handle a large daily tonnage. The No. 2 mine adjoins that of the Minnehaha which by the new arrangement will handle the coal from both territories; thus a saving is expected to be effected in the mining of the remaining coal in No. 2 mine.

INDIANA

Sullivan — The Bays-Logan Coal Co., composed of Lee F. Bays and R. F. Logan, has bought from the People Coal and Mining Co. a mine near Coalmont with a present capacity of 400 tons a day. It is planned to increase materially the output and improve the property.

ILLINOIS

La Salle — The old Marquette mine near here has been abandoned and closed up. At one time this property was one of the large mines of the state and produced a considerable tonnage. The first shaft was sunk about 40 years ago by George H. Locey, of La Salle; he died a few months ago at Atlanta, Ga. Later Charles J. Develin developed the mine to big capacity. It was next taken over by Walsh Brothers, of Davenport, Iowa, who operated it for several years; they were twice burned out.

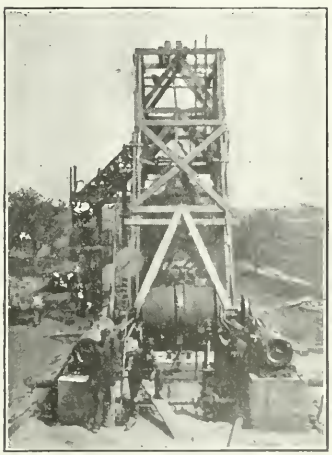
Zeigler—Extraordinary precautions are now being taken by many southern Illinois mining companies in paying off their large payrolls, since the bold daylight robbery at the United States Steel Co's. Middle Fork mine at Benton, some weeks ago. In one case, the Bell & Zoller Mining Co., at this place, hired a number of armed guards while they were paying off their $70,000 payroll. Besides having all the clerks and office force heavily armed and extra guards in the room, men and automobiles were stationed outside the building and an attempt at another such robbery as the Middle Fork holdup would have been easily foiled.

Belleville—H. O. Panhorst, auditor of the Staunton-Mt. Olive Coal Co., has positively identified one of the men held in the Belleville jail for the robbery of the Benton coal mining offices, as one of the bandits who robbed his own office early last spring getting away with $14,000 in cash. Mr. Panhorst and three clerks were locked in the vault. The three clerks accompanied Mr. Panhorst to Belleville and all four of the men were positive in their identification. Following the more recent robbery at Benton, where it is said that $42,000 disappeared in a daring daylight holdup, and one of the robbers was killed, feeling became so bitter against the captured bandits that they were removed by the Benton sheriff and placed in the Belleville jail for safekeeping. One of the robbers was shot through the left lung and it is believed that he will die.

Duquoin, Ill.—James Hamilton, of the Hamilton Coal and Mining Co., of Weir, Kan., has started to develop a strip mine northeast of town. A tract of ground which was formerly owned by Dowell & Lafont, of Duquoin, has been leased and plans have been made to strip the coal and mine it with small steam shovels. Preliminary details have been arranged and the Illinois Central R.R. will soon begin construction on a switch to the site. This plant will make the second strip mine at Duquoin, the other being operated by the E. J. Scott Coal Co., of St. Louis, south of the town.

William Johnson and F. F. Oliphant, of Harrisburg, have leased 2000 acres of coal land near Duquoin and work will be started at once on the construction of a large mine. The land lies near the Saline County Coal Co.'s No. 4 mine and the contract calls for coal to he hoisted within one year. All equipment will be modern throughout, including a washer.

Edwardsville—The progress made at Donk Bros. Coal and Coke Co.'s new No. 4 mine at this place is noted in the accompanying illustration which shows the Clark hoisting engine in its temporary quarters at the main shaft. As noted in



DONK BROTHERS NO. 4 MINE

the June 12, 1919, issue of *Coal Age*, this plant promises to be one of the prominent mines of the state. It is to be a 5000-ton, skip-hoist operation whose design and construction is being looked after by Allen & Garcia, of Chicago.

CANADA

Sydney, N. S.—Coal production is on the increase at Sydney, as shown by the July output. The Florence colliery was again premier with a record output of 16,000 tons, followed by Princess, which increased its production over the previous month, and raised to the surface 13,000 odd tons. Scotia, on account of the disarrangement of the electrical plant, went back considerably, but on the whole had good average outputs.

Halifax, N. S.—D. H. MacDougall, president of the Nova Scotia Steel and Coal Co., has purchased for his company from the British ministry of shipping (represented by director J. B. White, of New York) the coal-handling plant on the Canadian National railway terminals at this place.

Foreign News

Melbourne, Australia—Regulations have been passed under the War Precautions Act putting under control of the Prime Minister the entire coal output of the Australian commonwealth. The regulations further empower the Federal Government to fix wages and conditions of employment in the mines and establish the price of coal. Acting Prime Minister Watt, in announcing the new regulations, pointed out that the step was taken in order to avoid a strike of the miners in New South Wales, through which the output of that state would have been stopped and many of the industries of the commonwealth paralyzed.

Personals

L. E. Hoggins has been appointed assistant manager of sales of the coal department of the United Fuel and Iron Co., with headquarters in the House Building, Pittsburgh, Penn.

D. H. Parker formerly mine superintendent at the Marianna mine of the Union Coal and Coke Co., has accepted the same position at the Isabella mine of the Hillman Coal and Coke Co., Hillcoke, Penn.

J. L. Canby has been appointed district manager of sales of the Chicago Pneumatic Tool Co., succeeding Nelson B. Gatch, who has been transferred to New York as district manager of sales.

Isaiah Clayton is now mine superintendent at the Canonsburg mine of the Canonsburg Gas Coal Co. Mr. Clayton was formerly in charge of operations for the Masten Coal Co., at Coon Island, Penn.

E. J. Payne, of Huntington, W. Va., has severed his connection with the Main Island Creek Coal Co., of which he has been general sales manager, to manage the general office of the recently organized Export Coal Co., at Huntington.

Lieutenant A. F. Strouse, formerly superintendent of the Grindstone mine of the H. C. Frick Coke Co., has returned from duty overseas and is now representative at Pittsburgh, Penn., for the Underfeed Stoker Company of America.

J. M. Davis, formerly operating vice president of the Baltimore & Ohio R.R. and now manager of the New York properties of this corporation, has resigned, effective Sept. 1, to become president of the Rock Hill Iron and Coal Co., with offices at No. 1 Broadway, New York City.

Theodore A. Hendley, for a number of years salesman for the Crescent Coal Co., at Peoria, Ill., has returned a sergeant from overseas where he spent 15 months with the American Expeditionary Force. Mr. Hendley will resume his former duties with the Crescent Coal Co.

C. M. Young has resigned as Assistant Professor of Mining Research at the University of Illinois to take the position of Professor and head of the Department of Mining Engineering at the University of Kansas. Professor Young was formerly editor of the Colliery Engineer, at Scranton, Penn., and later associate editor of *Coal Age*.

George Watkin Evans resigned his position as district mining engineer for the U. S. Bureau of Mines and has entered the field as a consulting engineer, specializing in coal, including geological surveys, examinations and reports on coal prospects, operating coal mines, mining methods, preparation of coal for market and valuations of coal properties. Mr. Evans' headquarters is in the Smith Building, Seattle, Wash.

R. B. Isner, of Elkins, has been appointed general manager of the Boone County Coal Corporation, effective Aug. 1, with headquarters at Sharples, W. Va. Prior to this appointment, Mr. Isner had been general sales manager of the West Virginia Coal and Coke Co. since its organization in 1917, having been retained by that company when it took over the Davis Colliery Co., of which Mr. Isner was manager of sales. He had been with the Davis interests since 1902.

Fremont Wilson, consulting engineer, who has recently returned to New York to resume his practice after a year spent in charge of construction work in one of the large shipyards, has recently been asked to report on the cost of equipping three bituminous coal plants with modern machinery throughout. He would greatly appreciate receiving catalogs, bulletins, illustrations, data sheets, prices and so on pertaining to the matter in question from manufacturers or agents. During August this information may be sent to his residence, 444 Riverside Drive, New York, N. Y.

Gen. C. B. Dougherty recently celebrated the fortieth anniversary of his connection with the Susquehanna Collieries Co. in a fitting manner by giving a dinner at Hotel Redington in Wilkes-Barre to the operating department of the company as well as the M. A. Hanna & Co., of which he is

purchasing agent and assistant to the manager. Robert A. Quinn, manager of the Susquehanna company, acted as toastmaster, and referred to General Dougherty, his long years of service and his steady advancement in glowing terms; he also referred to his faithful service in the welfare of the Susquehanna company as well as that of the Hanna, in which he has been holding such responsible positions. Among others who expressed high admiration for General Dougherty was George H. Ross, of Philadelphia, vice president of the Susquehanna company; a number of others connected with the mining and sales companies in question also attended the dinner and paid tribute to General Dougherty in expressions of friendship and esteem.

Obituary

William B. Tanner died of pneumonia on Aug. 4 at his home in Mahanoy City, Penn. He was 57 years of age. For 30 years Mr. Tanner was general inside foreman at Boston Run and Tunnel Ridge collieries of the Philadelphia & Reading Coal and Iron Co. A wife and four children survive.

Publications Received

Annual Report of the Mines Branch of the Province of Alberta, 1918. Department of Public Works of Province of Alberta. Illustrated; pp. 137; 6½ x 10 inches.

Practical and Mechanical Books. Norman W. Henley Publishing Co., New York. Catalog for 1919. Unillustrated; pp. 40; 3¼ x 6 inches.

Bibliography of Petroleum and Allied Substances in 1916. By E. H. Burroughs, Department of the Interior, Bureau of Mines. Bulletin 165. Unillustrated; pp. 159; 5⅞ x 9¼ inches.

Best Automobile and Aviation Books. Norman W. Henley Publishing Co., New York. Editions for 1919. Illustrated; pp. 16; 3¼ x 5½ inches.

Safe Practices. National Safety Council, 168 N. Michigan Ave., Chicago, Ill. Protecting Life Against Fire. Part II. Fire Extinguishment. Illustrated; pp. 15; 8½ x 11 inches.

Annual Report of the Minister of Mines of the Province of British Columbia. Victoria, British Columbia. Report for the year ending Dec. 31, 1918. Illustrated; pp. 510; 7½ x 10½ inches.

Recovery of Gasolene from Natural Gas by Compression and Refrigeration. By W. P. Dykema, Department of the Interior, Bureau of Mines. Bulletin 151. Petroleum Technology 40. Illustrated; pp. 123; 6 x 9 inches.

Abstracts of Current Decisions on Mines and Mining. By J. W. Thompson. Reported from September to December, 1918. Bulletin 179. Law Serial 18. Department of the Interior, Bureau of Mines. Unillustrated; pp. 165; 6 x 9 inches.

Recent Developments in the Absorption Process for Recovering Gasolene from Natural Gas. By W. P. Dykema, Department of the Interior, Bureau of Mines. Bulletin 176 (Petroleum Technology 50). Illustrated; pp. 90; 5⅞ x 9 inches.

War Gas Investigations. By Van H. Manning. Advance chapter from Bulletin 178, War Work of the Bureau of Mines, Department of the Interior, Bureau of Mines. Bulletin 178-A. Unillustrated; pp. 39; 5⅞ x 9¼ inches.

Trade Catalogs

Texaco at Home and Abroad. The Texas Co., Houston and New York. Pp. 46; 9 x 12 in.; illustrated. A sketch of some of the interesting items about the business of this company from oil well to market.

Nonpareil Corkboard Insulation. Armstrong Cork and Insulation Co., Pittsburgh, Penn. Folder. Pp. 6; 3½ x 6 in.; illustrated. Information about this insulation for cold storage rooms and freezing tanks.

Jeffrey Straitflo Ventilators. Jeffrey Manufacturing Co., Columbus, Ohio. Bulletin No. 270. pp., 8; 7½ x 10¾ in.; illustrated. Describes and illustrates special ventilation apparatus and installations of this type.

Triplex Power Pumps—Vertical Single Acting. The Deming Co., Salem, Ohio. Bulletin 300. Pp. 39; 6¾ x 9¼ in.; illustrated. Description of the various pumps made by this company and illustrations of the different types.

A Chain of Evidence. Morse Chain Co., Ithaca, N. Y. Catalog No. 14; 6½ x 9 in.; illustrated. Illustrates and describes the Morse silent chain and shows a few of the many large power drives. Contains full data necessary for filling out the blank inquiry page.

Ironton Storage Battery Locomotive for Mining and Industrial Purposes. The Ironton Engine Co., Ironton, Ohio. Bulletin No. 502. Pp. 32; 8½ x 11 in.; illustrated. Illustrations show various departments of the plant at Ironton; also battery locomotives, motor generator sets and switchboards.

Recent Coal and Coke Patents

Hopper for Automatic Stokers. J. S. Fulton, assignor to United Stokers Corporation, Chicago, Ill., 1,278,325. Sept. 10, 1918. Filed Oct. 31, 1917. Serial No. 199,576.

Smoke Consumer. R. J. Johnson, Lake Benton, Minn., 1,278,937. Sept. 17, 1918. Filed May 10, 1917. Serial No. 167,770.

Water-Tube Boiler. C. W. Dyson, Washington, D. C., 1,279,094. Sept. 17, 1918. Filed Apr. 17, 1916. Serial No. 91,721.

Coking Apparatus. F. Pribyl, Wilmette, Ill., 1,279,757. Sept. 24, 1918 Filed Nov. 4, 1913. Serial No. 799,113.

Smoke Consuming Apparatus. I. Therrien, Quebec, Can., 1,279,939. Sept. 24, 1918. Filed Mar. 12, 1917. Serial No. 154,197.

Ash Sifter. A. F. Staples, Dorchester, Mass., 1,279,605. Sept. 24, 1918. Filed Mar. 2, 1918. Serial No. 220,071.

Briquet and Method of Manufacturing the Same. C. E. Hite, assignor to American Briquet Co., a corporation of Delaware, 1,290,992. Jan. 14, 1919. Filed Apr. 17, 1917. Serial No. 162,745.

Safety Device for Mines. A. G. Biondi, Los Angeles, Cal., 1,292,236. Jan. 21, 1919. Filed Sept. 6, 1918. Serial No. 252,962.

Portable Coaling Device for Furnaces. G. C. Noteman, Lakewood, Ohio, 1,281,640. Oct. 15, 1918 Filed May 13, 1918. Serial No. 234,065.

Extensible Bridge Wall with Moist Air Circulation for Boiler Furnaces. C. Roudy, Paris, France, 1,281,843. Oct. 15, 1918. Filed Feb. 17, 1917. Serial No. 149,264.

Hopper Car. A. Campbell, assignor Enterprise Railway Equipment Co., Chicago, Ill., 1,281,286. Oct. 15, 1918. Filed May 14 1917. Serial No. 168,401.

Coaling Barge. L. S. Evans, Spartanburg, S. C., 1,281,542. Oct. 15, 1918. Filed Nov. 21, 1914. Serial No. 873,282.

Chain Grate. P. L. Crowe, Jersey City, N. J., and A. Frankenheim, New York, N. Y., 1,281,525. Oct. 15, 1918. Filed Nov. 21, 1914. Serial No. 873,272.

Briquet-Making Machine. F. E. Berlin, Spokane, Wash., 1,282,370. Oct. 22, 1918. Filed Apr. 4, 1918. Serial No. 226,607.

Industrial News

Johnstown, Penn.—Jacob M. Hoffman of this place has purchased the coal lands and plant of the Kerr Coal Co., of Freeport, Penn. Mr. Hoffman operates a mine adjoining the Kerr property and it is understood that he will consolidate the two plants.

Washington, D. C.—The Alaskan Engineering Commission states that the construction of the Government Alaskan R.R. is 80 per cent. completed; but there yet remain three years work and an expenditure of $18,000,000 to $20,000,000 to complete the system. About 2000 persons are now employed on the work.

Chattanooga, Tenn.—The Raccoon Coal Co., which recently increased its capital from $50,000 to $100,000, has completed negotiations for the purchase of coal property near Kelley's Ferry, and is planning development and the installation of the necessary machinery and equipment for operation. E. W. Virden is president.

Charleston, W. Va.—Fire is said to have caused a loss of about $30,000 at the plant of the Ephraim Creek Coal Co. recently when the company's upper tipple was destroyed in a blaze of unknown origin. It is probable that the tipple will be rebuilt at an early date. The company also lost 300 tons of coal in the tipple at the time it was destroyed

Romaine, Ohio—The Fair Oaks Coal Co., of Columbus, has opened a new mine at this place, on the Western Ohio R.R. A. Crawford, of Newark, is president, and R. C. Kyle, of Columbus, general manager.

East Chicago—The firm of Bull & Livensparger has been appointed the sales representative of the Green Engineering Co. in Chicago and northern Illinois territory. E. H. Bull of this firm has been connected with the Green company as an engineer, for the past seven years; D. A. Livensparger has been a member of the Green sales force for the past nine years.

Hinton, W. Va.—Smokeless coal will be produced by J. B. Laing, of Lewisburg, and others, who have leased 2000 acres of coal land from the Gauley Coal Land Co. in Greenbrier. The operation of the lessees will be on Meadow Creek of Meadow River about 12 miles from Rainelle. It will be necessary to build about ten miles of railroad in order to reach the tract leased.

Jefferson, Penn.—The work of building the town at the coal plant of the Mather Collieries Co., at this place, Green County, on Ten Mile Creek, is progressing steadily. Recently work was started on 70 new houses. It is said the coal company is spending $35,000 this summer on the construction of roads and streets; also a motion picture building is being erected.

Gassaway, W. Va.—The plant of the newly organized Vance Coal Co. will be at Exchange, in Braxton County, where the company owns a tract of coal; the company is capitalized at $100 000. Philadelphia people largely are interested in the new enterprise as follows: William S. Furst, C. P. Burtner, Harriett L. Burtner, Esther A. Burtner, together with Vance H. Burton of Exchange.

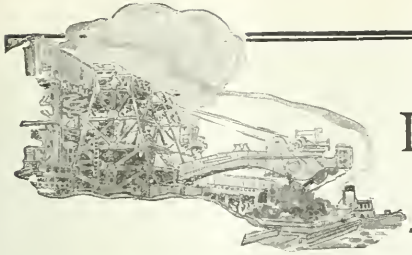
Carrolltown, Penn.—The Fairmont Mining and Machinery Co., of Fairmont, W. Va., has completed the installation of machinery for the Binder Coal Mining Co., at Tunnel Siding near this place. The tipple and mine are electrically equlpped. The plant is to have a capacity of from 1200 to 1400 tons of coal a day. Edwin Binder, of Barnsboro, is president; Chrales Adams, of Carrolltown, secretary-treasurer; James F. Green, of Carrolltown, general manager.

Morgantown, W. Va.—The plant and holdings of the South Pittsburgh Coal Co., near Morgantown, have been sold to the Davis Coal Co., of Morgantown. This tract is underlaid with a low sulphur coal, it is reported, and the present capacity of the plant is about five cars of coal a day. An even better grade of coal than is now produced will be shipped, it is announced, the company having arranged to install screens. The tract purchased has been in litigation for some time.

Logan, W. Va.—Active operations will soon be started by the Island Creek Mining Co., a concern whose activities have been dormant for several years. This company, headed by J. J. Ross, a well known Logan operator, has 3000 acres in the Big Creek section of Logan County which it will develop under the direction of Fred Haislip, general manager. The Logan Development Co., of which Mr. Ross is general manager, will build 1½ miles of road to the holdings of the Island Creek Mining Company.

Hinton, W. Va.—Hinton men will reorganize the Hominy Creek Land Co., having purchased all the holdings of that company in Nicholas and Greenbrier counties. On the 1100 acres included there is said to be a 6-ft. Sewell seam. Those joining in the purchase of the Hominy company were J. W. Graham, of Hinton; Dr. K. M. Jarrell, C. M. Ward, Dr. W. W. Hume, C. V. Cottle, of Beckley; and Ash Mankin, of Marshes. The following officers were elected: J. W. Graham, president; Dr. K. M. Jarrell, vice president; Dr. W. W. Hume, secretary and treasurer.

Charleston, W. Va.—Between Jan. 1 and June 30, 1919, 38 new coal companies have been organized in West Virginia, representing an aggregate capital of $8,600,000. Nearly all of such companies were organized for the purpose of producing coal, only a few being sales or holding companies. Of the 38 companies so organized a number have started construction work on their plants, while others organized early in the year have mines in operation, so that the organization of such companies means an addition to the production of West Virginia coal. Thirty-four coal companies were dissolved in the six-month period, most of such companies never having been engaged in operating mines. Many companies during the first half of the year increased their capital stock, the largest increase being that of the Boone County Coal Corporation, whose capital stock was increased from $3,000,000 to $12,000,000.



MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Market Conditions in Soft Coal Show Betterment—Middle West in Difficulties—Labor Unrest —Car Shortage and Embargoes Hamper Output—Anthracite Production Steadily Increasing—Outlook Favorable

RAILROADS and industrial consumers are beginning to stock bituminous coal. Continual dripping of water will wear away stone, and repeated warnings that delayed buying would react unfavorably upon large users of fuel are now accomplishing their purpose. Under the influence of better buying the quality grades of soft coal from eastern mines are advancing in cost, with the supply unequal to the demand.

Middle West operations are still up against it, for a preference is being shown by interior coal consumers for the product coming from West Virginia and other sections where the high grade coals are mined. The result is that many mines in Illinois, Indiana and Ohio are operating only at about 50 per cent. of their full capacity. Further complications have been brought about by striking miners in Illinois, who have stopped work pending the adjustment of a wage dispute.

The output of bituminous coal for the week ended Aug. 2 totaled 9,946,000 net tons, which is a slight decrease when compared with the production of the three weeks preceding.

Labor unrest is everywhere prevalent. Miners demand that a formal announcement be made that the war is over, so that existing wage agreements may be revised upward to meet the higher cost of living. Under an agreement entered into about eighteen months ago, no wage revisions in the coal-mining industry were to be discussed until peace was announced by the President.

Embargoes placed on shipments of coal originating on the lines of the Chesapeake & Ohio Railroad, because of the strike of the railroad shopmen, resulted in the shutdown of most of the mines served by this road. As the Chesapeake & Ohio hauls an average of 125,000 tons of coal daily, it can readily be appreciated what effect a longtime embargo would have on coal production in West Virginia.

Car shortages continue to hamper the efforts of the coal operators. Many cars are now being rushed to the West for use in the shipment of grain, and it is unlikely that there will be sufficient cars for the movement of coal for some time to come.

Just why there is a scarcity of coal-carrying equipment is no secret. The funds of the Railroad Administration became exhausted on Jan. 1, 1919. In its efforts to conserve in every way possible, the Railroad Administration ordered the discontinuance of the repair of all cars, and particularly coal cars. On June 20, an order was issued to resume the repair of coal cars. Owing to the fact that the car shop forces had been dismissed and had become scattered, it took at least six weeks to make this order effective. Thus no cars were repaired for seven months, and all those that were nonfit for service went to sidetracks. At this writing the work of repairing the cars is progressing very slowly, the reason alleged being that an order from Washington has stipulated that no one should be employed at this task who has not had at least four years' experience in repairing cars.

All the domestic sizes of anthracite continue to be insufficient to meet the demand. Pea coal and the steam sizes, on the other hand, are a drug on the market and bid fair to continue so. Coals produced by the so-called independent companies are being offered freely at premiums varying from 90c. to $1.75, depending on the ultimate destination.

The production of anthracite increased somewhat in the week ended Aug. 2, the output being estimated at 1,831,000 net tons as against 1,827,000 net tons the previous week. Labor conditions in the hard-coal regions are growing better; and if there is no interference with transportation, production may be expected to increase.

WEEKLY COAL PRODUCTION

Production of bituminous coal in the week ended Aug. 2 is estimated at 9,946,000 net tons, a slight decrease below the three preceding weeks. This rate of production, approximating 10,000,000 tons a week, is somewhat above current consumption, as railroads and industrials have begun to stock coal. If production is continued for the remaining 22 weeks of the year at an average of 10,000,000 tons a week, production for the year will be about 480,000,000 tons, equal to the output in 1913, and a decrease of 18 per cent. compared with 1918 but below that in 1916 and 1917. As indicating in part the reason for the lack of market for bituminous coal the first part of this year, it is noted that the railroads, with a consumption of 154,000,000 tons of bituminous coal in 1918, consumed 17 per cent. less coal the first half of 1919 than in the corresponding period of 1918, and the production of pig iron declined 10 per cent. in the same corresponding period.

The production of anthracite in the week ended Aug. 2 is estimated at 1,831,000 net tons, a slight increase over the previous week. It is reported that the supply of labor in the anthracite regions is improving, and with the present strong market and no interference with transportation, production may be expected to gradually increase.

Improved running time is reported for the week ended July 26, in western and central Pennsylvania, Virginia, Alabama and the far west. The gain in central Pennsylvania and the far west is attributed to better demand, in Virginia to better labor conditions, and in western Pennsylvania to general improvement in other conditions. Better market was offset by increased car shortage in Illinois, Indiana and southern Ohio, while in Kansas and Missouri labor difficulty reduced operating time.

Bituminous coal dumped at lower Lake ports during the week of July 26 was 892,736 tons, compared with 920,181 tons in the week of July 19. Except for the week of July 12, this is the lowest week since early in May. The heavy movement of coal up the Lakes, early in the season, filled the upper Lake docks, and the lack of demand until recently and now the lack of cars for carrying coal inland from the Superior docks, are the indirect causes to which is attributed the present congestion of lower Lake ports and the consequent falling off in the movement of Lake cargo coal.

The production of beehive coal increased from 371,000 net tons in the week of July 26 to more than 377,000 tons in the week of Aug. 2. The increase was in Pennsylvania and in Washington and Utah, all other districts both West and South recording considerable decreases

BUSINESS OPINIONS

Dry Goods Economist—Business in dry goods and allied lines is excellent. Prices for practically all goods are high, but they are being paid without protest in all sections of the country. Retailers have been laying in heavy stocks of goods and are seeking further supplies regardless of ruling prices.

Marshall Field & Co.—Current wholesale distribution of dry goods was much in excess of the corresponding week a year ago. The number of merchants in the market was considerably more than for the same period last year. Reports of excellent retail business continue. Orders from road salesmen for both immediate and fall delivery showed an increase over those of the same week of 1918.

The Iron Age—Actual stoppage of pig iron and steel making by railroad strikes in the Cleveland and Chicago districts in the past week have given more weight to the possibility of curtailment by strikes in the steel industry itself. Blast furnaces and steel works operations of the American Steel and Wire Company, at Cleveland have been largely suspended. At the South Chicago works of the Illinois Steel Company seven out of 12 blast furnaces are banked, and at Gary 14 out of 44 open-hearth furnaces are idle.

American Wool and Cotton Reporter—Trading in the Boston wool market has been somewhat spotty, but the demand for fine wools is still in evidence. Some speculation is reported in medium wools, dealers feeling that they will be considerably higher in value than they are at the present time. Business in raw cotton has not been very active. Fluctuations have shown the varying views and operations of those venturesome enough to trade in such erratic markets. Many advise that it is not conservative to do much buying under present conditions.

Atlantic Seaboard

BOSTON

Prices continue advancing. New levels for better grades. Threatened railroad strike a factor. No comprehensive buying. New York pier market more active. Hampton Roads coals in short supply. Water receipts here light. Almost no anthracite loading at Philadelphia. Anxiety over slow movement.

Bituminous—After a week or so of dullness the market has apparently recovered, and quiet buying here and there has again caused a mild stiffening of prices. Quotations at this writing are for prompt acceptance and are on a level 15@25c. higher than a fortnight ago. Purchases are still confined to a few large buyers who need shipments in better volume, although in the past few days of railroad turmoil there has been an impetus to buying on the part of consumers generally. On Aug. 8 the N. Y., N. H. & H. declared an embargo against all freight from connecting lines, food for human consumption alone excepted, and within a few hours the Boston & Maine made a similar announcement. The Boston & Albany has not yet placed any restriction, although traffic conditions in this territory seem to be hanging in the balance.

The better grades from Pennsylvania all-rail are of course taking the lead on prices. Shippers who have available good grades from Cambria districts and in any volume are very much the exception and for that reason are in position to command even higher prices than a week ago. At first hands $3.25@3.35 has been paid and that would mean $3.40@3.50 from the consumer. There are several medium grades that are selling down to $3@3.10, but these are not so actively in demand. Buyers generally are still discriminating between grades, and while this is partly the result of taking anything and everything during 1918, some of it is because so many consumers in this territory are used to Pocahontas and New River and are sceptical over substitutes.

While there is a disposition here not to get panicky over the threatened railroad strike, certain features of it have been brought close home to buyers the past few days. With suburban service practically eliminated on two of the systems running from Boston there is reason for much anxiety. From the steam-users whose stocks are small there has developed a spot demand for coal at the various rehandling piers, but the tonnage available is small and we have yet to hear of any marked advance in prices.

At the same time there is no comprehensive buying. Middle-houses are still making purchases, but less for their own account than for customers who prefer not to let their wants be known in the open market. Certainly it is far from a runaway market, as yet, and the fact remains that there is still an abundance of free coal of one grade or another. One of the railroads here has been trying to buy low volatile coal for power-house purposes, but the difficulty is over the price to be paid, rather than any lack of the grade desired. To that extent the market is still in the hands of the buyers, and they are not yet in the position where they are forced to pay the price asked.

Over the New York piers the better grades are in more active request, especially for bunker and export use. The seamen's strike had an effect upon movement, but steamers are now reporting with regularity and the tonnage available for New England is correspondingly light. At Philadelphia there is a surplus of high volatiles, due to the tie-up of railroad-owned barges, but gradually this situation is being cleared up. Shippers who have contract or other obligations to the Navy are being called upon for their full quota, and in more instances than one shippers are buying from others in order to meet their commitments.

The Pocahontas and New River agencies continue to devote most of their tonnage to over-sea business. Various interruptions in the flow of coal have been threatened the past week, but thus far nothing serious has transpired. At Norfolk the electricians walked out, thereby throwing one of the piers out of commission, but otherwise the loading there has continued about as usual. An advance in wages to mine-workers in the Pocahontas field is said to have been granted, effective Aug. 1, and buyers here have been notified of the additional charge on their contracts which will amount to 35c. per gross ton. A similar advance in the New River field it is said will amount to 50c. per ton.

Receipts here by water from all the loading ports are very light. Aside from steamers for big public utilities like the Boston Edison and the elevated railway there are remarkably few arrivals. To a very large extent the steamers that were built for the coastwise trade are offshore, many of them making regular trips to Buenos Ayres and Rio Janeiro. Rehandling factors are in no position to take on additional business, and should there be any sharp spot demand it is hard to see where the coal can be had for prompt forwarding from points like Boston, Providence and Portland.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F. o. b. mines, net tons.	$2.60@3.10	$3.00@3.60
F. o. b. Philadelphia, gross tons	4.79@5.35	5.20@5 80
F. o. b. New York, gross tons	5.10@5.70	5.50@6.20
Alongside Boston (water coal), gross tons	6.85@7.35	7.10@7.85

Georges Creek is quoted at $3.70 per net ton, f. o. b. mines.

Pocahontas and New River are quoted at $6.25@6.50 per gross ton f. o. b. Norfolk and Newport News, Va., in response to export demand. There are practically no sales for coastwise shipment.

Anthracite—Shipments the first ten days in August have been alarmingly small. This market depends for much of its water coal on the movement of the Reading fleet from Philadelphia, and for practically a fortnight now there have been almost no sailings from that end. Two tows did get away on Aug. 5, and others were to follow a few days later, but it will take several weeks to resume anything like normal movement. As a consequence there has been practically no anthracite loaded at the Port Richmond piers, and this is at a time when there are grave misgivings over the future of supply in most of our cities and larger towns. The trade is most insistent in other directions, west and along the line, and New England losses in August will hardly be made up later.

All the domestic sizes continue in very short supply. Pea and the steam sizes on the other hand are a drug on the market, and bid fair to continue so. Independent coals are being offered freely, the premium varying from 90c. to $1.75 per ton. There is a Massachusetts commission holding hearings on the high cost of commodities, and doubtless publicity will be given to the premiums now being asked.

NEW YORK

Dealers are optimistic as to supply of anthracite for the winter. Production reports encouraging and dealers say considerable coal has been put into bins. All three domestic sizes short. Steam sizes are easier. Bituminous moves slowly and operators report bad car supply. Prices hold steady.

Anthracite—The lack of sufficient prepared coals to fill the requirements of consumers and the possibility, however remote, of retail dealers entering the fall season with smaller stocks than they have carried in previous years under normal conditions, continue to be the features of the industry. Notwithstanding the clamor for coal, the trade believes there will be plenty of coal to meet all necessary requirements this winter and that unless the unforeseen occurs there will be no serious shortage such as faced the country earlier in the year.

Demand remains strong and dealers continue to complain of slow deliveries. While dealers are short of coal at present, there is reason to believe that consumers are considerably better off as regards supplies than it is generally realized.

Reports from the mines show that production is being maintained at nearly the two-million-ton mark in response to the growing demand for coal; and to offset the reports that shipments are more than 4,000,000 tons less during the coal year beginning Apr. 1 when compared with the same period of last year, it is claimed that of this amount the actual decrease in domestic sizes is not more than 1,500,000 tons. The balance of the decrease is attributed to steam sizes, much of which is due to the closing down of the washeries.

Some complaint is heard of the indifference displayed by the mine workers in various parts of the region. Frequently collieries are idle sometimes on the very day the output is badly needed. So far no complaint has been heard of the lack of cars such as now exists in the bituminous fields.

All three of the domestic coals—egg, stove and chestnut—continue to be short, the first two being the shortest, and producers and shippers claim to have sufficient orders ahead to keep them busy for many weeks.

There is a continued heavy call for the larger sizes from Canada and New England, and large shipments are being sent to these points.

The air is filled with rumors of new combinations of coal interests. One rumor has to do with a coming together of several independent operators and that the formal announcement will be forthcoming this week. Another has to do with the oft-repeated rumor of a combination of several retail yards in Brooklyn.

All retail dealers in Greater New York report an active season with many unfilled orders.

The market for the small coals is busy, but shippers are not finding it difficult to take care of the situation. Buckwheat No. 1 is being held around $3, with rice at about 25c. less for the better grades. Barley is the longest on the list.

Last week's dumpings as of Aug. 8, at the railroad piers, were 5866 cars as compared with 6363 cars the previous week.

Quotations for company white ash coals, per gross ton at the mines f.o.b. New York tidewater lower ports, during August, follow:

	Mine	Tidewater
Broken	$5.95	$7.80
Egg	6.25	8.10
Stove	6.50	8.35
Chestnut	6.60	8.45
Pea	5.20	6.95
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The activity in the local market has died down. Demand is slow and resumption of heavy selling is not looked for soon. Manufacturers and large consumers took advantage of the easy market of a few weeks back to stock up, and now that that has been accomplished they are not buying. However, this let-up has not left the market oversupplied with coal. The mines as a rule are not working more than half-time, and car supply along the Pennsylvania and New York Central has been so poor that operators are complaining more of it than of labor, which has failed to show any improvement.

The future does not look encouraging in the eyes of many tradesmen. With the bins of most consumers filled and cars moving slowly, due to three causes—bad equipment, grain movement and the steel industry requirements—there are many who do not see anything promising until early winter.

Buying is more active away from the seaboard, and prices at the mine are stronger than on the tidewater basis. Railroads are coming into the market and are said to be stocking heavily.

Shippers report a lack of the better grades, most of which is tied up on contract. In this situation some see an outlet for the medium grades, which are hard to move when the best grades are available. They point out the possibility of engineers becoming familiar with these cheaper grades and that producers may find it necessary to reduce their prices for the better coals if they want to dispose of their surplus supply.

Reports from Newport News and Hampton Roads show almost a lack of shipping there due to the strike of railroad shopmen, which also causes a serious setback in the program for sending coal to foreign lands.

Locally, the situation is spotty. Some shippers report many inquiries while others say everything is quiet. With the exception of Pools 1, 71 and 9, the other pools have been embargoed.

Dumping of bituminous at the local railroad piers during the week ended Aug. 8 amounted to 6463 cars as compared with 5997 cars the previous week.

Current quotations on spot coal, net tons, at the mines average about as follows:

	Spot
South Fork (best)	$3.15@$3.35
Cambria (best)	2.95@ 3.10
Cambria (ordinary)	2.75@ 2.95
Clearfield (best)	2.95@ 3.10
Clearfield (medium)	2.75@ 2.90
Clearfield (poor)	2.50@ 2.75
Reynoldsville	2.70@ 2.90
Quemahoning	3.10@ 3.25
Somerset (best)	2.95@ 3.10
Somerset (poor)	2.50@ 2.75
Western Maryland	2.50@ 2.75
Fairmont	2.10@ 2.35
Latrobe	2.60@ 2.65
Greensburg	2.50@ 2.60
Westmoreland, ¾ in	2.75@ 2.90
Westmoreland run-of-mine	2.50@ 2.60

PHILADELPHIA

Anthracite domestic sizes extremely tight. Pea moves better. Some dealers feel easy on future outlook. Financial situation good. Steam coals quiet. Bituminous price increases continue. Stronger buying and car shortage the cause. Little contracting. Spot business heavy.

Anthracite—The briskest sort of demand is maintained for the domestic sizes. While an exception must be made in the case of pea coal, this size is also beginning to share in a better movement, as the dealers are receiving one and two-ton orders from people in moderate circumstances, who show a disposition to lay by some coal. The larger companies are still asking their customers to take liberal proportions of pea coal along with the other domestic sizes, and even then some tonnage is left for the storage yards. The independent shippers seem well able to move their pea tonnage at the company circular, and as a consequence of all these efforts every local yard has an almost capacity stock of pea.

Stove has lost no part of the demand displayed by it all summer, and this is still the one size that all retailers are seeking. Egg is in almost the same class, but as the tonnage undelivered on the books of the dealers is not nearly so large as stove, they are not so insistent for this size. Chestnut is moderately free with many dealers, although we know of more than one instance where it is quite welcome. Other yards though are accumulating an unusual tonnage of this size for this time of the year, and these are the dealers who place more faith in the demand for nut as compared with pea and for this reason are making special efforts to get extra supplies.

Considering the local situation as a whole, some of the dealers are inclined to view it as being in good shape for the winter. They argue that with the exception of the two last summers, more coal has already been put away this summer than at any time previous. It must also be said that a considerable tonnage was left over in the cellars from last winter, and it is felt that a heavier supply than usual is now on hand with the better class of trade. They reason that it will actually take an unusual winter to cause any real suffering in the city. As they see it the one great advantage in present buying is that of price, as further increases are imminent, and when the coal-burning weather arrives the burden, as always, will fall on those least able to afford it. While this is the view of the small minority, there is a great deal of sound fact in it.

It is generally believed that all dealers have less tonnage on their books now than they have had all summer, and more orders are being delivered than are being placed upon the books, although there is a semblance of briskness to this also as compared with other years. This has all been brought about by the increased prices asked by the individual shippers, and which the dealers using that coal in any appreciable volume will endeavor to pass along to the consumer.

Dealers are now very cautious about taking orders at a price, and one of the largest companies in advertising prices this week does so with the stipulation that they are subject to change. For August standard retail prices are about covered by the following scale: Egg, $10.70; stove, $11.-10; nut, $11.05; pea, $9.45; all per gross ton. This is of course for dealers handling exclusively or principally company coal, and in addition there is a charge of 40c. a ton for wheeling or carrying. Concerns using a considerable portion of independent coal are adding 50c. a ton to these prices, and even then the increase is not always covered, as the jump at the mines ranged from 45c. to $1.60 a ton.

Until this week it was generally felt that still further increases were due for September, but with Congress actively going into the rising costs of all commodities it is just possible that the producers will go a little slower before adding any more to the price, even though they still insist that the business is far from profitable. There are still some whisperings as to the possibility of a fixed retail price, but it is believed that the trade generally does not want to see this. The only exception would be among the retailers handling high-price coal, who would profit by the fixing of a margin to cover their increased costs.

A nice feature of the trade is the fact that the biggest percentage of the business is on a cash basis. Of course most retailers have more standing out than last year when cash payment was almost enforced by Government direction, but they have less standing on their books than they expected to have. The shipping companies as a natural consequence are having little difficulty in maintaining a close payment of accounts.

The one weak spot in the anthracite trade is in the steam sizes. Rice and barley give all shippers much anxiety. For the latter size there is little demand, and were it not for the fact that this size is used in increasing volume at the mines all producers would find it hard to take care of it. As it is, the storage yards of the big companies contain record tonnages of these two sizes. A good tonnage of buckwheat is going into the trade, with a tendency at times to improvement, but it will take a couple of months yet before this size is entirely absorbed by current demand.

Bituminous—The pronounced upward price movement begun a week ago is still in evidence. The best grades are difficult to get and they are all well over the $3 mark. If the present rate of increase continues for a few weeks, all fuels will be over the $3 figure. The increases have been due to two causes, the first that an increasing number of buyers, stirred by the agitation of a possible shortage, have come into the market all at once, and the other is the growing car shortage, especially in the Fairmont region where the ordinary grades are moving freely and an indication of the scarcity of tonnage is the increasing number of buyers, representing brokerage houses, who are going into the region.

It is difficult to give an accurate survey of the present trend of the market. Any number of consumers claim that the shortage of fuel is not real and that it has been fostered by the operators, and as a consequence they refuse to buy. We have the opinion of one prominent producer, who at times says he feels that there will be a definite sagging in demand along about October, as there is a heavy tonnage of coal now above ground. On the other side, it would appear that the labor question and the car supply would have a tendency to maintain present conditions right through the year. There is a growing feeling that inside of a year there will be a noticeable competition with fuel oil. So far there have been no noticeable inroads on this account, but it is known that big fuel users are actually looking into the possibility of using oil.

The recent strong demand for coal has stirred up certain tardy buyers who had been hoping for more favorable prices, and these consumers are asking for contract figures. Very few shippers under the present circumstances are willing to take on increased tonnage obligations, and these buyers are falling back on spot coal.

The recent prices per net ton are as follows:

Georges Creek Pig Vein	$3.25 @ $3.50
South Fork Miller Vein	3.25 @ 3.50
Clearfield (ordinary)	3.05 @ 3.15
Somerset (ordinary)	2.95 @ 3.05
Fairmont lump	2.80 @ 2.95
Fairmont mine-run	2.70 @ 2.80
Fairmont slack	2.20 @ 2.35
Fairmont lump (ordinary)	2.55 @ 2.65
Fairmont mine-run	2.40 @ 2.55
Fairmont slack	2.35 @ 2.45

BALTIMORE

Export coals in great demand with prices going higher. Wild buying characterizes market in bituminous. Poor coals being eagerly bought up. Anthracite receipts light.

The strike of the railroad shopmen at various points, and the consequent declaration of embargoes on coal destined to Norfolk & Newport News, served to strengthen the local market in bituminous coal. Export coal prices continued to mount as the week passed. Many vessels are loading here for foreign ports, and in several instances the Railroad Administration permitted the lifting of embargoes to enable certain firms to load vessels for foreign account; and this despite the fact that there is a large volume of vessel coal here that is already accumulating demurrage charges.

Throughout the week foreign buyers have been ready to pay almost any price for fuel if they could get immediate shipments. In fact, doing business for export appears to be only a question of obtaining bottoms. The Custom House officials for the week under review announced that 13 vessels had left Baltimore carrying 57,095 tons for foreign countries. This was divided between 50,230 tons cargo and 6865 bunker. Holland obtained five ships, Italy four and Cuba, Sweden, France and Chile one each.

Shortage of rolling stock forced the domestic prices to rise and buyers of all classes sought to obtain coals at almost any figure. In the Cumberland section last week only 600 cars passed through daily, but this week the number reached 1000. Should the cars be available it is expected that at least 2000 cars daily will be loaded and ready for shipment. Even with the increased receipts this week the supply ranged from 33⅓ to 50 per cent. of the demand.

Reports here indicate that practically all of the mines had been working to capacity, but the railroad situation will likely call a halt on mining if the cars are not moved quickly and empties made available.

The market was unsteady throughout the week because of the wild buying. A little coal was offered unexpectedly out of

Coal and Coke Securities

New York Stock Exchange Closing Quotations Aug. 11, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	135	140
Burns Brothers, Pfd	(BB)	110	115
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, Pfd	(CK)	63	....
Colorado Fuel & Iron, Com	(CF)	44⅛	45
Colorado Fuel & Iron, Pfd	(CF)	....	125
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com	(EH)	38	38½
Elk Horn Coal, Pfd	(EH)	44	48
Island Creek Coal, Com	(ICR)	39	....
Island Creek Coal, Pfd	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	63	....
New Central Coal of West Va	(NCC)	5	....
Pittsburgh Coal, Com	(PC)	69⅞	70
Pittsburgh Coal, Pfd	(PC)	95¾	96½
Pond Creek Coal	(PD)	19	19½
Virginia Iron, Coal & Coke	(VK)	61	61½

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	96½	....
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	75½	....
Colorado Fuel & Iron, Gen. 5s, 1943	90½	92
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	79	80½
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	....	87
Jefferson & Clearfield Coal & Iron, Sec. Mort, 5s, 1926	96	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99½	100
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1913	77½	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F., 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	83½	83½
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	84½	87
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	93	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	....	80½
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	90	....
Utah Fuel, 1st Sinking Fund 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	84	85½

Pool No. 71, and this was taken up quickly at prices that started at $3.25 mines basis, and went above $3.50 and even higher. From Pools Nos. 9 and 10 limited quantities were offered at $3 and $3.25, and then the prices went higher. Fuels of poor quality, which a few weeks ago could hardly be given away, were snapped up eagerly at $2.50 as the minimum basis.

It is reported that the Pennsylvania R.R. is accummulating a local reserve of 500,000 tons of bituminous.

The increase in the price of anthracite for August has not brought forth any complaints from buyers. The public accepted the increase and appears ready to take all the hard coal it can get. Dealers carefully explained that the increase was due to the demand of independent mine operators for premiums. While premiums are being paid, it has not resulted in the dealers being able to obtain as much coal as they desire. The receipts of anthracite during the week were light.

Lake Markets

PITTSBURGH

Car shortages still more pronounced. Better demand for coal. Concern over possible Government price control.

Car shortages have become still more pronounced, and many mines have their output seriously curtailed in consequence. The situation arouses the gravest apprehensions as to the future, when bad weather comes. Railroads are making such efforts as they can to put more cars into service, but it is rather plain that more car repair work should have been done before this. Unrest among the shop employees of the railroads, leading to strikes at Cleveland and in the Chicago district, is far from reassuring.

Demand for coal has increased very materially, but part of the increase is due not to increased requirements but to curtailment of shipments through car shortages. Coal prices are firmer all along the line, while in slack there has been a sharp advance in steam grades, fully 30c. a ton. This is presumably a reflection of the fact that the lake shipping season is nearing its end, while in a very few weeks shipments will begin to taper off, and the production of slack will be correspondingly reduced.

Coal producers are much concerned over the possibility that Government control of prices will be resumed under the Lever act. Developments that would tend to make this control desirable, from the standpoint of the Government or consumers, are deplored for several reasons, the chief one being that it would place all coals on the same level, and the discrimination buyers have lately come to exercise, in paying higher prices for the better grades, has been very welcome. At the same time, if conditions were in line to force high prices the operators would probably prefer to have the Government step in and prevent such a movement, as in the long run a free market would react disadvantageously on the trade. We quote: Steam slack, $1.80@2; gas slack, $2@2.30; steam mine-run, $2.30@2.45; gas mine-run, $2.50@2.70; 3-in. gas, $2.80@3, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous coal market improving slowly. Jobbers tired of waiting. Prices rather unsteady. Cars rapidly growing short. Big demand for anthracite.

Bituminous—The feature of the trade is the slight advance in the price of slack. This indicates a pretty strong market, though there is complaint that the mine asking prices are not uniform. There may be several reasons for this. With a market that is not quite sure of itself there are always sellers who despair of getting full prices and will sell remnants for less and sometimes to stimulate a new customer. The jobbers are all doing something, which is a decided improvement over the early part of the season.

The car situation is becoming serious. None of the mines has a sure supply, and there are days when the supply runs down to 25 per cent. of the needs. This ought to interest the consumer, but it does not seem to. Nowhere is the demand at all insistent. The trade must be gone after, and it is the best salesman who gets it. Even some of the jobbers who have done well all along are afraid they are losing ground. The Canadian trade is still an uncertain quantity, and it is likely to remain so for awhile.

The worst of the situation is that the volume of business is not what it was expected to be by this time. The confident predictions made early last spring have been met by continued industrial difficulties, which do not promise to disappear right away, though until they do the business of the country cannot flow on smoothly. This is the real reason for the delay in all sorts of industrial activity. Nobody knows what to do, and to make a wrong move would be serious.

Bituminous prices are strong and some shippers call them satisfactory, at $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for same three-quarter, $4.20 for mine-run and $3.80 for all slack, with smithing special at $5.70 and Pennsylvania smokeless at $4.60, all per net ton, f.o.b. Buffalo.

Anthracite—The demand goes up as the supply fails to. Everybody cries for it, and the distributors of all grades are hard pressed. The all-rail trade westward has been cut to a small table to enable the trade to meet the local demand and the requirement to the Lakes. More coal is promised, but if it does come it will go just as the present supply does.

Coal men as a rule do not like the effort at sensation on the part of the press to display stories of anthracite shortage, for it merely makes people uneasy and helps nobody, unless it be at the expense of some one else. All the coal is going straight to the consumer now, in as careful a proportion as possible. Should consumers buy coke it would help. They may be obliged to buy bituminous also.

The August prices of anthracite are 10 cents higher than for July, except grate and buckwheat, as follows:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8.55	$10 20
Egg	8.85	10 50
Stove	8.95	10.70
Chestnut	9 05	10 80
Pea	7 40	9.25
Buckwheat	5 70	7 75

The effort to keep up Lake shipments is carrying the totals well beyond those of last season, the amount to August this season is 1,856,349 tons, as against 1,295,476 tons to the same time last season. The July shipment was 609,350 tons, as against 429,320 tons last season July. For the week the amount was 114,900 tons, of which 47,100 tons cleared for Duluth and Superior, 20,300 tons for Chicago, 21,300 tons for Milwaukee, 7200 tons for Fort William, 7200 tons for Green Bay and 6800 tons for Sault, Canada.

Freight rates are 50c. to Chicago, Sault, 47½c. to Milwaukee and 42½c. to Duluth-William.

CLEVELAND

Belief that coal is not now over-priced seems to hold sway among large consumers, for despite attacks upon the price of coal, along with other commodities, buying continues. Tonnages available for the lake trade and northern Ohio are slightly decreased because of car shortage and labor troubles at Ohio mines. No let-up in demand for domestic coal.

Bituminous—Prices of coal and coke, as have those of food, clothing and the like, have come under fire in the campaign to reduce the high cost of living, but the trade is standing pat and bearing up well. The only means of bringing about a reduction will come Aug. 15, when freight rates on coal from West Virginia, Ohio and western Pennsylvania into Cleveland and other northern Ohio districts are reduced 5c. a ton. The larger steam-coal users are taking all the operators can supply. Danger of a break in prices is most remote, according to well-informed operators. With representatives of the Mine Workers planning a big wage and time demands, prices will advance before they recede appreciably, it is declared.

The shortage of cars was felt more keenly last week than at any time so far. Whether this situation will be overcome by the strike of iron ore dock workers at upper Great Lakes ports remains to be seen, although much help is expected from this source. Because of the strike many lake ore carriers are being tied up, and not only will coal shipments up the Great Lakes be automatically cut down, but also many cars in the iron ore trade at Lake Erie ports will be released. In any event many operators believe that with the lake strike having all the earmarks of a long drawn-out struggle, a normal car supply for the local trade will become available. Southern and eastern Ohio mines, as a rule, are not working much better than 55 to 60 per cent., 5 to 10 per cent. under the mark of several weeks ago.

Labor trouble at the Ohio mines has many operators aroused. I. W. W. agitation is rampant just now, engaged not so much with curbing production at this time as with prompting extravagant demands by the mine workers when wage scales are negotiated. This trouble, apparently, is more of future than present concern. Labor, however, generally is restive, and a decided letting-up in effort is noticeable.

Pretty good inroad is being made on the surplus piles of slack thrown up at the mines last winter. The piles still are sizable, but shipments the past few weeks have been about twice production. Two of the largest users of slack in the Cleveland territory now are badly crippled by labor trouble, and the next few weeks likely will see this demand somewhat lower. Industrial establishments not hurried by labor troubles are approximating 100 per cent. operations.

Pocahontas and Anthracite—Retail dealers say domestic consumers of these grades are exhibiting an amazing capacity. Demand for both anthracite and Pocahontas seems not to be tapering off at all, while most dealers looked for a slack period from about the first of August till the first tinge of winter. Prices are firm, and receipts are barely sufficient to meet requirements, most dealers having quite a backlog.

Lake Trade—As fast as the larger iron-ore carriers reach Lake Erie ports they are being tied up or loaded with coal cargoes to hold until the dock strike at the head of the lakes is broken. Consequently, coal loading for this week may not fall much under 850,000 tons, which is the figure for the last few weeks; but next week will see a marked decrease. This will not be a great hardship, as coal just now is plentiful on the head of the lakes. According to figures from Duluth, receipts of bituminous coal there and at Superior in July were 1,327,000 tons, compared with 1,120,300 tons in July, 1918. Receipts of bituminous coal for the season to Aug. 1, at Duluth and Superior, were 4,481,500 tons against only 3,112,500 tons to Aug. 1, last year. A let-up of two weeks in the lake coal trade, allowing lower lake users the supplies they are seeking, will be welcomed by many operators.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg	$11.15@$11 25
Chestnut	11.65@ 11 75
Grate	11.45@ 11.55
Stove	11.55@ 11.65
Pocahontas:	
Forked	9.50
Lump	8.50@8.75
Mine-run	7.50
Domestic Bituminous:	
West Virginia splint	7.80@8.10
No. 8 Pittsburgh	6.30@6.65
Massillon lump	7.50@7.70
Steam Coal:	
No. 6 slack	4.35@4.55
No. 8 slack	4.90@5.10
Youghiogheny slack	4.95@5.25
No. 8 ¾-in.	5.60@5.75
No. 6 mine-run	4.70@4.80
No. 8 mine-run	5.10@5.20

DETROIT

Jobbers fear embargoes on coal shipments over various roads may seriously reduce Detroit's winter fuel supply.

Bituminous—Justification of often-reiterated warnings to Detroit buyers of bituminous coal to stock up early apparently is to be found in the action of the Chesapeake & Ohio and other roads placing an embargo on coal shipments, in the contingency created by labor difficulties. Detroit jobbers fear the embargo is likely to create a troublesome condition for some of the Detroit users of steam coal who have been postponing the accumulation of reserves, as a considerable proportion of the West Virginia coal reaching Detroit is handled over the Chesapeake & Ohio and connecting lines through the Toledo gateway.

Though a slight improvement has been noted by some of the jobbers in the number of inquiries received, the aggregate of business handled is still described as unsatisfactory and below the amount which it is said should be moving into the city at this season of the year, particularly in consideration of the restricted buying earlier in the season. Jobbers find that some of the consumers of steam coal are apparently still cherishing expectations that coal will be cheaper after a while.

though a study of the Government's figures on production would seem to refute this theory.

Quotations f.o.b. mines on a net-ton basis for Hocking domestic lump are reported firm at $2.75, while run-of-mine ranges from $2 to $2.20 and slack averages about $1.50. For Pittsburgh No. 8, three-quarter lump is quoted at about $2.50, with mine-run at $2 to $2.25 and slack at $1.75. Four-inch West Virginia lump ranges from $3.25 to $3.50; two-inch lump is $3, mine-run $2.25 to $2.50 and slack $1.85 to $1.90. Smokeless coal is almost unobtainable, though some mine-run is reported to have been offered at $2.75 to $3. Very little coal is to be found on tracks and sidings around Detroit, other than stock sent direct from producer to consumer.

Anthracite—Complaint is made by retailers that much delay is experienced in having orders for anthracite filled. The present conditions are construed to indicate that sufficient stock to meet all requirements will not be forthcoming. While most of the retail yards have some anthracite on hand, the supply would not last long with an active demand from customers.

COLUMBUS

The coal trade in Ohio has developed considerable strength in every department. There is a stronger domestic demand, which has the effect of strengthening prices. Steam business also shows some improvement. Car shortage is growing worse.

The principal feature of the Ohio coal trade is the better demand for domestic sizes which is reported from all localities. This is an encouraging feature, as that department has been rather slow for the past few months. Retailers are buying more liberally, as more householders are coming into the market. Domestic prices have advanced at the mines, with a corresponding advance to the consumer.

Under the influence of better buying, prices for Hocking lump are strong at $3 at the mines. Pocahontas lump is $5 and upward. West Virginia splints are all high, and the same is true of Kentucky grades. Retail prices are being advanced to about $6 for Hocking lump, Pomeroy lump to $6.25 and splints to about the same figure. Pocahontas is now retailing between $7.75 and $8.

The lake trade is rather quiet, although there is still a considerable tonnage moving to the Northwest. There is little congestion on the upper lake docks, as the interior movement has started. Vessels are still plentiful. It is believed that with the coming car shortage the lake trade will continue to the latter part of November, as there is a large tonnage yet to be moved to the upper lake ports.

Steam business is also improving to a small extent, because of the larger production of lump, there is not so much mine-run on the market and prices are higher. Prices of $1.75 for mine-run have now been withdrawn, and practically none can be purchased for less than $2 and even higher. Nut, pea and slack are also showing a little strength, but these grades are still a weak. The unusual weakness of screenings is difficult to explain. Railroads are using a larger tonnage than formerly, and some lines of manufacturing are increasing their fuel requisitions.

Production is restricted largely by car shortage. The scarcity of equipment is now affecting every field in the Buckeye State, with a corresponding decrease in output figures. In eastern Ohio, where the car shortage is most pronounced, it is estimated that the output during the past two weeks has been but 35 per cent. In the Hocking Valley, Pomeroy Bend and Cambridge fields production is about 50 per cent. or lower. There is little hope for an immediate improvement in the car-supply situation.

CINCINNATI

Coal car shortage and strike of railroad shopmen hurt coal shipments. Increased prices announced.

Two circumstances of vital importance to coal operators, dealers and consumers in the Cincinnati district occurred during the past week. The first of these was the increase in the price of all grades of coal, and the second the strike of the railroad shopmen, which caused the closing down of virtually every mine in the Kanawha, New River and Logan districts in West Virginia that is reached by the Chesapeake & Ohio R.R. Thousands of miners have been forced to idleness. The situation on other coal-carrying railroads is decidedly better, but there is a car shortage on all, owing to the tremendous number of cars being sent into the West to take care of the grain movement. This, along with the strike of the shopmen, makes the car shortage a serious one.

The much heralded and thoroughly advertised prediction that coal prices would rot come down, and that if anything they would increase, came true in Cincinnati during the past week when prices were quoted 50c. a ton higher, wholesale at $6.50@6.75 a ton for Youghiogheny and Fairmont lump. Smokeless lump and egg was up 50c. at $8@8.25 a ton. Anthracite was quoted at $12.50 a ton. The advance really occurred Aug. 1, but quotations were not posted until Aug. 5.

The increased prices had a tendency to stimulate those users of coal who have been inclined to think that prices must come down. They are now thoroughly convinced trat there are to be no lower prices, and consequently the past week has seen a great volume of business booked by the dealers.

INDIANAPOLIS

Increase announced on all grades of coal. Labor and car shortage is reported.

An increase of about 25c. a ton for Indiana coal and from 50 to 75c. a ton for Pocahontas and anthracite has been quoted by Indianapolis coal dealers. Notice has been received by dealers from two operators in the Terre Haute field, the Coal Block Co. and Richards & Son, of price increases of 25c. a ton for Indiana mine-run and lump coal, and a similar increase in the steam grades. Indianapolis retailers increased the price of coal approximately 25c. a ton June 4, and the same reasons are assigned for the new increase. Mines have been able to operate only two or three days a week because of car shortage and because the domestic demand has been less than normal.

Because the steel mills and other users of screenings have been operating below capacity, the cost of producing lump coal has been increased, as there has been no market for screenings, it is said. With an increase in the domestic demand the operators are advancing the price to meet the high cost in production. In some fields a labor shortage is reported, due partly to the emigration of miners to Europe. A. B. Meyer & Co. have announced an increase in Indiana Linton lump No. 4 from $5.75 to $6 a ton and Indiana mine-run from $5 to $5.50 a ton. Pocahontas shoveled lump was increased from $8.75 to $9.50 a ton and Pocahontas mine-run from $7.50 to $8 a ton. There is a difference among dealers because of the uncertainty of the supply. A. B. Meyer & Co. also quoted an increase of 25c. on Kentucky lump coal.

LOUISVILLE

General coal market stronger, with domestic prices climbing out of sight and threatening to result in Federal control. Railroad strikes and embargoes blocking shipments in many sections.

The strike situation on the railroads has been the principal topic during the past week, as it has disorganized shipping. The Chesapeake & Ohio is refusing all freights. The Louisville & Nashville has placed numerous embargoes, and the Cincinnati gateway is generally barred to all shipments. Some shipments are moving through Louisville, but with embargoes to connecting lines at various points. Shipments to Atlanta and beyond are embargoed in some instances, and conditions have reached a point where it is a hard matter to find out just what shipments can be accepted and handled. The car shortage is steadily becoming worse, due to congestion at terminals and failure of empties to return promptly.

At the mines labor is not overlooking the railroad situation, and it is reported that miners are anything but satisfied with conditions.

Production in the eastern Kentucky fields is reported to be on a 50 to 60 per cent. basis, with western Kentucky working two and 2½ days per week. Under existing car shortage labor is equal to all demand.

Western Kentucky prices have advanced well on domestic coal during the past two weeks due to the high quotations on eastern Kentucky grades and the shortage. Steam coal is again draggy and hard to sell, but less spot coal on the market.

Eastern Kentucky block coal is rising fast, having jumped from around $3.50 to $4 a ton to prices ranging from $4 to $4.75, with most of it quoted at around $4.25. At that the operators are not accepting much new business as they cannot handle it with present car supplies. The high prices quoted on eastern Kentucky block resulted in a surge of retail buying to the West Virginia fields, but labor troubles on th Norfolk & Western, Chesapeake & Ohio, and other lines are resulting in little West Virginia coal coming through.

Principal quotations are:

	Eastern Kentucky	Western Kentucky
Block and egg	$4.00@$4.75	$2.40@$2.50
Run-of-mine	2.75@3.00	2.25@2.40
Nut and slack	2.00@2.90	1.35@1.50
Thin screenings		1.00@1.25

Eastern Kentucky operators claim that block coal will probably hit $5 a ton by the end of the month. Western Kentucky operators report that lump will go back to $2.55. Some western Kentucky pea and slack has been quoted at 65 to 90 cents a ton, but long stocks have been reduced and about the lowest quotations on such coal are around $1 a ton.

Coke

CONNELLSVILLE

Surplus production, with some concessions on spot furnace coke. Negotiations by idle blast furnaces. Foundry coke firm.

Connellsville coke operators who blew in large numbers of ovens in June and the first week or two of July evidently anticipated their welcome. The theory was that there would be a much larger demand for coke late in the year, say in the last three or four months, and the rise in the spot market in June, from $4 or less to fully $4.25, seemed to suggest that the better market was already at hand. The holiday period passed without production being restricted to any extent by the celebrations, and since then there has at all times been a considerable quantity of furnace coke on track awaiting movement. While operators were disposed to hold their surplus at $4 and endeavor to apply it in time on contract shipments, there have been some divergences in the past few days, coke selling in small lots down to $3.80, which appears to be the outside price that furnaces would pay, since they are well supplied as to the current consumption by contract shipments, and would take extra coke only for stocking purposes. It is thought that the majority of furnaces already have some stocks.

There are dilettante negotiations for furnace coke for the balance of the year, on the part of furnaces contemplating getting into blast again, but the furnaces want to drive rather sharp bargains. The usual asking price for the balance of the year is $4.50, though $4.25 might possibly be done. Furnaces note that coke was sold on contract at a ratio of 6¼ to 1, against basic pig iron at valley furnaces, which makes $4.12 for coke when iron is at its present level of $25.75; and as there is no immediate prospect of pig iron advancing, the furnaces now negotiating do not desire to pay more than about that figure.

The market stands quotable as follows: Spot and prompt furnace, $3.80@4; contract, $4.25@4.50; spot and prompt foundry, $5@5.50; contract (largely nominal) $5@5.50, per net ton at ovens.

Buffalo—A little more movement of iron ore shows that the furnaces are becoming more active, but the increase is light. Coke is strong on the basis of $7.60 for 72-hour Connellsville foundry, $7.25 for 48-hour furnace and $7 for off grades. Domestic sizes bring $6.75 and breeze, $5.75, all per net ton, f.o.b. Buffalo.

Middle West

MILWAUKEE

August coal market dull and featureless. Receipts by lake slow up a little, but thus far exceed those of last year.

The August advances in anthracite, soft coal and coke failed to cause even a ripple of excitement in the coal market, and midsummer dullness prevails. Deliveries would be some livelier, small dealers say, if the dockmen would stand for more liberal requisitions on their part of anthracite and Pocahontas. There are fairly good stocks of both on hand, but the accumulation is being conserved to protect future delivery obligations. Coke does not seem to be wanted at present, and the stock piles keep growing. Receipts by lake are slowing up some. Thus far since the opening of navigation 433,900 tons of anthracite and 1,715,324 tons of soft coal have been put over the docks, a gain of 141,184 tons of the former and 197,127 tons of the latter over the record of the same period in 1918

ST. LOUIS

All Standard mines idle and troubles spreading into other sections of the state. Railroad strike almost completely ties up St. Louis movement of coal. Present supply limited on account of congested conditions. Steam trade to suffer most. War time prices prevailing.

The trouble that started the latter part of last week in the Standard field, when the miners refused to work on account of the operators deducting one day's pay as a fine, according to the agreement, because the miners laid off work on July 5 as a protest in the Mooney case, spread, and at the present time every mine in the Standard field is down excepting those around Sparta on the M. & O. and one or two in isolated places. Nearly every mine in the Mt. Olive district is also idle, and dissatisfaction is rampant. The trouble is not only confined to these districts, but is also in Perry County and in Franklin County, where some of the miners have already gone out on strike.

The trouble, apparently, is because of the failure of the Government to declare the war officially ended and in this manner give the miners a chance to get together with the operators under a new agreement. The general feeling throughout this section on the part of the public is that the miners are justified in their stand because they entered an agreement almost eighteen months ago to work on a certain scale until the war was over. The cost of living has increased in the meantime and there is no chance of their getting a new working scale.

For a long time there has been considerable dissatisfaction in the southern Illinois fields, and at a meeting this week at Belleville the miners openly asked for the resignation of the union officials, indicating that what was prophesied some time ago had come up, and that was that the men had got beyond the control of their leaders.

On the 4th instant screenings were down to 90c. in the Standard field and 2-in. lump to $1.75. At the close of the week screenings were better than $2, and lump was up to $3, with none available. When the trouble spread to the Carterville field of Williamson and Franklin County screenings were down at one time to about $1.25 on the Chicago market and $1.50 on the St. Louis market. On Aug. 6 these same screenings went up to $2.20, with nothing to offer.

The majority of the operators in all fields are for confining such sales as they are able to make to a reasonable price. The Carterville field is sticking close to its regular price, but in the Standard field operators are getting just as much as the traffic will bear.

The steam market is in a critical shape for the reason that everybody is short. If the troubles continue for another week many plants in St. Louis will be idle.

The domestic demand for Standard is light. Mt. Olive is not causing any worry, whereas Carterville is much in demand, with little available.

On account of the unusual conditions it is hard to indicate just what is going to happen, as circumstances are changed daily. The shopmen on practically every road in St. Louis are out. On some roads no freight trains are moving at all. The Terminal men are working, and that is the only thing that is keeping St. Louis on the map right now. The crews are working night and day, and every effort is being made to keep lines open, but it is only a matter of a day or two if the trouble continues until St. Louis will be completely tied up.

Conditions in the country are worse than in St. Louis, for no coal is being accepted for outside movement. This is going to work a hardship on the outside steam plants. The demand from the country is good, but it is out of the question to accept any orders. Railroads are refusing to place empty cars at the mines for commercial loading, and such empties as are being placed are being loaded with railroad coal. In the Carterville field a 50 per cent. car supply has prevailed the past week, and some mines on the Illinois Central work one day out of six on account of no cars.

There is no anthracite or smokeless coal coming in and no indication that anything like this will move this way until conditions become normal.

I. C. C. Decisions

No. 10268. Seaboard Byproduct Coke Company vs. Director General, Delaware, Lackawanna & Western Railroad Company, et al. Submitted May 27, 1919. Decided June 27, 1919. Combination rates assessed on certain shipments of bituminous coal en route from mines in the Pittsburgh and Connellsville districts to Elizabethport, N. J., for delivery by barge at Seaboard (Kearney), N. J., diverted in transit to all-rail routes over which there were no joint rates, found unreasonable to the extent that they exceeded $2.35 per long ton. Reparation awarded where settlement was made at a rate in excess of $2.35 per long ton.

No. 10231. Virginia Iron, Coal and Coke Co. et al. vs. Director General, Southern Railway Co. et al. Submitted May 14, 1919. Decided June 27, 1919.

1. Increased rates on iron ore to Middlesboro, Ky., from points in Tennessee, Georgia, North Carolina, and Virginia on the Southern Railway and the Rome & Northern and Louisville & Nashville railroads found justified.

2. Practice of stating rates on iron ore in terms of net tons instead of long tons not shown to be unreasonable or otherwise unlawful. Complaint dismissed.

General Statistics

ANTHRACITE SHIPMENTS FOR JUNE, 1919

The shipments of anthracite for the month of June, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 5,619,591 tons, as compared with 5,711,915 tons in the preceding month, and with 6,867,669 tons in the corresponding month of 1918. As was the case in May, the larger part of the decrease in June of this year as compared with last was due to the smaller output of steam sizes from the washeries, more than two-thirds of the decrease being in the steam sizes.

The shipments by companies were as follows:

	June, 1919	June, 1918	Coal Year, 1919-1920	Coal Year 1918-1919
P. & R. Ry.	1,084,635	1,345,079	3,284,946	3,935,469
L. V. R.R.	1,041,696	1,352,820	2,937,780	3,856,311
C. R.R. of N. J.	508,702	622,005	1,489,004	1,717,865
D. L. & W. R.R.	903,306	1,015,438	2,702,822	3,061,059
D. & H. Co.	661,991	773,691	1,932,697	2,371,234
Penna. R.R.	372,658	482,737	1,157,826	1,424,491
Erie R.R.	616,939	756,257	1,819,718	2,212,879
N. Y., O. & W. Ry.	167,327	186,948	479,586	549,670
L. & N. E. R.R.	262,337	332,694	751,842	994,320
Totals	5,619,591	6,867,669	16,556,221	20,123,298

COKE PRODUCTION IN 1918

The final figures on the production of coke in 1918, collected by the Geological Survey from producers, record an output of 56,478,872 net tons, of which 25,997,580 tons, or 46 per cent., were from byproduct ovens and 30,480,792 tons were from beehive ovens. Estimates for 1918 published on Jan. 4, 1919, differed from the final figures by three-tenths of 1 per cent.

Total production increased 1.6 per cent. over 1917; byproduct production increased 15.9 per cent.; beehive production decreased 8 per cent. There were 8904 byproduct ovens in operation in 1918, an increase of 1606 over 1917; and 61,317 beehive ovens active, a decrease of 7370 compared with 1917. (See table below.)

Of the beehive coke produced, 23,171,627 tons were sold as furnace coke at an average of $5.93 per ton, and 2,230,156 tons as foundry coke at an average of $7.53 per ton.

In all, 84 per cent. of the beehive coke was sold and 16 per cent. used by the producer. Byproduct coke is largely consumed by the producer—68 per cent. of the output in 1918, compared with 32 per cent. sold. More than 2,500,000 tons of byproduct coke were sold for domestic and other uses than furnace and foundry.

BEEHIVE AND BYPRODUCT COKE PRODUCED IN THE UNITED STATES IN 1917 AND 1918
Compiled by C. E. Lesher, United States Geological Survey, Department of the Interior

State	1917 Beehive Coke Active Ovens	1917 Beehive Coke Produced, Net Tons	1917 Byproduct Coke Active Ovens	1917 Byproduct Coke Produced, Net Tons	1917 Total Coke, Net Tons	1918 Beehive Coke Active Ovens	1918 Beehive Coke Produced, Net Tons	1918 Byproduct Coke Active Ovens	1918 Byproduct Coke Produced, Net Tons	1918 Total Coke, Net Tons
Alabama	5,493	2,151,828	831	2,740,761	4,892,589	5,570	1,717,721	807	2,634,451	4,352,172
Colorado	2,867	1,112,449	.....	.....	1,112,449	1,431	(a)	120	(a)	989,447
Georgia	151	39,589	.....	.....	39,589	101	22,048	.....	.....	22,048
Illinois	.....	.....	619	2,289,833	2,289,833	.....	.....	605	2,285,610	2,285,610
Indiana	.....	.....	861	3,540,718	3,540,718	.....	.....	945	3,898,215	3,898,215
Kentucky	801	331,532	108	531,539	863,071	798	301,036	108	517,749	818,785
Maryland	.....	.....	120	518,810	518,810	.....	.....	180	474,368	474,368
Massachusetts	.....	.....	317	595,113	595,113	.....	.....	400	556,397	556,397
Michigan	.....	.....	258	(a)	(a)	.....	.....	269	(a)	(a)
Minnesota	.....	.....	152	490,272	490,272	.....	.....	214	784,065	784,055
Missouri	.....	.....	56	(a)	(a)	.....	.....	56	(a)	(a)
New Jersey	.....	.....	260	423,361	423,361	.....	.....	260	682,148	682,148
New Mexico	1,134	577,679	.....	.....	577,679	1,053	597,072	.....	.....	597,072
New York	.....	.....	615	993,184	993,184	.....	.....	615	1,069,587	1,069,587
Ohio	198	147,826	1,009	3,546,476	3,694,302	198	(a)	1,610	(a)	5,365,243
Oklahoma	.....	.....	.....	.....	.....	304	(a)	.....	.....	(a)
Pennsylvania	44,534	23,816,420	1,629	4,095,605	27,912,025	37,730	22,136,664	2,189	4,586,981	26,723,645
Tennessee	1,266	376,080	12	35,246	411,326	1,101	302,637	24	124,469	427,106
Utah	726	(b)	.....	.....	(b)	819	(a)	.....	.....	(a)
Virginia	8,029	1,304,330	.....	.....	1,304,230	3,135	1,234,256	.....	.....	1,234,256
Washington	254	(c) 471,187	5	26,346	(c) 497,533	250	93,659	20	30,129	123,788
West Virginia	8,234	2,838,728	214	511,033	3,349,761	8,827	2,716,613	214	603,393	3,320,006
Wisconsin	.....	.....	232	(a)	(a)	.....	.....	268	(a)	(a)
Combined states	.....	.....	.....	2,100,983	2,100,983	.....	1,359,086	.....	7,750,018	2,754,414
Total	68,687	33,167,548	7,298	22,439,280	55,606,828	61,317	30,480,792	8,904	25,997,580	56,478,372

(a) Included in combined states. (b) Included with Washington. (c) Includes Utah.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations compiled by the Matthew Addy Company as per Department of Commerce Committee Schedule.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$29 80	$30.35
Northern Basic	27.55	27 55
Southern Ohio No. 2	28.55	28 25
NEW YORK, Tidewater delivery		
2X Virginia (silicon 2.25 to 2.75)	32.40	31 90
Southern No. 2 (silicon 2.25 to 2.75)	35.20	33.95
BIRMINGHAM		
No. 2 Foundry	28.00	25.25
PHILADELPHIA		
Eastern Pa.	30.65*	30.65
Virginia No. 2	32.10–34.10	30.85
Basic	30.90*	30.90
Grey Forge	29.90*	30.90
CHICAGO		
No. 2 Foundry Local	26 75	26.75
No. 2 Foundry Southern	28.00	32.00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	28 15	28.15
Basic	27 15	27.15
Bessemer	29 35	29.35

* F. o. b. furnace † Delivered.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$2 45	$3 47	$4 24½	$3 54	$3.47
Channels, 3 to 15 in.	2 45	3.47	4.24½	3.54	3.47
Angles, 3 to 6 in., ¼ in thick.	2 45	3 47	4 24½	3 54	3 47
Tees, 3 in. and larger	2 45	3 52	4 24½	3 54	3 47
Plates	2 66	3 67	4 49½	3 54	3.67

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	Cincinnati	St. Louis	Denver	Birmingham
2.75	3 25	3.44	4 30	3 50

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3 25	$3 90	$4 90	$3 90	$4 25	$5 00	$5 00
Cut	4 25	5 40	5 61	5.50		6.65	6.40

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3 35	$4 27	$4.44	$5 65	$4 50	$5 05
Track bolts	4 35	5 17	Prem. 6 65	6 00	6 05	
Standard section angle bars	3 00	4 22	Prem. 4 60		6.50	

COLD DRAWN STEEL SHAFTING—From warehouse to consumers requiring lair-sized lots, the following discounts hold:

Cincinnati	Cleveland	Chicago	St Louis	Denver	Birmingham
15%	List—5%	List—2%	+15%	+20%	+20%

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5 75	$7 50	$6 50	$7 25	$8 15	$7 00
Assorted	6 40	7 50	6 50-7.00	6 40	8 40	7.25

Cincinnati—Horseshoe nails sell for $4 50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$55 30	$53 00	$64 75	$56 80	$50 00	$77 55	$65 00
6 in. and over	52 30	50 00	61 75	53.80	47 00	74 55	62 00

Gaspipe and 16-ft lengths are $1 per ton extra

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$45 00	$55 00	$45 00	$65.00
Standard openhearth rails	47 00	57.00	47 00	67.00
Light rails, 8 to 10 lb.	2 58½*	3.13*	2.83½*	3 13½*
Light rails, 12 to 14 lb.	2 54*	3.09*	2 79*	3.09*
Light rails, 25 to 45 lb.	2 45*	3 00*	2 70*	3 00*

* Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$22.00	$17.50	$19.50
Stove plate	17.00	18 25	21.50
No. 1 machinery cast	23.00	22.00	23.50
Machine shop turnings	10 00	8.75	11 50
Cast borings	10.00	11 00	11 50
Railroad malleable cast	15 00	18.50	18.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0 16½	$0 18	$0 13	$0 18½

DRILL STEEL Warehouse price per pound:

	New York	St. Louis	Birmingham
Solid	14c	13c.	15c.
Hollow	18c.	....	....

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Inches	Steel Black	Steel Galvanized	Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	50½%	24%	¾ to 1¼	39½%	23½%
½	54½%	40%			
¾ to 3	57½%	44%			

LAP WELD

2	50½%	35%	2	32½%	18½%
2½ to 6	53½%	41%	2½ to 4	34½%	21½%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	46½%	29%	¾ to 1¼	39½%	24½%
½	51½%	39%			
¾ to 1¼	55½%	43%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	48½%	37%	2	33½%	20½%
2½ to 4	51½%	40%	2½ to 4	35½%	23½%
4½ to 6	50½%	39%	4½ to 6	34½%	22½%

Stocks discounts in cities named are as follows:

	New York Black	New York Galvanized	Cleveland Black	Cleveland Galvanized	Chicago Black	Chicago Galvanized
⅛ to 3 in. steel butt welded	47%	31%	43½%	34½%	57½%	44%
3½ to 3 in. steel lap welded	42%	27%	45½%	30½%	53½%	41%

Malleable fittings. Class B and C, from New York stock sell at list + 12½%.

Cast iron, standard sizes, 10% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+12½%
Galvanized cast steel rigging	7½%
Bright plain rigging	35%
Bright cast steel	22½%
Bright iron and iron tiller	5%

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Chicago Current
*No. 28 black	4 35	5.50	5 62	6.495	5.27	5.37
*No. 26 black	4 25	5.40	5.52	6.395	5.17	5 27
*Nos. 22 and 24 black	4 20	5.35	5.47	6 345	5.12	5.22
Nos. 18 and 20 black	4 15	5.30	5 42	6.295	5.07	5 17
No. 16 blue annealed	3 75	4 77	4 77	5 695	4.67	4 77
No. 14 blue annealed	3 65	4 67	4 67	5.595	4.57	4.67
No. 10 blue annealed	3 55	4 57	4 57	5.495	4.47	4 57
*No. 28 galvanized	5 70	7 20	7 42	7 745	6.62	6 97
*No. 26 galvanized	5 40	6 90	7 12	7 445	6.32	6 67
No. 24 galvanized	5.25	6 75	6.97	7 295	6 17	6 52

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gages; 25c for 19 to 24 gages, for galvanized corrugated sheets add 15c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair size orders, the following amount is deducted from list:

	New York Current	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago	St. Louis Current
Hot pressed square	$1 50	$2 25	$1 40	$2.00	$2 00	$2 25
Hot pressed hexagon	1 50	2 25	1 20	2.00	2 00	2 25
Cold punched square	1 50	2 25	75	1.30	1 30	2.25
Cold punched hexagon	1 50	2 25	75	1.30	1.30	2.25

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	50—10%	40%
Chicago	50%	50%
Cleveland	60–10–10%	60%
St. Louis	45%	

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago	St Louis
½ by 4 in. and smaller	50%	50%	50–10%	50–10%
Larger and longer up to 1 in. by 30 in.	40%	40%	40–10%	40–10%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York..... $1 25 Cleveland..... $3 75 Chicago..... $2 25

For cast-iron washers the base price per 100 lb. is as follows:
New York..... $6 00 Cleveland..... $3 75 Chicago..... $4 00

RIVETS—The following quotations are allowed for fair-sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ⅞ and smaller	50–10%	60%	45%
Tinned	50–10%	60%	40%

Boiler, ½, ⅝, ¾, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb:
New York..$4.72 base Cleveland..$4.00 Chicago..$4.87 Pittsburgh..$4.65

Structural, same sizes:
New York $4 82 Cleveland $4 10 Chicago $4 97 Pittsburgh $4.75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York — Current	New York — One Year Ago	Cleveland — Current	Cleveland — One Year Ago	Chicago — Current	Chicago — One Year Ago
Raw in barrel	$2 15	$1 86	$2 15	$2 00	$2 48	$1 97
5-gal. cans	2 28	1 96	2 40	2 15	2 68	2 17

WHITE AND RED LEAD—Base price:

	Red — Current Dry	Red — Current In Oil	Red — 1 Year Ago Dry	Red — 1 Year Ago In Oil	White — Current Dry and In Oil	White — 1 Year Ago Dry and In Oil
100-lb. keg	13 00	14 50	14 00	14 50	13 00	14 00
25 and 50-lb. kegs	13 25	14 75	14 25	12.75	13.25	14.25
12½-lb. keg	13.50	15 00	14 50	15 00	13.50	14 50
5-lb. cans	15 00	16.50			15 00	16 00
1-lb. cans	16 00	17 50			16 00	17 00

500 lb. lots less 10% discount. 2000 lb. lots less 10 2½% discount.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Chicago	$12 00	Birmingham	$15 00
St. Louis, salmon	10 00	Denver (hard red)	13.00
Cincinnati	17 00		

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply — C.l.	1-Ply — L.c.l.	2-Ply — C.l.	2-Ply — L.c.l.	3-Ply — C.l.	3-Ply — L.c.l.
No. 1 grade	$1 50	$1 75	$1 90	$2 15	$2 30	$2.55
No. 2 grade	1 35	1 60	1 70	1 95	2.05	2.30

Asbestos asphalt saturated felt (14 lb. per square) costs $5.00 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $2 25 per roll in carload lots and $2.50 for smaller quantities.

Shingles, red and green slate finish cost $6.00 per square in carloads, $6.25 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b New York and Chicago:

	Carload Lots N. Y.	Carload Lots Chicago	Less Than Carload Lots N. Y.	Less Than Carload Lots Chicago
Tar felt (14 lb. per square of 100 sq.ft.)	$70 00	$70 00	$71 00	$71.00
Tar pitch (in 400-lb. bbl.)	21 00	18 00	22 00	19.00
Asphalt pitch (in barrels)	34 00	34 00	37 50	37 50
Asphalt felt	68 00	68.00	72 50	72 50

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	06 065	$0 135	$0 185
St. Louis	.08	15	
Seattle	.09	.175	.30
Los Angeles*	.082	.154	.236
New Orleans	.165	.22	.325
Pittsburgh	.065	.115	
Chicago	.08	.144	
Denver	.125	.18	.25
Cincinnati	.0645	.146	.1777

*F. o. b. factory, 4, 8 and 10 inch

LUMBER—Price of pine per M in carload lots.

	1-In Rough 10 In. x 16 Ft	2-In T. and G. 10 In. x 16 Ft	8 x 8 In. x 20 Ft.
St. Louis	$30@ 51	$35 00	$33 00
Birmingham	39 00	33 00	31 00
Denver	43 25	35 00	43 00
Cincinnati	43 50	41 50	42 50

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%	40%	Gelatin 60%	80%	Black Powder
New York		$0.27½	$0 30		$2 40
Boston	$0.22½	24½	26½	$0.31	2.20
Kansas City	.19	23½	26½	30	2.25
New Orleans	.22½ (50%)	23½	24½	30½	
Seattle	.14½	.18½	.21	.315	1.90
Chicago	.18½	21½	.25½	29½	2.15
St. Paul	.19	23½	.26½		2.45
St. Louis	.19	.23½	.25½	.30	2.40
Denver	.17½	.22	.24½	.28½	2.25
Dallas	.189	.225	.288	.342	2.75
Los Angeles	.189	.232	.257		2.55

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	7	8½	14½
Fiber or sponge	8	13	8½	18
Transmission	7	13	8½	17
Axle	4½	4½	4½	5¼
Gear	4½	7½	8½	8
Car journal	22 (gal)	49	8½	8

BABBITT METAL—Warehouse prices in cents per pound.

	New York — Current	New York — One Year Ago	Cleveland — Current	Cleveland — One Year Ago	Chicago — Current	Chicago — One Year Ago
Best grade	90 00	125 00	80.00	108.00	75.00	100.00
Commercial	50.00	70.00	18 50	23.00	15.00	24 00

HOSE—Following are prices of various classes of hose:

Fire	50-Ft. Lengths
Underwriters' 2½-in.	70c. per ft.
Common, 2½-in.	40%

Air	First Grade	Second Grade	Third Grade
¾-in per ft.	$0 50	$0 35	$0.25

Steam—Discounts from list

First grade	30%	Second grade	40%	Third grade 40-10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	45%	50%
Denver	30%	25%
Birmingham	35%	35%
Chicago	45%	35%
Cincinnati	30-5-2½%	40-2½%

RAWHIDE LACING—20% for cut; 45c. per sq.ft. for ordinary.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.60
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	1.00
Wire insertion asbestos sheet	1.20
Rubber sheet	.60
Rubber sheet, wire insertion	.80
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.20
Asbestos wick, ½- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ⅜-in. the price is ¼ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ¼-in., 8 ft.; ⅜-in., 6; ½-in., 4½; ⅝ in., 3½; ¾-in., 2 ft. 10 in.; 1-in., 2 ft. 4 in. Following is price per pound for ⅜-in. and larger, in 1200-ft. coils:

Boston	$0.25	Atlanta	$0.29½
New York	.27	Denver	.27½
St. Louis	.26½	Kansas City	.28½
Chicago	.26½	New Orleans	.27½
St. Paul	.28	Seattle	.27½
San Francisco	.26	Los Angeles	.26

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING Pipe Size	Standard List Per Lin.Ft.	BLOCKS AND SHEETS Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0.27
2-in.	.36	1-in.	.30
3-in.	.45	1½-in.	.45
4-in.	.60	2-in.	.60
6-in.	.80	2½-in.	.75
8-in.	1.10	3-in.	.90
10-in.	1.30	3½-in.	1.05
85% magnesia high pressure			List

For low-pressure heating and return lines: 4-ply.... 58% off; 3-ply.... 60% off; 2-ply.... 62½ off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½-lb. rolls	48c. per lb.
Rubber tape, ½-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

No.	Denver — Single Braid	Denver — Double Braid	Denver — Double Duplex	St. Louis — Single Braid	St. Louis — Double Braid	St. Louis — Double Duplex	Birmingham — Single Braid	Birmingham — Double Braid	Birmingham — Double Duplex
14	$12.00	$15.50	$33 00	$11 00	$20.00	$31 50	$9 92	$9 92	$41.66
10	19 95	26 45	52 95	25 40	29.00	59 00	29 99	29.99	56 26
8	28.05	35 33	70 95	35 45	35.00	72 50	40 89	40 89	..
6	44.35	47.85			61.00	120.00	82 13	82 13	..
4	63.65	68.25			86 00		112.48	112 48	..
2	95.35	100.85			130.00		158.76	158 76	..
1	124.40	131 45			176 00		213.34	213 34	..
0	156.00	156.00			222.00		251 50	251 50	..
00					270.00		302.78	302.78	..
000					330.00		366.00	366.00	..
0000					400.00		439 74	439 74	..

Cincinnati is using a 20-cent base, with 55 to 58% discount.

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc the following freight rates per 1000 lb. are effective:

Boston	$0.30	New Orleans	$0 38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	.24
Cleveland	.17	St. Paul	.49½
Denver	.99	Pacific Coast (all rail)	1.25*
Kansas City	.59		

Note—Add 3% transportation tax Minimum carload, 80,000 lb.

COAL AGE

Volume 16 New York, August 21, 1919 Number 8

Labor, Now and Twenty Years Ago

ABOR now is operating in huge trusts, far larger and more powerful, more all embracing and less easily controllable, than the capitalist interests they oppose. Yet there is one good feature in these trusts; they have prevented a decline in wages, and so saved a distressing fall in prices.

At every halt in the path of progress during the last century, the nation waited in dread until wages fell. We had begun to believe that until wages had dropped industry must continue to decline. When, in the past, the looked-for fall in wages came, values of goods on the shelves dropped heavily, banks broke through the failure of credit, stores were closed and a panic occurred. It was not a healthy condition.

The public prophesied that we would see it again during the present year, but the labor trusts working in the interests of their members saved us from the collapse. Though nearly every newspaper proclaimed lower wages and lower prices they never came.

"Coal Age," firm in the belief that prices were the outcome of wages and that the labor trusts would not permit the reduction of the compensation paid to manual workers, argued that prices must rise rather than fall. They have. The prophesy has been somewhat more fully verified than most of us would wish, but the condition prophesied has arrived and it has restored public confidence and stimulated public buying.

We may congratulate the labor trusts on this performance, but unfortunately they not only steady wages; they tend to raise them and so unsettle values and reduce the value of incorporeal estates. Those who have financed industry have in the last two or three years gained a 6 per cent dividend or less and lost perhaps 40 or 50 per cent per annum in the depreciation of the purchasing power of their money.

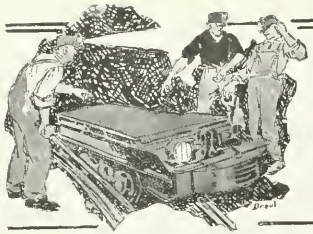
This is clearly unjust, and it is undesirable. The general rise in rents is one of the results of the decline in the value of the money. Thus to the labor trusts may be credited avoidance of a panic, but to them also must be debited that change in money values which makes accident compensation and other insurance inadequate and renders all savings of decreased value. If the labor trust raises wages above the present level it will do the nation much harm. All wages which more than compensate for the change in cost of living or for the increase in productivity should be condemned.

LABOR trusts have repeatedly claimed that their existence was necessary if they were to meet capital on an even ground because as capital had already combined labor must unite also. This is the well recognized argument in favor of the "collective bargain."

One would expect that the employees of the industries where the employers were organized would most need the collective principle and would have strong unions. However, this is not so. Where the employers are combined, the men are unorganized and where the employees are unorganized, the employers are combined. If the defense of the "collective bargain" is needed, those that need it most have it least.

In coal circles the union was the first agency to bring coal operators together. Attacked by the union as a group and urged by the mine workers to sign up as a group, they have combined on the question of wages just so far as they have been compelled by the union to combine. Those who could resist union pressure have remained out. The union has unionized the operators. In fact, the operators have repeatedly resisted this forced combination.

A reporter, who wore out his heels at the conference room of the mine workers and operators in the McAlpin hotel, came back with one predominating impression, saying, that a big burly mine leader fidgetily strode back and forth repeating confidentially to whoever would listen: "They are unionizing the operators. Till we can get the bosses to agree and combine we cannot make a contract. We have unionized ourselves, now we find we must unionize those we would deal with." It is the same today. There are many operators but only one union.



IDEAS AND SUGGESTIONS

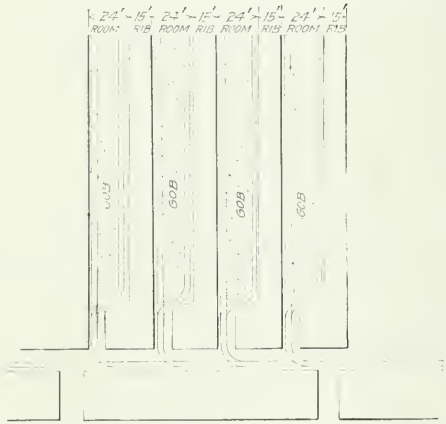
PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Conservation of Coal

By JOHN A. MORRISON
Monongahela City, Penn.

It is well known that not enough coal is extracted in certain districts, although different forms of mining have been tried. After experimenting with various methods, we still find quite a loss, and it is time to look further for a solution.

One cause for loss in recovery arises from the length of time it takes to drive rooms their allotted distance



THIS METHOD OF WORKING RESULTS IN GREATER RECOVERY OF COAL

and extract the pillars. In certain districts the miners' agreement calls for two rooms for each two men, with the understanding that they will clean up one place before starting in the next, but in many instances the work has been so manipulated by the miner (either on account of not agreeing with his buddy or for some other reason) that one man now works one room. This results in each man losing considerable time. Often a man will clean up about 9 or 10 o'clock and then go home for the rest of the day. This happens on each cut loaded out, or possibly twice a week. The result is that where rooms are driven, say 24 ft. wide, about 10 ft. are extracted each week, or it requires six months to complete a room 250 ft. long. Thus before the rib is drawn out the place caves, causing loss of coal, and a squeeze is brought on with its enormous cost and extreme danger.

This length of time could be almost cut in half by the following arrangement, and still afford the loader a place to work in: As the room entries are advanced, the necks of the rooms could be driven to the point ready for widening out; then, when the time comes to drive rooms, a double track may be put in each room so that two men can work in the same room and load two cars instead of one. The gob may be thrown into the center, and as soon as the room is driven its proper distance one of the tracks can be taken up while the other is left for the extraction of the rib.

Under this arrangement the miner could not complain of having too far to shovel coal, nor could the mine official growl about too much open territory. The same number of men would be placed in half the number of places, and these could be driven up in half the time. The only difficult point to be taken care of would be the cutting of the places. This would mean giving the machine runner enough loaders so that he could just keep them in coal. The machine would be taken in the room over one track and brought out over the other. The cost for laying the extra switch and providing the second track will be small, and the benefit gained will be gratifying. The accompanying illustration makes the method more clear.

Handy Cleaning Spray

By CHARLES H. WILLEY
Concord, N. H.

The accompany illustration shows a handy way in which to spray a cleaning mixture of sal soda and lye or kerosene on the parts of mine machinery just before

SUGGESTION FOR AN EASILY MADE SPRAY

overhauling. I use this device at frequent intervals to keep things clean. It is easy to use and is a great improvement over mopping the dirty or greasy parts with a saturated bunch of waste. The spray is easily made from some short lengths of ¼ and ⅜-in. pipe and a bit of brass strap or plate.

An Outdoor Substation for Supplying Power to a Coal Mine

By H. W. Young
Chicago, Ill.

The use of the high-tension outdoor substations for supplying power to coal mines is becoming more general. Therefore, a short description of a recent 2500-kv.a.-three-phase installation will be of interest to coal-mine people.

Fig. 1 shows the substation proper. It consists of an

FIG. 1. OUTSIDE VIEW OF SUBSTATION

expanded steel structure on top of which is installed a double-throw, 200-amp., 13,200-volt, three-pole air-brake switch arranged to connect the transformers with either of two incoming three-phase lines. This switch is of a manually operated, inter-locked, remote-control type, permitting all three poles to be simultaneously

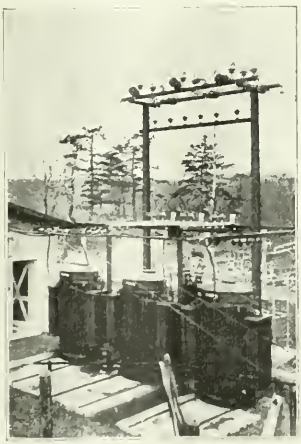


FIG. 2. VIEW OF TRANSFORMING EQUIPMENT

opened and closed from the ground level by means of a locking-type handle.

The three 833-kv.a. single-phase transformers are located on concrete foundations directly under the steel rack, attached to the main steel poles. The transformers are so located that in case of trouble any unit can be quickly removed. Just above the transformers is a steel framework carrying choke coils, fuses and disconnecting switches for the lightning arresters mounted on a separate pipe-frame structure. These arresters are of the high-speed, sphere-gap, graded-resistance type, which do not require regular attendance.

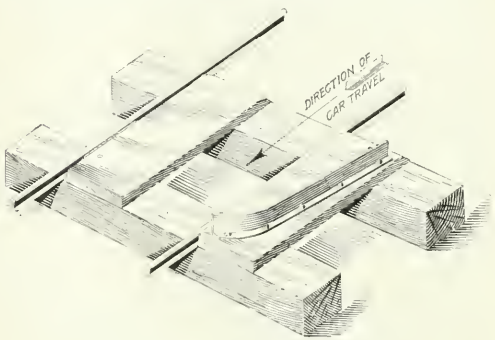
Referring to Fig. 2, it will be seen that a primary metering equipment is mounted between the two main steel poles. At the left is a house in which is mounted the distribution switch-board equipped with oil switches and the necessary measuring instruments. This substation was designed and built by the Delta-Star Electric Co. of Chicago, Illinois.

An Automatic Rerail

By Ralph W. Mayer
California, Penn.

Many types of rerailing devices are used in American coal mines. The one here described and illustrated consists merely of a means for raising a derailed car to the level of the track and crowding the wheels over onto the rails.

A piece of heavy plank about 2 ft. wide and 6 ft. long is covered with sheet iron and placed on the outside of the rail, its inner edge being in contact with and at the



RERAILING DEVICE IN POSITION

same height as the top of the rail. Extending diagonally across the surface of this steel-covered planking a heavy angle iron is placed. This may, if desired, be slightly bent or L-shaped.

On the corresponding side of the opposite rail a similar steel-covered plank is placed. A suitable space is here left, however, to accommodate the flange of the wheel. The operation of this device is so self-evident as to require no explanation.

Salesman's Duty to Employer—An agent engaged to negotiate sales is under obligation to use the utmost good faith toward his employer, and will forfeit right to compensation for his services where he has assisted in diverting the patronage of his employer's customer to a competitor for his own benefit by securing a prospectively better position with the competitor than he has with his old employer. The fact that an old customer may have become dissatisfied with products furnished him will not excuse the seller's salesman in diverting his trade to a competitor; it is the salesman's duty to report the dissatisfaction to his employer and attempt to remove the cause of it and thereby hold the customer's trade. (New York Supreme Court, Appellate Division; McCaskey vs. Cumberland Glass Manufacturing Co.; 176 New York Supplement, 798.)

Mine Electric Signaling Practice*

By Terrell Croft
St. Louis, Mo.

SYNOPSIS — *Mine signaling systems are of several varieties and may be either visual, audible or telephonic, battery magneto or power-actuated. Some types require carefully insulated, lead covered or even armored cable, while others employ bare wire. Switches are important as the ordinary push buttons used in residences and industrial plants are not suited to rough usage.*

ELECTRIC mine signaling systems may, with reference to their sources of energy, be divided into three different classes: (a) Battery, (b) magneto and (c) power. A battery signaling system may utilize either primary or secondary cells. If primary cells are employed, they must be renewed or replaced frequently. Storage cells require constant attention and recharging. Hence, where such application

FIG. 1. SIGNALING SYSTEM FOR A HAULAGEWAY

is feasible, either a magneto or a power-actuated system is preferable.

The magneto signaling system uses a magneto-generator, driven by a hand-operated crank, similar to that used in a telephone, at each station from which a signal is to be transmitted. To transmit the signal, the crank is so turned as to produce the right number of long and short rings in the proper sequence. The bells which receive the signals are of the polarized type and are similar to those used in telephones. Both the magneto-generators and the polarized ringers as designed for mine application are specially constructed to withstand severe service and are contained in waterproof cast-iron casings. The magnetos and ringers are relatively expensive, but the system is quite reliable and satisfactory.

Power-actuated signal circuits feed from either the alternating- or direct-current power lines on the property. The pressure for the signal circuit should be reduced so that it does not, in gaseous mines, exceed 10 to 25 volts. With alternating current this is accomplished readily with a "bell-ringing transformer." In nongaseous mines, pressures up to 125 volts may be used advantageously. The Holstzer-Cabot Co., of Boston, Mass., manufactures polarized loud-ringing type bells of 300 ohms resistance which will operate satisfactorily on 50- or 60-cycle, 110-volt, alternating-current circuits.

Wire for signaling circuits should have rubber insulation. Twisted-pair conductor such as that used by the telephone companies can sometimes be employed to advantage. It is particularly adaptable for telephone circuits in that, with it, the transpositions (which are necessary where power circuits are adjacent) are provided by the "twists" in the conductor. In shafts, signal wires may be carried in wrought-iron conduit. In entries and tunnels, signal wires should be held on porcelain or glass insulators and should not be permitted to contact with anything else. Underground insulation is difficult to maintain, particularly in wet mines.

Signal wiring, even though it operates at low voltage, should be carefully insulated. The following, which also applies to lighting wiring, is Rule 23 from the Bureau of Standards "Standardization of Electrical Practice in Mines": "Small wires for lighting or signal circuits shall either be conveyed in pipes or casings, or they may be suspended from porcelain or glass insulators or securely tied to them, so that they do not touch any timbering, rock, coal or metal. On no account shall staples be used. If metallic pipes are used, they must be grounded, and if not electrically continuous, every section must be grounded. If separate uncased wires are used, they shall be kept at least 3 in. apart, and not brought together, except at lamps or fittings."

Battery hoisting-signal systems are shown in Fig. 2.

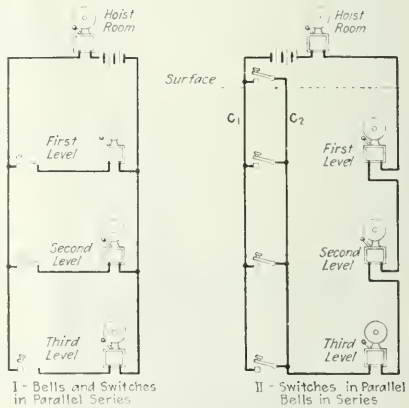


FIG. 2. MINE HOIST SIGNAL CIRCUITS

The circuit of Fig. 2 *I* should not be used because with it two persons may endeavor to signal simultaneously at different levels and thereby cause confusion and possibly an accident. A circuit arranged as at *II*, or as in Fig. 3, is preferable, because with them all of the station signals sound when the engine room signal sounds. If deemed desirable, the conductors C_1 and C_2 in Fig. 2 may be bare and carried down the shaft within reach of the cage. Then a man riding on the cage can transmit signals by short-circuiting them with any piece of metal.

The signaling system for a haulage road may consist of two bare conductors held on insulators about 4 or

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5 in. apart on the roof over the road. These two conductors (Fig. 1) are connected at the engine-room end through a source of voltage and a signaling bell. To signal the engineman, the triprider places a short iron rod, which he carries with him, across the wires. This closes the circuit and causes the bell in the engine room to ring. Signals are transmitted in accordance with the predetermined code of long and short rings. Sometimes it is possible for a triprider to signal the engineman by merely bringing the two wires together with his hand. However, he cannot do this at the insulators. Where one engineman operates the hoists for several different roads, indicators on each of the several signal bells are necessary to show definitely which of the bells transmitted the signal. When several signals arrive simultaneously the engineman does nothing until he obtains a clear signal from one of the roads.

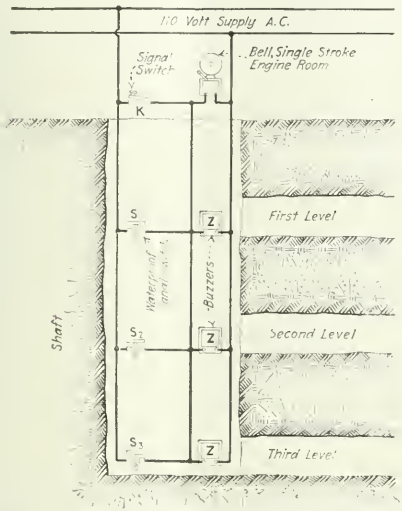


FIG. SYSTEM WITH SIGNALING DEVICES IN PARALLEL

A method of obtaining low-voltage for signaling from a high-voltage direct-current circuit is shown in Fig. 4. Two rows of five lamps each connected in parallel are used, so that the failure of one lamp does not render the signal system inoperative.

A hoisting signaling system fed from a 110-volt circuit (Fig. 3) can be used if the switches, gongs and buzzers are properly designed. This installation was made at the Raven Mine, Butte, Mont. The bell B is a single-stroke device while Z and Z are buzzers. If either S_1, S_2 or S is closed, all of the buzzers and the bell ring. The engineer can return a confirmatory signal by manipulating the key K.

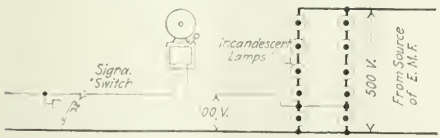


FIG. 4. METHOD OF OBTAINING LOW VOLTAGE FOR SIGNALING

A signaling system using an alternating-current supply through a transformer (Fig. 5) can be arranged readily. The system depicted shows only one bare wire in the shaft. Grounding this wire to the frame of the cage with any piece of metal will operate the signal inasmuch as one side of the secondary of the transformer is grounded. This system is used at the Penn and Republic Iron Mines in Michigan. The three wires "to grade," "to skip" and "to cage" are of No. 4 bare copper and are held in the shaft on porcelain insulators. An indicator, not shown, registers the number of taps which any bell sounds; a lamp is also lighted.

Switches for signaling stations should be of rugged construction. The ordinary push buttons, which are satisfactory for residence and industrial-building signaling systems, are out of place around a mine and also are expensive in ultimate cost. Iron-clad pull-type switches (Fig. 6) especially designed for this service are the most satisfactory and economical. High-voltage switches of this type should have a quick break in order to minimize destructive arcing.

Block-signal wiring to indicate when a section of track, which lies between two sidings or around a curve, is occupied by a trip may be arranged as shown in Fig. 7. Illuminated lamps indicate a clear track and dark lamps a blocked track. When the locomotive passes one of the signaling stations, the motorman throws the lever and opens the circuit, thereby extinguishing the lights.

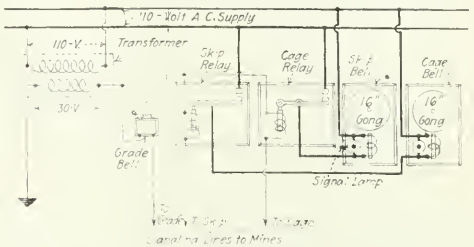


FIG. SIGNALING SYSTEM USING ALTERNATING SUPPLY FED THROUGH TRANSFORMER

In leaving the section, he throws the lever at that end and thereby lights the lights. When the section is blocked, the lights should always be extinguished. By wiring so that this is accomplished, the possibility of a collision due to an "open" in the signal circuit is eliminated. The block-signal switches may be mounted either on the wall or the roof, whichever is the most convenient. In any case they should be within reach of the motorman without his leaving his locomotive. The wiring for a series of block signals (Fig. 8) follows the principles outlined in Fig. 7.

Mine telephone systems may be divided into two general classes: Exchange systems and bridging systems. In the bridging system (Fig. 9) all of the telephones are connected on one line in parallel, forming a party line, so that the turning of the generator crank on any one telephone rings all of them. Each station has a designated call consisting of a combination of long and short rings. The bridging system has the advantage of low cost and simplicity. In the exchange system, each telephone or group of telephones has its own circuit while a centrally located switchboard where an operator is on duty is provided. Connection between the different lines is effected by this operator as in any telephone exchange. This system is used and is

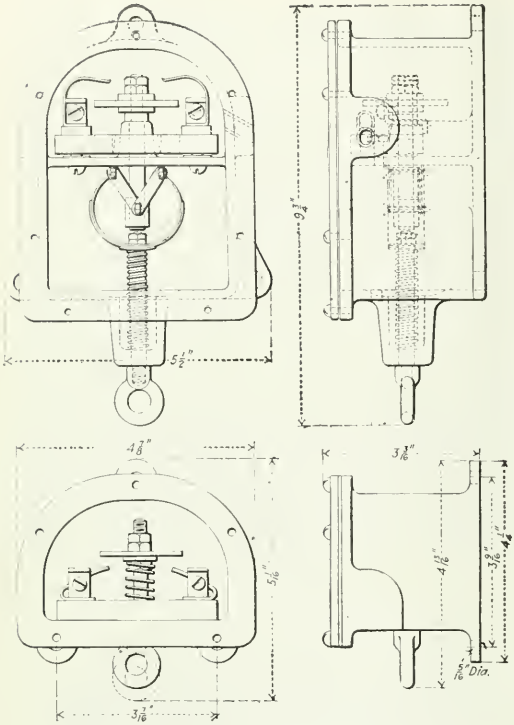


FIG. 6. MINE SIGNAL PULL SWITCHES OF THE HIGH VOLTAGE AND BATTERY CIRCUIT TYPE

desirable only for the largest properties where the number of stations exceeds 15 or 20.

In selecting telephones for mining service, for use above ground (in the engine-room, offices and in the various residences), the stationary wooden, wall or desk type sets should be used unless they are located in exposed positions. Under ground, and in locations above ground which are exposed to the weather, the special mining-type metal-cased telephone should be used. Extension bells may be located at a point distant from any given telephone station and connected so as to ring simultaneously with the bells of that station. For above-ground service, wooden-box extension bells, similar in construction to the box-type telephones, are employed. Under ground and in locations exposed to the weather, iron-box bells having impregnated coils and exposed metal parts galvanized or otherwise protected, should be installed.

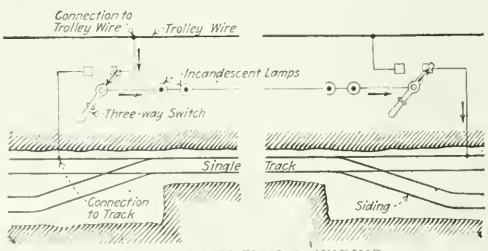


FIG. 7. BLOCK SIGNAL WIRING

Conductors for Telephone Wiring may (according to the Western Electric Co.) be either armored cable, Ferrin circular loom cable, braided weather-proof iron or copper wire, or bare iron wire. Ordinary lead-covered cable when used in mines may give trouble because the sheath is subject to contact with dilute acids. Electrolytic action between the cable sheath and the metal supports is likely. Furthermore, a lead sheath is mechanically weak, which necessitates supporting it at frequent intervals. Jarring of cars or cages has been sufficient to cause crystallization and severing of the lead sheath.

Armored cable is probably the best that can be used for mine service. It is also quite expensive. The construction is this: Three copper conductors are used, each equivalent to one No. 18 B. & S. gage conductor and consisting of three No. 23 gage wires. Over each stranded conductor is placed a $\frac{1}{16}$-in. wall of rubber over which is placed a layer of tape. Two of these conductors are then twisted together and the third laid beside them, after which a jute filler is put on to make the core of the cable round. Over this core is placed a wrapping of tape, another layer of jute and then the whole is armored with No. 14 BWG galvanized iron wire. Over this armor is then placed another layer of jute, and over all a heavy cotton-braid covering which is saturated with a moisture-resisting and preservative compound. Such a cable would be a little over an inch in diameter, and would weigh approximately 1¼ lb. per foot.

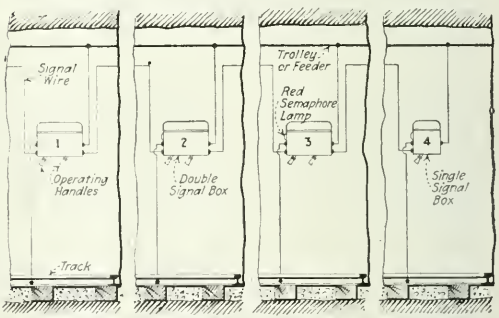


FIG. 8. ON THIS AND THE FACING

Where weather-proof copper or iron wire is used for telephone circuits either two separate wires or a twisted pair can be employed. A twisted-pair installation will cost the least because with it only one insulator is used to support both wires. Where two wires are used, each is supported on its own knob.

Bare galvanized-iron telephone wire, No. 10 BWG, will give satisfaction in a dry mine. Each wire must, of course, be supported on its own porcelain insulator. In splicing, double-tube, tinned-copper sleeves should be used.

Ferrin circular-loom cable is made with any required number of pairs. It is composed of braided, rubber-covered, twisted pair copper conductor having a jute filler saturated with a moisture-proof preservative compound. Over this is placed a serving of impregnated tape and on top of this is woven a circular casing of heavy cotton which is also impregnated with the weather-proof compound. Circular-loom covering differs from ordinary braiding in that the strands are

laid longitudinally and transversely instead of being braided diagonally. This makes a much stronger fabric, as the pull on the cable is resisted by the heavy longitudinal strands. Cable can be furnished with any size conductor, but No. 14 or No. 18 gage is best suited for mine service.

In wiring shafts for telephone service, cables as described above should be used. To protect against falls from the cage, armored cable may be employed. If unarmored cable is utilized, it should be incased in grooved wooden molding, consisting of a base and capping which supports as well as protects the cable. In supporting armored cable, if it is not too long, one clamp at the top is usually sufficient. Conduit or pipe provides a good protection for telephone cable. Support is provided by bending the conduit at intervals of possibly 100 feet.

In installing the cable in a shaft it is bad practice to unreel it from the top. This method permits the total weight of the cable to come upon the conductors before the supports are in place. This condition is liable to cause the wires to break and the cable to part. The best method is to fasten one end in a clamp at the top of the shaft, place the cable reel on the cage and proceed toward the bottom, affixing clamps at the proper intervals. When each clamp is being fastened to its support in the shaft, it should be so placed that there is a trifle of slack between it and the next succeeding clamp. By proceeding thus, it will be assured that each clamp is supporting its proper length of cable. In carrying telephone cable in roads, entries and tunnels, one good method is to hold the cable to the timbers with porcelain cleats similar to those used in power wiring. Another good method is to tie the cable on glass or porcelain knobs held by spikes or lag screws.

Haulage signal wires may be used for a telephone circuit (Fig. 10). The two bare wires supported over the track, as suggested in Fig. 1, form one side of the telephone circuit and the ground is used for the return. The condensers will not permit the track signaling current to flow through them but will pass the alternating magneto and talking currents of the telephone. When a triprider short-circuits the signal wires, a relay is operated which in turn causes the signal bell to ring. To insure satisfactory operation of the telephone system, the ground connections must be good and the signal wires must be well insulated; that is, free from leaks and grounds. This system is not workable where a grounded generator is used to furnish the signaling current.

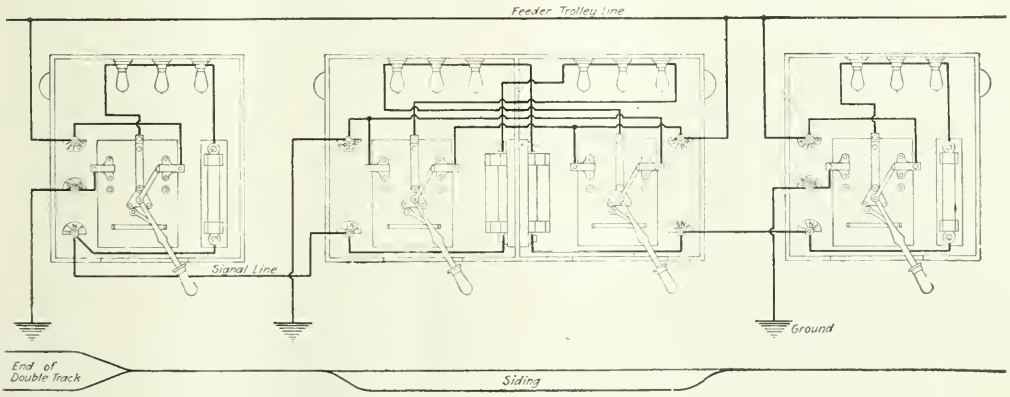
Protectors are desirable on telephone lines above ground. Where the telephone lines are not liable to interference from power circuits, a protector consisting only of a lightning arrester is satisfactory. But where contact of the telephone with the power circuits is possible, protectors, which employ both fuses to protect against power currents and arresters to protect against lightning, should be employed.

A few telephone troubles and their correction are enumerated below (Western Electric Company):

(a.) It is impossible to ring any one; the generator handle turns hard and the bell does not ring when the crank is turned. When testing to discover the cause of this trouble, the receiver should be left on the hook. First disconnect the two wires which enter the telephone set from the terminals marked "Line 1" and "Line 2," and screw down the connections on the wires coming from the ringer. Then turn the generator. If it turns easily and the bell rings well, the trouble is not in the telephone instrument.

Next connect the line wires again to their respective terminals and disconnect the line wires from the protector, leaving the wires to the telephone set attached to the protector. Now turn the generator handle. If it turns hard, remove the carbon blocks from the protector and try the generator again. If it now turns easily, clean the carbon blocks by rubbing them together, and brush them off, replace the thin piece of mica between them and put them back into the protector. Now try the generator again, and if it works freely reconnect the line wires to the protector.

If the generator turns freely when the line wires are disconnected at the protector, but turns hard again when the carbons have been cleaned and the line wires again attached, the trouble is either in the wiring between the protector and the main line, on the line, or in the wiring or apparatus at one of the other stations. Look the wiring and line over carefully for a place where one wire touches another, and if you do not find any trouble of this nature, look for a place where the line wires come in contact with a damp timber, the ground or other conducting substance. If the generator still turns hard after the wires have been disconnected



PAGE IS SHOWN METHOD OF WIRING A SERIES OF KEYSTONE BLOCK SIGNALS

from Line 1 and Line 2 in the telephone, look for incorrect wiring or crossed wires in the instrument. The wiring should be as shown in Fig. 11.

(b.) It is impossible to ring any one; the generator handle turns easily and the bell rings when the crank is turned. Look for a loose connection at Line 1 or Line 2 in the telephone, at the protector or where the branch wiring is connected to the main line. If trouble is not found at these points, look for a broken wire.

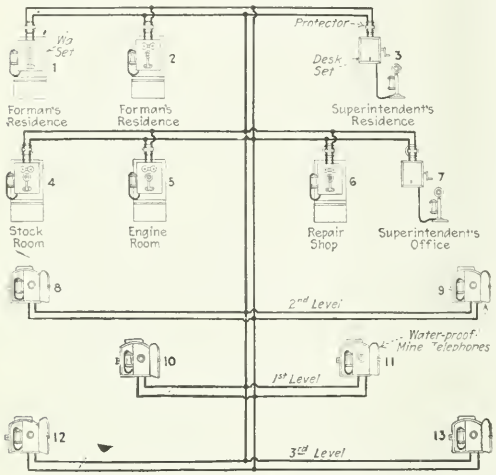


FIG. 9. TYPICAL "BRIDGING" MINE TELEPHONE SYSTEM

(c.) It is impossible to ring any one; the generator handle turns easily but the bell does not ring when the crank is turned. Look for a loose connection or a broken wire in the telephone instrument. It may be that one of the wires to the generator is disconnected, or one of the line wires and one of the ringer wires at Line 1 and Line 2 may be loose.

(d.) Other bells on the line cannot be rung easily, the bell on the instrument rings properly when the crank is turned. Look for a loose connection at Line 1 or Line 2, or where wires connect to protector. It is possible that the trouble may arise from a poor splice in the line wire or from contact between the line wires and damp timbers, earth or rock.

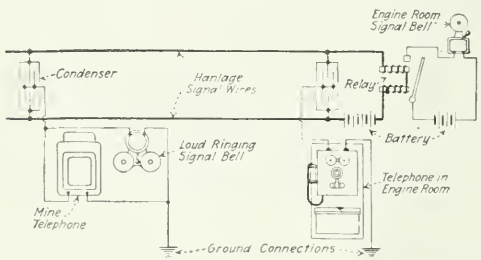


FIG. 10. TYPICAL "BRIDGING" TELEPHONE CIRCUIT

(e.) The bell does not ring; other bells on the line ring properly. Look for a broken wire or loose connection in the wires coming from the ringer. If the connections and wire are all right, see that the ringer is properly adjusted. If you cannot get the bell to ring in any way, it is possible that the fine wire used for winding the coils is broken or burned out. If this trouble has occurred, new ringer coils will be required.

(f.) You can hear others all right, but they cannot hear you. Look for a loose connection or broken wire coming from the transmitter or battery. Try the two short wires connecting the batteries. See if the connections to the induction coil are all right. If this examination does not show anything wrong, thump the underside of the transmitter lightly with the hand. If this fails to improve matters the trouble may arise from an exhausted battery. When batteries are to be replaced, be sure to put in fresh cells and replace all at one time. Never connect a fresh one in with old ones.

(g.) You cannot hear others distinctly; others hear you. Look for a loose connection or broken wire coming from the receiver, switchhook or induction coil. Unscrew the earpiece from the receiver and clean off the diaphragm. If the diaphragm is bent in, turn it over and replace the earpiece. If this does not reveal the cause of trouble, unfasten the receiver cord from the terminals marked REC and, while holding the receiver to the ear, touch the two terminals of the receiver cord to one of the dry batteries. If you can hear a click when the connection is made or broken, the receiver is in good condition and there must be some fault in the wiring. If you do not hear a click, the receiver winding or the cord is probably broken.

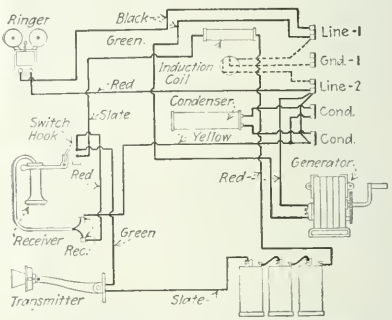


FIG. 11. METHOD OF USING HAULAGE SIGNAL WIRES FOR TELEPHONE CIRCUIT

(h.) Neither you nor others can hear distinctly. The trouble here is probably due to some loose connection or poor joint in the wiring at the telephone station or on the line.

IN USING the weights of coal as given in handbooks and technical publications, it should be remembered that such figures were obtained in a certain way or under definite conditions. The weights per cubic foot for the same coal under different conditions may vary considerably. We naturally expect the weight of coal to increase when moisture is added or when it is stored in a deep pile. Coal also compacts more or less in a bin or car, especially the latter, when it has been jarred or bumped in transit. For these reasons, says the Bureau of Mines, one should not expect that the use of the weights per cubic foot as ordinarily noted will give accurate results within, say, 10 or 15 per cent., if applied to coal in a storage pile or other place where the material is liable to be in a compact mass.

St. Louis steamship agents estimate that 400 foreign-born laborers leave through that city each week for their native lands, and many of these are known to come from the coal fields. A report has been received that 600 miners at Staunton, Ill., are waiting to go back home and will depart as soon as they can get passports. This is in the Mt. Olive coal district.

Physical Examination Previous to Employment*

By Charles F. Willis†
Bisbee, Ariz.

THE physical examination of workmen previous to employment started with an effort to prevent the spread of tuberculosis, for tuberculosis may be detected in its early stages and cured. But it was soon found that many other diseases were detected and saving of lives made possible. The physical examination does not mean the elimination of the unfit—on that basis it would utterly fail—but rather the measuring of a man's physical fitness and placing the man where he can do the best for himself, his fellow worker and the company. Industry as a whole cannot expect to live up to the standard of physical examination set for the army, nor should it expect to do so, for in all branches of industry, there are types of work that do not require the same amount of endurance as does army work, and the placing of men with physical limitations in the work for which they are capable permits a higher average of physical fitness for the work requiring physical excellence.

> The time is no longer when a man can act as an independent unit; the appreciation of the interdependence of one man upon another has emphasized the importance of the social unit. Epidemics have made us recognize that even a man's health is not distinctly his own to control as he pleases.

The objects of a physical examination are: The early detection of illness, particularly at a time when a full restoration of health is possible; the protection of employees from infection caused by working in contact with contagious diseases; the discovery of a man's physical limitations, in so far as his possibility for rendering good service is concerned; assistance to the safety movement by eliminating association in hazardous occcupations with men whose physical condition renders them likely of accident to themselves and others; and the lessening of time lost by sickness. Statistics issued by the United States Department of Labor show that 22.54 per cent. of idleness is caused by sickness, with an avarage number of 7.71 weeks idle; whereas only 1.66 per cent is caused by accident with an average number of 8.98 weeks lost. Sickness is responsible for almost one-quarter of the economic losses due to unemployment.

The physical examination, however, will not stand as a preventive of illness and accident unless followed by the most minute detail. The army does not merely get fit men into its service but does everything possible to keep them fit, and in industry, unless like care is taken and every effort made to follow the advantages of the physical examination, nothing is gained. The employment of healthy men to do work in unhealthy surroundings is nothing short of criminal.

Many mine managers have recognized for some time the importance of illness-prevention work, but they have appreciated that illness cannot be prevented by the physical examination alone any more than by improvements in sanitation, sick benefits, free medical advice or any one of the other factors entering into the problem, and that only by the combination of all of these factors can results be secured and benefits obtained. There are so many factors and so many branches that illness-prevention work, offhand, looks to be costly, and statistics have not been available as to its necessity or even its cost to the industry. But the experience of those who have been active in illness-prevention work is that it has paid big dividends in money, satisfaction, continuity of work and contentment. Another reason for the lack of adoption of the physical examination has been the financial unpreparedness of the average employee to meet the exigencies of sickness, which delays early detection and treatment. While without a doubt this will some day be cared for by the state with some form of insurance, there are many ways of caring for it at the present time, and the mines where physical examination is in vogue do not allow that feature to stand in the way of success.

The Copper Queen Branch of the Phelps Dodge Corporation, operating in Bisbee, Ariz., has had the physical examination as part of its general plan for prevention of illness and accident and the improvement of the physical caliber of its workmen for a number of years. A study of the methods used, their relation to the other activities of the company for the benefit of the workmen, and the results obtained are well worth the time spent, for the methods have been very beneficial to the operators and more so to the employees.

In the early days of the Copper Queen mines, sickness was common, epidemics not infrequent, and accidents an everyday occurrence, with the result that the employees were a heterogeneous gathering of inefficient individuals who appreciated the fact that the company cared little for their well being and who cared little themselves. Soon, however, there was a well-devised plan that not only included better health for the employee, better working conditions, and better living conditions, but also better social and recreational facilities. It included practically everything necessary to make a well-organized, substantial, permanent community. Space will not permit of the details of the whole plan, but only of reference to some of the activities relating to illness prevention, particularly the physical examination. Parts of the plan are common to many companies, but the methods of relating them to the general plan are matters of policy and not so common.

*Paper to be presented at the Chicago meeting of the American Institute of Mining Engineers in September, 1919.

†Consulting Supervisor, Department of Industrial Relations, Phelps Dodge Corporation

A contract-hospital system is a common factor in nearly all mining communities today, but the ordinary hospital of the mining camp is not aimed so specifically at illness prevention as is the one at the Copper Queen. Its policies are broad; the desire is to be as liberal as possible, not to draw the line closely as to what should be included in the hospital fee. The hospital does not, by many thousands of dollars, support itself by its fees, but the loss is more than made up by the greater satisfaction given the employees and in the knowledge of the officials of the company that the hospital is performing the best service possible and that the doctors are not using their positions to obtain money from the men on various pretexts. As is usual in contract-hospital systems, elective operations are charged for, and occasionally disputes arise as to what constitutes an elective operation. As the object is not merely to cure men but to keep them well, in the Copper Queen hospital any operation that will improve health is ordinarily considered necessary and is performed without extra charge.

The liberality of the hospital policy would not be possible if it were not for the physical examination. It would not be feasible for a company to employ men irrespective of their physical condition and allow all the same hospital privileges. The physical examination becomes to some extent the selection of risks, and because of this selection the very liberal policy is made possible. Without a physical examination, a liberal hospital policy would soon cause a camp to become a gathering place for industrial cripples seeking to be cured. While there is no doubt that there should be such a place, it should be provided by the state rather than by any one organization.

The Copper Queen also maintains a beneficial association for its employees, which is nothing more nor less than a cheap form of insurance against sickness and death outside of work. During 1917, the employees paid into the association $55,362.82 and the company contributed $12,600.85. The total benefit payments amounted to $69,844. This insurance only costs the workmen 1¾ per cent. of his daily wage up to a maximum of $2.19 per month; and in case of death by accident or sickness while off duty, one year's wages are paid the dependents, not exceeding $1500. In case of the loss of time by accident, one-half wages are paid during disability, not exceeding $62.50 per month. In case of the loss of a hand or a foot, both hands or both feet, or both eyes, one year's wages are paid, not exceeding $1500; and in the case of the loss of one eye, one-half year's wages are paid, not exceeding $750.

Physical Examination Leads to Low Insurance

The support of the employees' beneficial association comes from the recognition of the Copper Queen officials that the health of the workmen and their continuous employment is worth money to the company. Without a doubt it is worth more to the men themselves, but the company is willing to pay a proportion of the necessary expense, the percentage depending on the number of employees who are members of the association. It is a cheap form of insurance, but if men were taken into this insurance company without an examination as to their fitness, the cost of such insurance would become prohibitive. The physical examination, therefore, makes possible a very low insurance, particularly when the insurance company is run without overhead expense, without the necessity of a large surplus fund, and with the company paying a considerable percentage of the premiums.

The physical examination was also made a part of the general plan for the improvement of conditions for workmen due to its relation to the safety movement. In no other industry, as in mining, is the safety of a man more interwoven with that of his fellow workmen. For instance, when a hoisting engineer died suddenly from heart failure, three men in the bucket dropped to the bottom of a prospect shaft and were killed. Without a physical examination, men with hernia are likely to be placed where heavy lifting is necessary and the hernia aggravated. Many instances may be related of accidents to others due to a spell of weakness, dizziness, fits, etc., of one man. Bad eyesight also is the cause of many accidents.

In line with the general improvement in health and physical fitness of their employees, the Copper Queen has installed every sanitary convenience that seemed practical. The intallation of such devices, however, would mean little if the company were to employ physically unfit men to use them. It has been the desire of the company to build up its mines and its community, and to have its workmen physically the best.

Arguments Against Examinations

Samuel Gompers, president of the American Federation of Labor, is responsible for the following arguments against physical examinations: (1) The apprehension in the minds of the workers that, if their deficiencies are ascertained, they will be discharged and will have to walk the streets in idleness and thus aggravate their situation and condition. (2) The rejection of the unfit, which practically means condemnation and suffering for those depending on him for support. (3) The fact that many applicants for work have been weakened and enfeebled by long periods of unemployment, lack of proper nourishment, etc. (4) That there is a tendency on the part of the companies working in illness prevention to extend their sphere of jurisdiction into the homes. (5) That there is no provision for the care of industrial cripples.

There is no doubt that some of these objections would be tenable if the physical examination were carried out with those objects in view. But the employer who carries out the examination for the purpose of building up a physically perfect working force rather than for the benefit of the employee himself, will ultimately defeat the real purpose and object desired.

Two years later, however, as chairman of the Committee on Labor, Mr. Gompers recommended to Secretary of Labor Wilson that medical examination of applicants be made one of the functions of the government recruiting agency. This recommendation was the outcome of a conference held in New York, July 15, 1918, and embodies the consensus of opinion of ex-physicians and public-health workers. Resolutions stated that it was the sense of the conference that the physical examination of workers is primarily a measure of health conservation, and also is essential to maximum production, a war necessity, in that the purpose of the medical examination is not to eliminate the worker from industrial service, but to adapt him to the work for which he is physically fitted.

The method of carrying out the physical examination by the Copper Queen answers well the arguments against such examinations. The large number of cases that come to the attention of the medical examiner are

not cases of illness that require hospital or sanatorium treatment or necessitate the laying off of the man. Full preservation of the rights of the employees is maintained and the matter of following up the results of the examination by re-examination and treatment is strictly optional with the men. The examination does not increase the authority of the employer over the workman, and, except in a few cases, it has been the desire of the employee to correct and maintain good health.

To secure privacy, the examiner's room is fitted with five private rooms, all of which open directly upon the doctor's room but are not open to each other. The attitude of the examiner is important. Dr. R. B. Durfee, who conducts the examinations of the Copper Queen, emphasizes the fact that the examination is done in order that the workman may have a better knowledge of his own condition. He is told of his condition as the examination progresses, wherein he can help himself, where treatment is necessary, and where changes in his living conditions would improve his health. Many of the men are given information that is invaluable to them.

Record of Inspected Cases

During the six months' period, ending June 30, 1918, the medical examiner of the Copper Queen mines examined 2342 men, 88 of whom were rejected. Of these 88, 20 were conditionally passed by the mine superintendent and put to work. Therefore, the rejections amounted to about 30 in 1000, as against several times that number in the army. It can be readily seen that the Copper Queen policy is not the rejection of the physically unfit, but rather the placing of men where they are best fitted and where the safety and health of their fellow employees is not impaired.

Three men were rejected for albumen; this is only in extreme cases, however. A man is usually put to work where conditions warrant treatment and cure. A careful examination is made of the heart, for this has its influence upon safety. A man likely to have heart disease is a menace to his fellow employees and is physically unable to carry on his work. He is likely to become disturbed if engaged in work that is full of quick surprises or excitement; the excitement itself saps his strength, interferes with his own safety and adds to the risk of others. However, only seven men were rejected for this cause. Mining is arduous work and involves much heavy lifting; therefore a careful examination is made for hernia, a serious natural weakness common in every walk of life. Thousands of people have hernia who do not know anything about it until it becomes painfully serious or is pointed out to them. A comparatively simple operation cures the disease in a short time. Out of over 2300 examined, 48 were found to have severe cases of hernia. Practically all of the 20 men conditionally passed by the mine superintendent were men having hernia, which was to be corrected by an operation later. A ruptured person mortgages his vitality and gambles with his life when he lifts heavy loads or even coughs violently, and it is not right that he should be placed in a position where he is liable to injure himself.

It is only in the case of active tuberculosis that rejection is made; in ordinary cases of lung weaknesses men are placed in out-of-door work where the danger of contagion is small and where the likelihood of cure is large. But seven men were rejected for tuberculosis. Men with this disease in an active stage are unable to do a day's work and, what is more important, they are likely to extend the disease to other workmen when working in a confined place. The detection of weak lungs offers the doctor the opportunity to give men advice as to their methods of living, eating, etc., which will correct their condition.

But six men were turned down because of their eyes. Those with ordinarily poor eyesight are not rejected—practically every case amounts almost to blindness. It is not uncommon to find a man entirely blind in one eye who does not know it. If eye tests had been common in industries in the workman's early life, the sight of the now useless eyes could have been saved in many cases. Occasionally cases of trachoma are found, which call for special care in order to protect other workmen from the contagion of the disease.

The rejection on account of defective hearing is a matter of degree. But two men were turned down for this cause during the six months, both of whom were cases in which there would have been considerable danger to themselves.

It is not uncommon to have men making application for work who have one arm, one leg, or who have not the use of their arms or legs; and while there are occasional positions in which these men might be placed, and it is the policy to do so whenever possible, usually rejection has to be made. But one man was rejected on this account.

Men having venereal diseases in an acute and contagious state are rejected, although there was but one case of this in more than 2300 men examined. The conditions of a mine where men are working in more or less confined quarters permits the spread of such diseases far more readily than in many other industries, and no man desires to be in direct contact with venereal diseases.

Drug Addicts Not Accepted

Drugs, alcoholism, and morphine were responsible for the rejection of four men. Such men are dangerous to others. Bright's disease accounted for one man, fever for three, measles for one, and teeth for one. Bad teeth lead to indigestion, which in turn clogs the mental and physical powers and makes a person stupid and inefficient. They also send germs in increased quantities to the lungs and heart, tighten joints, and cause rheumatism. Rejection is only in extreme cases, however, for this reason.

It can be seen from the foregoing that the Copper Queen method is by no means the rejection of the unfit, but rather the rejection of those almost totally crippled and those who are a menace to their fellow employees. There can be no question of the advisability of the physical examination, whether it is considered from the humanitarian standpoint, or the selfish cash-conserving standpoint. It adds to the workers' physical comfort, gives them better employment for longer periods, removes as far as possible danger from contagion, and improves conditions in their homes and in the community. By paying attention to physical defects in time, defects that would be overlooked if such physical examinations were not made, hundreds of employees have been refitted for work who would otherwise be jobless because partly incapacitated. Moreover, the health education imbibed by the workers extends to their families.

A Large Coal Mine on the Allegheny River

Although lying close to the river, this mine ships no coal by water. Its output, or most of it, will soon be consumed by a large electrical power plant located close to the mine mouth. Some quite ingenious devices are employed in and about this operation.

By Ralph W. Mayer
California, Penn.

THE Harwick mine, which is operated by the Equitable Coke Co., is located about 15 miles up the Allegheny River from the business district of Pittsburgh and about 7 miles from the city limits. This operation lies about a mile back from Cheswick, the nearest point on the river. It may be reached from Pittsburgh by trolley car. The Pennsylvania R.R. passes through Cheswick, and the Bessemer & Lake Erie also has a station about a mile from the mine. Spur tracks from both roads run to the tipple and coal may be shipped over either or both.

The output of the mine is about 500,000 tons per year, and 500 men are employed. This is probably the largest operation along the Allegheny, although there are other mines being developed which are ultimately expected to produce a larger tonnage. Practically, no mines along this river have tipples immediately on the river bank, all such buildings being placed some distance back from the stream. Consequently, not much coal is shipped down the river on either barges or steamers, nearly all of it being sent out by rail. The reason for this is obvious. Little backwater exists in the Allegheny for handling barges at a river tipple, and the river itself is shallow and rather swift. A system of locks, such as those existing in the Monongahela River, would easily make the Allegheny as available for navigation as the other stream. Plenty of water also exists for this purpose. As is well known, the Monongahela has a system of locks extending upstream as far as Fairmont, W. Va., making it navigable to this point.

Most of the coal produced at Harwick mine is consumed by the Pittsburgh Railways Co. and the Duquesne Power and Light Co., although some is shipped to the Lakes. The Duquesne company is interested in the Harwick mine, and probably owns it. This firm recently floated $25,000,000 worth of 6 per cent. gold bonds in New York at par. The money thus realized will be used for the erection of a large electric power plant at Cheswick, and the power produced will be consumed in the Pittsburgh district. The capacity of this plant will be 60,000 kw., while the building will be so constructed as to allow the capacity of the plant to be increased to 120,000 kw. At some future date it is believed this plant may be enlarged to 300,000 kw. The capacity now contemplated—namely, 120,000 kw.—will make this plant as large as the Brunots Island power plant.

Converting the coal into electrical energy practically at the mine's mouth, and conveying this power over wires to the point of consumption, instead of hauling the fuel by rail to some distant power plant or plants, will effect a marked reduction in transportation charges.

The town of Harwick, located at this mine, is owned by the company. It is of considerable size, as mining towns go, but many of the miners who work in this operation nevertheless live in surrounding towns and cities.

The Freeport bed of coal is the one worked. No overlying slate is encountered, as in the case of the Pittsburgh seam, and the roof is fairly good. A band of bone or sulphur from 6 to 12 in. thick is, however, found in the middle of this coal bed. This is gobbed within the mine. This operation, like most of those lying along the Allegheny River, is gassy, and the coal dust is highly explosive.

Much of the water made in underground operation is utilized within the mine itself, although some has to be pumped from the shaft. That used within the mine is pumped from the wet portions of the workings to the dry and dusty areas, and is there used to sprinkle and dampen the coal dust that accumulates. To accomplish this sprinkling, a system of pipes is run from the drainage pump through the dry portions of the mine. In these, at suitable intervals, holes are drilled over which are placed clamps held in place by suitable U-bolts and provided with pedestals drilled the same size as the hole in the pipe. A suitable piece of gasket rubber is of course placed between the clamp and the pipe. A thread is then cut through the pedestal on the clamp and through the pipe, and a 10-in. nipple screwed through both. This nipple thus has an extremely good bearing which prevents it from being easily broken. A valve upon the outer end of the nipple regulates the flow of water therefrom.

Ventilation for the mine is secured through the use of two exhaust fans. One of these machines only is employed at a time, the other being kept as a spare in case of accident or emergency.

Since all of the coal is shipped by rail, the tipple is equipped only for loading cars. In order to get rid of the sulphur and bone, previously spoken of, it is necessary to pass the coal over picking tables, although all

GENERAL VIEW OF TOWN AND TIPPLE

reasonable attempts are made to free the coal from the objectionable material within the mine.

To this end, the miner who loads too much bone has his attention, as well as that of everyone else, called to it by means of a small piece of cardboard. This is cut the same size and shape as the miner's car check, the same dies being used. The car checks are all hung in a rack, so that the miner can get his checks before entering the mine. Thus far the same practice is here followed that prevails in most mines in this region. The miner who loads dirty coal, however, finds a white cardboard check hung over top of his brass ones with his check number and the word "bony" printed on the white check. This little piece of white cardboard, therefore, shows conspicuously on the board, and everyone knows what it means. Fines and discharges are also used with discretion.

Coal is hoisted from the mine through a three-compartment shaft, one compartment being used for handling men, while the other two are utilized for raising coal. The haulage on the main road is performed by electric locomotives. Gathering is done by horses. These animals are all housed within the mine, their stable being fireproof and having no wood in its construction. The partitions between stalls and elsewhere are of brick and cement, with holes left near the top for ventilation and light. A spacious passageway extends the whole length of the stable in the center. This

HINGED MINE RAIL IN RAILROAD YARD

affords room for the purpose of cleaning and of gaining access. Upon either side of this is located a row of stalls, the horses facing outward. There is, of course, also a passage between the mangers and the rib, so that feeding may be done therefrom. Steel doors close this underground structure.

Every Saturday afternoon the horses are taken to the top and returned in time for work Monday morning. To facilitate the hoisting and lowering of the animals a special stall or pen is employed. This is made wide enough to accommodate a horse without the animal's flanks touching the sides of the pen. It is provided with a gate or door at either end, while crosspieces over the top prevent the inclosed animal from rearing or leaping out of the stall.

A long iron hook is attached to each corner of the stall, and when hoisting or lowering this is hooked fast to a suitable eye-bolt in the side of the mine cage. These hooks hold the stall in place while it is being raised or lowered. The stall is mounted on four small wheels, each about 4 in. in diameter. These prevent it from

VIEW OF POWDER HOUSE SHOWING ROOF CONSTRUCTION

being easily displaced while on the cage, as well as making it easy to place upon or remove from the cage. Their small diameters render the floor of the stall low, so that the horse can easily walk into it.

The roofs of partings within the mine are timbered with 12 to 15-in. pipe cross-beams strengethened by old steel rails placed within the pipe and wedged against the upper surface thereof. The ends of these pipe beams are supported in hitches cut into the rib or by props with their ends slightly notched.

In this mine the coal is undercut by electric chain machines. It is shot down and loaded out in benches. The first, or "buster," shot is placed in the middle of the room just below the sulphur band. This brings down the lower bench, which is loaded out before the top coal is shot. A hole in each corner of the upper bench brings down the rest of the coal in the room, unless the room is extremely wide.

All blasting is done by shotfirers. These men carry both an Edison electric lamp and a Wolf safety lamp. In addition, each shotfirer carries a shooting cable, a wooden tamping stick, a battery, and the necessary detonators, which are either Monobel No. 5 or Hercules. An ordinary dry-cell battery is employed for firing the shots. When not in use, this is carried upside-down in the shotfirer's pocket in order to keep the exposed terminals of the battery covered. The detonators are carried loose in a canvas bag swung over the man's shoulder.

Each shotfirer collects a small brass check from the miner for every detonator which he uses in shooting that miner's coal. He turns these checks in to the powder house at the end of each shift, and the miner buys his detonator or cap checks, as they are locally called, from the powder man from whom he receives his explosives. Each check is good for one detonator.

The powder house is constructed of brick, cement and old track rails, these being employed only in the roof. The rails are laid across the walls of the building and bricks placed between their flanges, cement being liberally employed to hold them in place. Both ends of the rail extend over the walls of the building and bricks are laid to their extremities, thus forming eaves. A row of bricks at the side of the building also extends out over the wall, one half of the brick only projecting outward. A second layer placed over these bricks and over the top of the rails and bricks already laid prevents the bricks from slipping and tends to hold the whole roof firmly in place. The upper surface of the roof thus formed is liberally covered with cement mortar, thus

forming a water-tight and fireproof roof. The roof of the fanhouse is similarly constructed, except that instead of steel rails, beams are used and flat brick arches formed between them.

Mine props are shipped to this operation in railroad cars and unloaded therefrom to piles beside the railroad track. They are loaded from here directly into the mine cars and hauled to the shaft and lowered while still in the car. This method saves unnecessary handling. A track for the mine cars is laid between railroad tracks and a hinged rail is employed where the mine track crosses the railroad track. Planks or timbers are placed under the mine rail so as to bring its bottom to the same height as the top of the railroad rail. The hinged rail may then be swung into and fastened in place or unfastened and moved out of the way, as desired.

Some of the practices employed underground, while not strikingly extraordinary, are nevertheless worthy of mention. The floors of some of the overcasts are made from used track rails laid about 2 ft. apart crosswise of the entry. Inch boards are then laid between the rails, their ends resting upon the rail flanges. Wire netting is placed above these and over the rails, and cement grout poured over the whole, filling the space between the rails and rendering it airtight. This makes a solid and substantial floor. Brick walls built at both sides of this floor and extending to the roof form the side walls of the overcast. The edges of low hanging or projecting pieces of rock in the roof of entries or passages where persons are likely to travel are given a coat of whitewash or lime, thus rendering them easily visible.

A disastrous explosion occurred in this mine some years ago, caving a part of it. Some pillars still remain in this portion of the operation. This throws unusual weight upon some other parts of the mine now being worked, and the roof caves in some cases before the room is driven to its full length. This necessitates care in timbering and the driving of narrow rooms.

National First-Aid and Mine-Rescue Meet to Be Held in Pittsburgh

Indications are that the proposed National First-Aid and Mine-Rescue Meet to be held in Pittsburgh, Penn., Sept. 30 and Oct. 1, under the auspices of the Bureau of Mines, will witness the greatest gathering of miners ever assembled for such a purpose. Coal and metal-mining teams from all parts of the country have already entered the various contests. So far 68 teams have agreed to participate and more are coming every day.

The first-aid and mine-rescue contest is to be a part of the dedication of the new laboratories of the Bureau of Mines at Pittsburgh. The dedication ceremonies will begin on Sept. 29, to be followed by first-aid and mine-rescue contests of Sept. 30 and Oct. 1.

Many companies have entered as many as three teams in the respective events, and there is a long list of prospective entries. The entries close Sept. 15. It has been decided to limit the national first-aid contest to full-team events. In the place of prizes and competition for one- and two-man events, an additional incentive has been added to the first day's program in that teams are competing not only for place among the first twenty for the final day's program, but also for the championship of their respective states, based on the relative rating received on the first day only. This in no way affects the final day's contests; it simply means the awarding of additional prizes. Thus, if six teams are entered from Indiana, the team from Indiana receiving the highest rating on the first day will be awarded the championship of the State of Indiana at the national meet. If only one team is entered from the State of Colorado, it will naturally receive the state prize, etc.

Prizes and trophies to be competed for are now being arranged by the prize committee. The following have already been arranged for. (1) New National Safety Council silver cup to winner of national first-aid contest. (2) Silver challenge cup to winner of national mine-rescue contest. Gold medals of the National Safety Council to the winning team members of mine-rescue and first-aid contests respectively. Silver medals of the National Safety Council to the second best team members of mine-rescue and first-aid contests respectively. Bronze medals of the National Safety Council to the third best team members of mine-rescue and first-aid contests respectively. Bronze medals of the American Red Cross to each member of the winning first-aid team.

Prize certificates of the American Red Cross will be awarded to each member of the second and third best first-aid teams. Special prizes will be given to the highest rating teams in the first day's mine-rescue and first-aid contests from each state represented. Banners will be received by each team competing in either the mine-rescue or first-aid contests (provided that only one banner will be given to a team participating in both the first-aid and mine-rescue contests), and souvenir watch fobs to all members of first-aid and mine-rescue teams competing. It is expected that additional prizes will be announced later.

Legal Department

DEALING WITH AGENTS—Plaintiff, in suing to recover on a contract for hauling coal made with an employee of defendant company, had the burden of showing that such employee had apparent authority to make the contract for the company. (St. Louis Court of Appeals, Johannes vs. Union Fuel Co., 199 Southwestern Reporter, 1032.)

VALIDITY OF COMPROMISE AGREEMENT—If on the faith of a misrepresentation by the buyer of coal to the seller that shipments had been rejected by its customers as being of inferior quality and that an inspection showed the complaints to be justified, whereas there had been no rejection or inspection at that time, the seller authorized the buyer to sell to the best advantage and stated that seller would bear any loss, the agreement was not binding on the latter. (St. Louis Court of Appeals, Haddaway Curd Coal Co. vs. Breese-Trenton Mining Co., 200 Southwestern Reporter, 104.)

PENNSYLVANIA SAFETY STATUTE—Under the Pennsylvania statute which provides that all mine machinery from which accident is likely to occur must be fenced off by suitable guard railing, an employer cannot escape liability for injury resulting from violation of the law on the ground that the injured man assumed the risk by reason of knowledge of the dangerous condition. Hence where a mine engineer was injured through defendant's neglect to guard dangerous shafting, he was not deprived of the right to recover damages because he knew of the unguarded condition. Nor is it any defense, in the face of the express statutory requirement, that similar machinery in other mines is commonly left unguarded. (Pennsylvania Supreme Court, Carley vs. Dexcar Coal Mining Co., 105 Atlantic Reporter, 651.)

Appliances in Mining Operations

By Chesla C. Sherlock
Des Moines, Iowa

At common law it was the duty of the employer to furnish the workman a safe place in which to work and to provide him with reasonably safe tools and appliances with which to carry on his work. This common-law duty has been enlarged and elaborated from time to time by statute, as more progressive methods of performing work have been brought into use.

Because mining operations have been peculiarly hazardous, there has been a great deal of legislation upon the subject, even from the earliest times. While the general rule enjoining employers to furnish a safe place in which to work and safe tools and appliances has been commonly understood as applying to mining operations, we find that almost from the beginning of legislative enactment of laws, special statutes have been exacted looking to a complete and rigid supervision over mining operations and the manner in which they may be conducted.

It is interesting to note that the duty to furnish a safe place in which to work and safe appliances with which to do that work, while apparently extending only to the original transaction, are in fact continuing duties constantly imposed by law upon mine operators. The Federal Court has said, and it carries dozens of other decisions with it, that the mere furnishing of safe tools and appliances does not discharge the mine operator's duty; but that, in a legal sense, it comprises a continuous duty of oversight and inspection to keep them in the condition in which they are required to be originally given.

Greater Liability of Employers

It is needless to say to mine operators that this is a considerable enlargement of the liability of an employer as it was formerly known. With all the common-law defences which employers, by patience and skill, had developed, it was practically impossible for the employee of an ordinary employer to recover damages for injuries which he sustained by reason of defective machinery or appliances. It was generally shown that the defective condition of such appliances was known to the workman, hence he could not recover; or else other equally valid showings were made to cut off his recovery.

However true it may have been or may be in other employments, it is not true in mining operations that there is any relaxation of the duty to furnish safe appliances and to keep them so. This means that only the greatest degree of care in the inspection and repair of the appliances will suffice to discharge the mine operator's duty in this respect. Since his duty is one of "continuous oversight and inspection," it can be seen that only a high degree of care and caution will be accepted from him.

In another Federal case, however, it was decided that while a mine operator may be held responsible for injuries incurred by a miner which were brought about by defective appliances, the rule does not apply in cases where the appliances were not owned by the operator and where he was not charged with the duty of furnishing them.

The miner is under no legal obligation to inspect the machinery or appliances before be commences using them or to ascertain whether or not they are safe, according to another Federal case. He has a legal right to assume that the machinery and appliances furnished are safe as required by law and that the operator is discharging his duty and is keeping them safe. This is quite a step in advance of some of the decisions formerly handed down by the courts.

Frequently in the past employers were permitted to escape liability where it was shown that the machine or appliance was obviously defective and that this would have been known to a workman of reasonable skill and precision. In such cases, the workman had to bear the loss; but we do not find any such rule obtaining in the case of mining operations. It is apparently impossible for mine operators to invoke it in defense of their shortcomings.

There are, however, many exceptions to the general rule that often work in favor of mine operators. Chief among these is the so-called "simple tool" rule. It is to the effect that no employer owes any duty of inspection to simple tools or appliances, such as are used by workmen every day and which are so simple in their purpose and construction as to be readily understandable to the average person. Among tools which are recognized as belonging to this class are hammers, saws, chisels, mauls, sledges, axes, and countless others which are peculiar to given trades and callings.

In the case of simple tools, no duty devolves upon the employer to offer instruction in their use, or to inspect them, and the workman of mature age and experience has no right to look to his employer for such instruction or inspection.

Held That Ax Is a Simple Tool

In a Kentucky case, involving a coal miner, it was held that an ax is a simple tool, subject to the simple-tool rule, and that an employee who so holds and uses an ax as to receive an injury, where there is no reason why he should so hold or use it, cannot hold his employer responsible for the injury even though the tool is, in fact, defective.

Furnishing safe tools and apliances, in the opinion of the Lousiana court, extends to furnishing appliances of suitable size and strength to carry on the work in hand. If an employer furnishes a machine or appliance which is generally recognized by experts to be insufficient in strength and capacity to carry on the contemplated work, he has not discharged his duty to his workmen and is responsible to any who are injured while working with such machine or appliance.

In an Alabama case, it was held to be the duty of the operator or his foreman to furnish a workman charged with remedying defects all the necessary materials and equipment to effect such a remedy, and to furnish them in such a manner as not to expose the workman to unnecessary peril. It was further held that in case the operator fails to so furnish the proper facilities that the employee is justified in refusing or neglecting to carry out the order, compliance with which would have subjected him to great personal peril.

In connection with this case it is well to call attention to the fact that the employer has no legal right to order an employee to perform a dangerous task, even though it arises in an emergency. Even if there is some doubt as to the danger to the employee, the employer has no right to require by order a compliance from his employee unless he has furnished him with the proper equipment and facilities, for carrying out the order.

There has been some contention as to just what is necessary on the part of the employer to bring about a compliance with the law in furnishing safe tools and appliances, especially in the case of simple tools. It has long been held that where the employer purchases simple tools of a reputable dealer, made by a reputable manufacturer, he discharged this duty to his employees.

But the modern tendency, as pointed out by a Missouri decision, is to the effect that the mere purchase of a reputable manufactured article, even though it falls in the class of simple tools, is not sufficient to discharge the liability to furnish safe tools and appliances. In the Missouri case a bucket used in hoisting dirt, which held three-quarters of a ton, and which was hoisted over the heads of workmen, was the appliance in question. The court said that the employer's duty had not been discharged by its mere purchase from a reputable dealer, inferring that a careful inspection after purchase and before use was also necessary.

The decision draws a distinction which it is well to note and which perhaps explains the ruling in a better light. The court said that the duty of inspection is owed to employees in cases where the simple tool is to be used in hazardous work, and that in the absence of such inspection reliance on the fact that the bucket was purchased from a reputable dealer not being sufficient, the operator must be responsible for the injury occasioned a workman by its defective condition.

Of course, it is generally recognized that this duty of inspection is not owing in cases where the simple tool is not to be used in hazardous work. In one case, which I recall distinctly, an employer had purchased a number of hammers and chisels, placed them in his stockroom, and from that place issued them to his workmen. There was no inspection of these tools after purchase or before they were issued, and the court said that there was no duty on the part of the employer to so inspect them, for they were not to be used in hazardous work.

In a Federal case, in which the duty to furnish safe tools and appliances was again stated, it was held that the duty, which extended to a coal-mine operator, was a duty which could not be delegated to a servant or other person so as to exempt the employer from liability in case of omission; that is, the duty is nondelegable.

All of these instances, with the exception of one, are cases arising out of coal-mining operations. The one exception arose out of mineral-mining work, but is recognized as applying to coal-mining as well.

Dedication of Bureau of Mines Building

By D. J. Baker

One of the entertainment features arranged for the dedication of the Bureau of Mines building at Pittsburgh during September will be the presentation of a pageant at Forbes Field showing the growth of the coal industry from the Age of Bronze to the present time. The work is under the direction of Thomas Wood Stevens, president of the American Pageant Association, who is the author of the production. Mr. Stevens acquired a national reputation during the war as author and director of the National Red Cross Pageant and the Joan of Arc Pageant presented at Pittsburgh and at Domrémy, France, by the American Expeditionary Forces. He will also be recalled as State Director of the masque of the Massachusetts Institute of Technology. Mr. Stevens is an engineering-school graduate and quite familiar with coal-mining methods. As a result the coming spectacle, the first of its kind with the coal industry as a theme, promises to surpass anything ever before attempted in the line of educational amusement. An experienced force of 30 people from the School of Design of the Carnegie Institute of Technology are at present coöperating with Mr. Stevens in the writing of the book and arranging for the stage settings. The cast will be drawn largely from students at the University of Pittsburgh, Carnegie Tech and men coming to Pittsburgh to take part in the first-aid and mine rescue meet. The finished book will contain parts for twenty speakers, many dancers and hundreds of other performers.

In the prologue, the Earth's Spirit is represented as concealing her riches for which the Spirit of Science is searching. The Bronze Age, the primitive period of mining, when the art of mineral extraction was practiced by the magician, necromancer and medicine-man, is next portrayed. It serves to introduce the first episode. Under the guiding hand of Science, a magician is represented as practicing his ancient methods.

The second episode of a Gold Age shows the strides made by the Spirit of Science against the Spirit of the Earth and serves as a background for scenes of Oriental splendor. The third episode portrays the advance made in mining during the Iron Age which is assume to run to the 15th century. The age of chivalry acts as the background for this period.

The fourth and last episode is represented by the Coal Age and is the largest of all four in point of elaboration. All the different operations involved in present-day mining methods are shown. The daily lives of the miners are portrayed in the mines and around their homes. Spectacles of dramatic interest are unfolded.

It is planned to enact a miniature, imitation coal-dust explosion in which excited wives rush to the mouth of the mine as first-aid and mine-rescue teams prepare to enter. The central theme throughout presses home the conviction that the Spirit of the Earth, which rebels against giving up her treasures has not yet been completely conquered by the Spirit of Science.

The program will be as follows.

MONDAY, SEPT. 29

8:30 a.m.—Bureau building open for inspection.
10:30 a.m.—Dedicatory ceremonies in rear of main building, 4800 Forbes St.
2:00 p.m.—Special train and automobiles to experimental mine near Bruceton, Penn.
3:00 to 6:00 p.m.—Mine explosion and inspection of experimental mine and explosives testing plant near Bruceton, Penn.
6:00 p.m.—Return by special train and automobiles to Baltimore & Ohio R.R. Depot, Pittsburgh.
8:00 p.m.—Informal reception and organ recital, Carnegie Music Hall. Arranged by Carnegie Institute of Technology.

TUESDAY, SEPT. 30

Nation-wide first-aid and mine-rescue contest. Forbes Field, Pittsburgh.
9:00 to 12:00 a.m.—Mine-rescue elimination contests.
2:00 to 5:00 p.m.—First-aid elimination contests.
5:00 p.m.—Coal-dust explosion.
8:00 p.m.—Pageant glorifying the mining industry. Forbes Field.

WEDNESDAY, OCT. 1

9:00 to 12:00 a.m.—Mine-rescue final contest.
2:00 to 5:00 p.m.—First-aid final contest.
5:00 p.m.—Coal-dust explosion.
8:00 p.m.—Smoker with award of prizes to winning teams.

WHAT THE ENGINEERING SOCIETIES ARE DOING

Engineering Societies Pay Tribute to Carnegie

A meeting of representatives of the large national engineering societies was held on Monday afternoon of this week at the Engineering Societies' Building, New York, to take action on the death of Andrew Carnegie. It was informal in character, owing to the short time available for calling together those who represented the engineering societies which have been benefited by the generosity of Mr. Carnegie. It was called thus soon after the death of the great ironmaster, however, in order that prompt steps might be taken to give expression to the deep regret of the engineering professions and to their tribute. It was voted at the meeting that the following representatives of the founder societies of the United Engineering Society and the Engineers' Club be requested to attend in a body the general memorial service which has been proposed: For the founder societies the presidents and secretaries; for the United Engineering Society, the president and former trustees; for the Engineers' Club, the president, board of directors and past-presidents. Furthermore, a committee was appointed with Charles F. Rand as chairman to draft suitable resolutions to be spread on the record of the bodies represented and sent to the family of Mr. Carnegie.

ANDREW CARNEGIE

It was also voted that the chairman appoint four men to serve with himself as a committee to determine whether there should be a memorial to Mr. Carnegie by the Engineering Societies and, if so, what form it should take, the committee to have power to make the necessary arrangements and carry them through. The members of this committee are Charles F. Rand, Lansing C. Holden, W. L. Saunders, J. A. Bensel and Prof. Comfort A. Adams.

The Engineering Societies' Building, at 29 West Thirty-ninth Street, New York City, and the home of the Engineers' Club, adjoining it in the rear and fronting on West Fortieth Street, which were made possible by the present of Mr. Carnegie, are shown in the illustration on page 322. A plan for a home for the engineering societies was submitted to Mr. Carnegie in 1895 by W. D. Weaver, former editor of the *Electrical World*. Others made similar suggestions later. It was in 1903 that Mr. Carnegie offered to give $1,000,000 for a suitable union building for all of the societies. A year later, after it was found that a larger sum would be needed to make adequate provision for their comfort, Mr. Carnegie increased the gift to $1,500,000 for the joint benefit of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers and the Engineers' Club. The only limitation was that the money should be devoted to the erection of a building, the societies buying the land. A conference committee representing the various societies, after considering the requirements and objects of the Engineering Societies' Building and the Engineers' Club respectively, allotted the sum. To the Engineering Societies' Building $1,050,000 was given and to the Engineers' Club $450,000. On May 8, 1906, the cornerstone of the fine building was laid by Mrs. Carnegie. Although not entirely finished, the building was ready for use on Jan. 1, 1907. A large bronze tablet near the main entrance to the building bears a portrait of Mr. Carnegie and the words of his brief letter giving the $1,500,000. Another bronze tablet announces that the land was given by members and friends of the three founder societies. A bronze bust of Mr. Carnegie in the library, was presented by officers of these three associations. By the recent construction of additional stories on the building, quarters were provided for the American Society of Civil Engineers. A number of other societies closely affiliated in membership and service with the national engineering organizations also have homes in the building.

Andrew Carnegie, philanthropist and steel manufacturer, died on Aug. 11, in his eighty-fourth year. He had been in his time bobbin-boy, stoker, bill clerk, messenger boy, telegraph operator, railroad superintendent and steel magnate. In every place that he filled he showed that the work could be successfully accomplished with a cheerful humanity such as, so many of us believe, little comports with being a "hard-headed business man."

A. I. M. E. Has Large Fuel Program

As if to meet the objections of those who do not like the word "Metallurgical" in the name of the American Institute of Mining and Metallurgical Engineers that institution has prepared a coal program for its meet in Chicago, Sept. 22 to 26, which far distances any other attempt in that direction.

Among the papers to be presented are the following: "Height of the Gas Cap in the Safety Lamp," by C. M. Young; "Engineering Features of Large Modern Coal Mines in Illinois and Indiana," by C. A. Herbert and C. M. Young; "Gas Producer Practice," by G. S. Brooks and C. C. Nitchie; "Testing of Coals for Byproduct Coking and Gas Manufacture," by Horace C. Porter; "Coals of Ohio and Their Limitations for Byproduct Coke," by Wilbur Stout; "Outdoor Substation in Connection with Coal-Mining Installation," by H. M. Young; "Low Temperature Carbonization of Coals," by S. W. Parr; these will all be presented for discussion in the afternoon of Sept. 22. On the evening of the next day the following papers will be read on a competing industry, that of oil: "The Irvine Oil District, Kentucky," by Stuart St. Clair; "Petroliferous Provinces," by E. G. Woodruff; "Investigations Concerning Oil Water Emulsions," by A. W. McCoy, H. R. Shidel and E. A. Trager; "Essential Factors in the Valuation of Oil Properties," by Carl H. Beal; "Application of Law of Equal Expectations and Its Application to Oil Production in California," by Carl H. Beal and E. D. Nolan; "Value of American Oil Shales," by Charles Baskerville.

HOME OF A. I. M. E. ENGINEERING SOCIETIES' BUILDING—GIFT OF ANDREW CARNEGIE

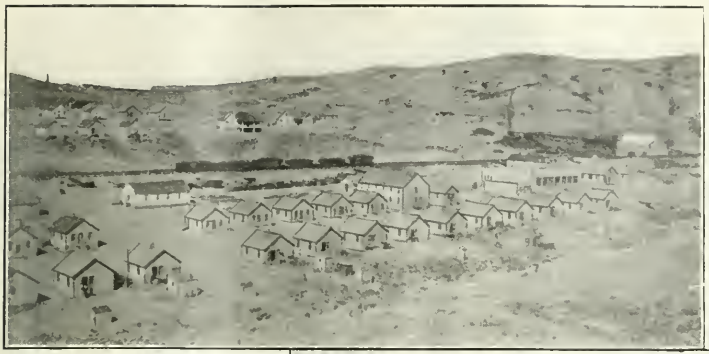
On the morning of the next day, Wednesday, will be held an interesting symposium on sulphur which will upset many old-fashioned theories and disclose many facts about sulphur not yet known. It reveals sulphur not as an alien in coal but as an original incorporator of the coal substance and it shows that sulphur has only exercised its right of self determination and separated itself from the carbonaceous material of which it formed at one time an important organic part. The articles are entitled: "Geographic Distribution of Sulphur in the West Virginia Coal Beds," by I. C. White; "Occurrence and Origin of Finely Disseminated Sulphur Compounds in Coal," by Rheinhardt Thiessen; "Mechanical Separation of Sulphur Minerals from Coal," by J. R. Campbell; "Sulphur in Coal—Geological Aspects," by George H. Ashley; "The Forms in Which Sulphur Occurs in Coal," by A. R. Powell; "Effect of Sulphur in Coal Used in the Ceramic Industries," by C. W. Parmelee. And there will be yet another sulphur-in-coal session in the afternoon of the same day, Wednesday, Sept. 24, when the following interesting papers will be open for discussion; "Removal of Sulphur from Illuminating Gas," by W. W. Odell and W. A. Dunkley; "Low Sulphur in Coal," by H. M. and T. M. Chance; "Low Sulphur Coal in Kentucky," by Willard R. Jillson; "Low Sulphur Coal in Illinois," by Gilbert H. Cady; "Sulphur in the Coking Process," by S. W. Parr; "Commercial Recovery of Pyrite from Coal," by S. H. Davis; "Sulphur in Producer Gas," by Frederick Crabtree and A. R. Powell. As has been said the meeting opens at the Congress Hotel, Chicago, Ill., Monday, Sept. 22, the day being occupied in technical discussions. In the evening there will be a smoker at the Chicago University Club. The next day the institute will go by steamer to the Gary Steel Plant of the United States Steel Corporation where lunch will be served. Wednesday is devoted to technical sessions. On Thursday a trip will be made to LaSalle where the guests will be entertained by the Illinois Valley Manufacturers' Club and the local Chamber of Commerce. From the standpoint of scenery, geology, mining and industry, the itinerary of the trip to LaSalle, Ill., cannot be surpassed. The committee has arranged all details with a view to the convenience of the visitors and will furnish the guests automobiles, luncheon and guidance.

Judging by the scenery in the vicinity of LaSalle, the appellation "Prairie State" for Illinois, is a misnomer. The scenic beauty of the country rivals that of the Appalachian region. Deep ravines abound, and large rocky bluffs are evidences that Illinois is not without its bolder topographic features. Starved Rock and Deep Park have, for many years, been the Mecca of tourists and in addition the district is one rich in tradition and in historic lore. Furthermore the important LaSalle anticline may be readily studied.

Longwall mining is the predominant type of coal operation at LaSalle. The room-and-pillar method, however, may be studied at the mines of one of the companies, as may also the manner of operation by a modified panel system.

On Thursday evening there will be optional trips to Franklin and to Macoupin Counties, the whole of Friday being spent at the mines. Many of the members will journey from the institute meeting to the dedication of the Bureau of Mines Experiment Station where an interesting program is provided. Carl Scholz is the chairman of the committee of arrangements of the institute.

Views Taken During the Rocky Mountain Institute Trip



Winton McGeath Post Office Wyoming

The town of Winton is located in a country made barren by lack of water and hence it has a bare appearance, but to those accustomed to a country, tonsured and close shaven, Winton is an attractive village of sociable people with a high standard of living.

How a Southern Wyoming Creek Bed Looks

View taken on the creek, or arroyo, between Winton and Rock Springs. The valleys are covered with "loess" (pronounced "lurse") a partially cemented deposit of airborne particles. Streams cut marvelous meanders into the soft material.

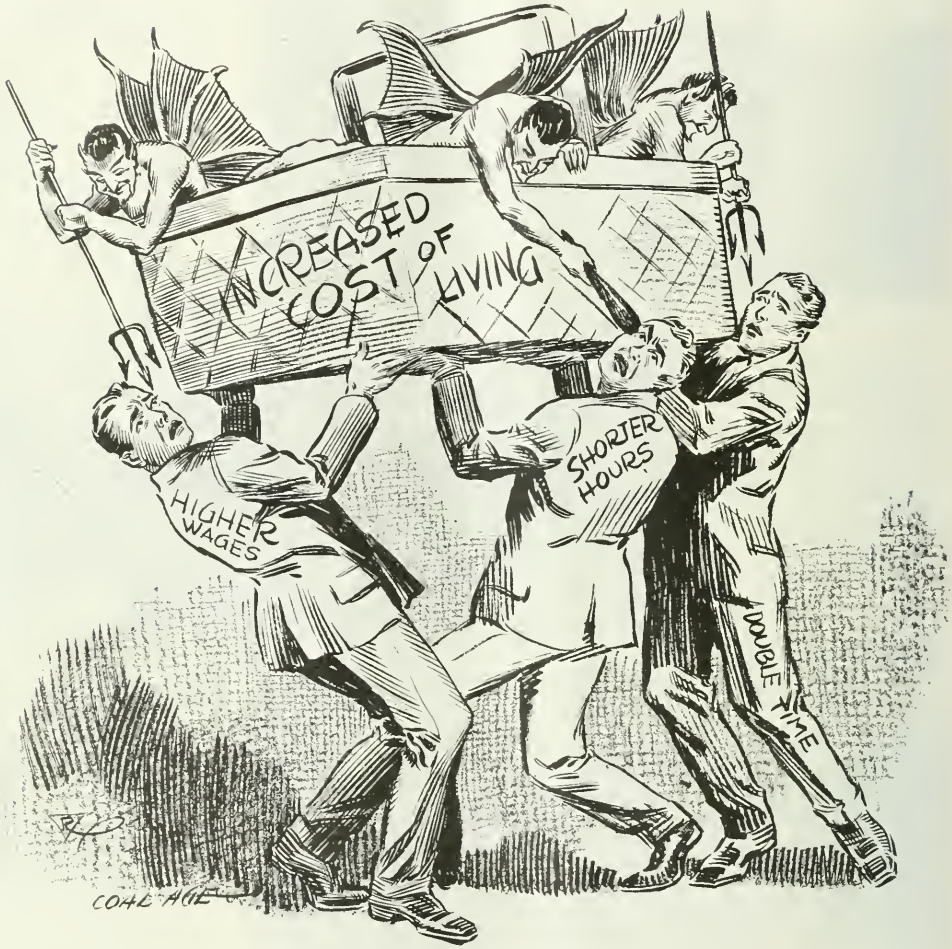
Typical Rocks of Mesa Verde Formation

A scene along the road leading from Rock Springs to Winton. The southern part of Wyoming is a "world unclad of verdure." A little greasewood is found on the flats. The rocks are usually bare and almost rounded by the impact of wind-driven sand.

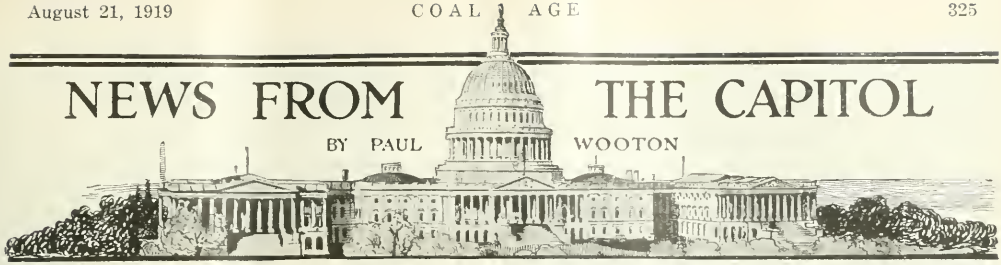
Entrance to the Man Way at Reliance No. 1

This concrete and stone portal leads steeply to the workings below. At the left side of the entry, as will be seen, is a noticeboard giving the rules of the state and mine in several languages.

These Three Hold Up Your Living Costs



When the men in one trade want higher wages, shorter hours and double time everyone else wants the same and some want a little more. That makes everything cost more and increases the cost of living. When you work hard to boost the cost of living by raising wages, shortening hours and doubling time, the cost of living "strikes back like the very devil." Prices will never go down till wages fall and surely there is no one would like to see a reduction in wages.



The Railway Administration Reports Coal Car Conditions

Under peace time conditions, the Railroad Administration believes it is not likely to prove practicable to transport an average of 11,340,000 tons of coal per week during the rest of the year, as would be necessary if the country is going to consume 500,000,000 tons. In answer to the Pomerene resolution calling for explicit details with regard to the open-top car situation, the Railroad Administration has furnished what is regarded as one of the most comprehensive compilations ever made with regard to the coal-carrying equipment of the railroads of the country. The statement, which is signed by the Director General, follows in part:

Pursuant to resolutions of the Senate (S. Res. 152) adopted Aug. 4, 1919, I give you below answers to the questions propounded in the resolution:

First Question: Give the total number of coal cars now in use in the transportation of coal; and the number of empty coal cars belonging to the several railroad companies under the control of the Director General of Railroads which are suitable and available for the transportation of coal.

Answer: Exhibit "A" hereto attached gives the details in response to this question. Broadly, the situation is as follows:

The number of open top cars in the United States is approximately 1,067,000, of which over 99 per cent are owned by Federally operated railroads and all of which are, generally speaking, subject to interchangeable use on Federally and non-Federally operated railroads. Among open top cars are low-side, high-side, solid-bottom, drop-bottom, side-dump, hopper-bottom, and mill gondolas, and also coke cars. Open top cars are commonly known as coal cars, though some such are not suitable for coal loading.

At the present time something less than 10 per cent of these cars are awaiting repairs, either light or heavy. A large number of the cars so awaiting repairs are so held for very light repairs which can be speedily applied. During Federal control the methods of classification to determine what cars need repairs have been made much more strict, with the result that large numbers of cars are now shown as needing repairs which in former years have not been so shown. The Railroad Administration program of car repairs will, it is expected, gradually reduce the proportion of cars awaiting repairs despite the stricter classification.

The total result is that there are now approximately 900,000 open top cars in the United States ready for use without any repairs, and about 775,000 of these open top cars are suitable for coal loading. This type of equipment is, however, regularly used for heavy tonnage of other bulk commodities which cannot be handled except in open top cars. Adequate transportation for many of these commodities, particularly those used in highway construction and repairs, general building, and railroad ballast and improvement work, now requires a large number of these cars. Those actually in current use for the transportation of coal number approximately 600,000. Box cars have always been used to an important extent in some parts of the country for transporting coal.

Second Question: State whether the coal cars belonging to the railroads and under said control are now sufficient or have been during the past six months to meet the demand therefor.

Answer: During the first five months of the present year open top cars were regularly available greatly in excess of shippers' orders for them. The maximum was reached in February and March when the surplus of open top cars daily available amounted to 187,339 and 192,933 respectively.

There has at no time been any shortage of cars for anthracite coal loading.

As to bituminous coal, there occurred in June a slight shortage in southern West Virginia, eastern Ohio and western Pennsylvania due to an accumulation of cars in Lake coal trade, and increased detention of such cars under load at Lake Erie ports awaiting vessels, also arising from a strike of roalroad shopmen on the Norfolk & Western railroad.

Since about July 15, 1919, coincident with a marked upward trend in production, there have been some shortages of cars for loading with bituminous coal in some producing districts, mainly in eastern Kentucky, Virginia, West Virginia, Maryland and Pennsylvania, and usually in districts producing the higher grades of coal. A strike of marine workers on coastwise ships, floods and other operating difficulties have contributed to these shortages. Contemporaneously, however, there still exist slight surpluses of open top cars in some sections, principally in the West.

Exhibit "E" attached shows comparatively for 1919, as far as available, the weekly reports by the Geological Survey of percentage of full time operation lost by bituminous coal mines in the United States, and the cause of such loss, and indicates that up to July 12 the loss on account of "car shortages" was a minor one, and relatively much less than that from "mine causes" and "no market." The Survey's detailed reports show this information weekly by producing districts, and indicate the district situation to be as above stated.

Third Question: State the number of coal cars which have been constructed or purchased for the account of the Director General of Railroads which are under his control and which have not been sold or transferred to the several railrad companies, and if they have not been sold or transferred to the several railroad companies, give the reason therefor.

Answer: The purchase of 45,000 cars available for coal loading was arranged for by the Director General for delivery to railroads under Federal control. All these cars have been or will be put in service as rapidly as practicable, whether transferred to the several railroad companies or not. Thirty-seven thousand have already been built, of which 17,000 have been put in service. The remaining 20,000 already built are now being numbered and lettered and are being placed in service as fast as this work is being completed. The 8,000 not yet built will be put in service as rapidly as they are constructed.

Of the 45,000 cars available for coal loading thus purchased, 4,750 have not yet been assigned definitely to any one or more railroad companies; 32,800 have been assigned to various railroad companies and definitely accepted by them; the remaining 7,450 cars have been allocated to certain of the railroad companies, but up to this time these cars have not been definitely accepted, due to unwillingness of said companies to accept the cars. Mandatory orders to require the cars to be accepted have not been issued pending full opportunity for discussion with the companies, but the fact that in these instances the cars have not been accepted by the companies is not delaying the cars being put in service as rapidly as constructed.

Fourth Question: State fully the methods adopted by the Director General for the purpose of supplying the producers of coal with the necessary cars for transportation of coal to the consumers.

Answer: Cars when available in full of all requirements are placed for loading in accordance with shippers' orders. Whenever requirements exceed the cars available, each railroad endeavors to allocate cars to the service of the several commodities requiring open top cars so that the same relative service is accorded to each without undue discrimination. Commodities which can obtain adequate transportation in the rougher class of closed cars, although more conveniently handled in open top cars, are required to use rough box or stock cars where available in order that open top cars may be released for coal loading.

The cars available daily for bituminous coal loading are prorated among the mines on the basis of the rated capacity of the mines, or their orders, if less than that rating. The rated capacity is ascertained by a formula which has been adopted and promulgated for the use of all railroads by the Railroad Administration with the concurrence of the National Coal Association, and is in effect uniformly throughout the United States.

In what is known as Eastern Railroads Car Pool territory, there is a pool in which is included the ownership of open top cars other than coke cars of the railroads in the Eastern and Allegheny regions and C. & O. and N. & W. railroads. The territory covered may be roughly described as lying east of Chicago and St. Louis and north of a line following the Ohio River to Cincinnati and thence to Norfolk via the Norfolk & Western R.R. Such cars are distributed between the railroads members of the pool through the medium of a pool manager located in Pittsburgh, Penn. Elsewhere in the country coal cars are handled on rules which require that a car located off the owning line must be returned to the owning line loaded or empty. Interregional distribution and distribution between the territory of the Eastern Railroads Car Pool and the other four regions, is handled by the Central Administration in Washington. The aim throughout is to obtain the maximum service from the cars available.

Fifth Question: State what, if any, further action by Congress is required in order to meet the demands for the transportion of coal.

Answer: It is not believed that futher action by Congress will aid in meeting the demands for the transportation of the coal which will be needed during the remainder of this calendar year. The matter is largely dependent upon practical conditions which will not be affected by legislation. A statement is appended showing some of the important conditions in this respect and indicating that if the demand to be supplied is as large as has been predicted by the National Coal Association there promises to be not only substantial difficulties in the transportation of coal but also in the production by the mines of the coal which can be transported. The transportation difficulties will not be principally or primarily a shortage of cars but the fact that the entire railroad plant—locomotives, cars, main tracks, terminal tracks, etc.—will be so occupied in handling a large business of all sorts that an abnormal amount of any particular business

such as coal will inevitably lead to congestion and delay. Nevertheless, the unified control of the railroad will admit of specializing on the transportation of coal to whatever extent is absolutely necessary to prevent actual hardship.

I believe it will be of specific advantage to the public if Congress would provide for an official inquiry by the proper branch of the Government (presumably the Geological Survey in the Interior Department) to ascertain the probable demand for coal for the rest of the year, so as to determine the extent to which the predictions of an abnormal demand for coal are justified.

It is important to emphasize that the relatively low production and purchase of coal up to the present date in this year have been due only in small extent to shortage of transportation and have been due to a large extent to "no market" or absence of demand for the coal, and in some parts of the country the lack of demand for coal still prevails. The weekly statements of the Geological Survey which are listed in the attached Exhibit "B," shows that beginning with January, 1919, and extending to June 14, 1919, the weekly loss of bituminous coal production on account of no market, ranged from 32.6 to 46.5 per cent of working time, whereas, during the same period, the loss of time on account of car shortage ranged from only 0.6 per cent to a maximum of 4.8 per cent. In the event any Congressional inquiry should be undertaken, it would be expedient to ascertain the extent to which the absence of demand has been due to the maintenance of high prices which discouraged demand.

Some of the practical considerations which will affect the production and transportation of coal during the remainder of this calendar year are the following:

The ability of the railroads to transport all the bituminous coal required for the rest of this year, will, of course, be largely dependent upon the amount required. On that point no accurate information seems to be available. The National Coal Association, however, has advertised that 500,000,000 tons of bituminous coal must be produced in the calendar year 1919 to meet the requirements of the country. This estimate of 500,000,000 tons is just about the production of 1916, a year of great industrial activity, with normal winter weather and normal storage of coal to begin with, whereas in 1919 the year began with storage piles greatly exceeding normal, winter weather was the mildest in history, and industrial activity, due to the readustment of business following the war, has been at a low ebb for months. Another element to be kept in mind in estimating the prospective tonnage for which transportation must be furnished is the export movement, of which much has been said to indicate that the tonnage will be large, but with respect to which there is little accurate information readily available.

It may be noted that during the first six months of 1919 the coal consumption by railroads was about 26,000,000 tons less than in the corresponding period of 1918, during which latter year the fuel coal consumption by railroads aggregated 154,000,000 tons for the twelve months.

If 500,000,000 tons shall be needed in the present year, the prospects are that its transportation will be accompanied by difficulties and, especially in view of the heavy business to be expected this fall, it will be exceedingly difficult to transport the amount required. These difficulties will not be due primarily or principally to the car shortage, but rather to the fact that an abnormal demand for coal will be concentrated into an unusually short period, when the necessary use of the railroads for other purposes will make it difficult to handle the coal.

During 1918 every transportation preference possible was accorded to coal traffic in order to obtain the maximum output. This was done as a matter of war necessity and under the authority of war legislation.

Illustrative of what was done to transport the maximum of coal, I may cite the following:

(1) The movement of both bituminous and anthracite coal was zoned by the Fuel and Railroad Administrations, and waste of transportation by reason of cross-hauling and undue long-hauling was avoided.

(2) On many railroads, coal cars both loaded and empty, were given preferred service after live stock and perishables.

(3) Bituminous coal moving to Lake Erie ports for trans-shipment was pooled, the result being a much smaller number of cars in that service, and a much lesser average detention per car at Lake Erie ports than has been the case this year. In the aggregate, the discontinuance of pooling in 1919 has required probably not less than 5,000 coal cars to be constantly engaged in Lake coal traffic this year in excess of what was so engaged last year.

(4) Bituminous coal, and to a lesser extent, anthracite coal, moving to North Atlantic ports for trans-shipment was pooled, with a saving similar to that effected by the pooling of Lake coal.

(5) Preference in car supply was accorded to coal mines by excluding from the use of coal cars, non-war traffic less essential than coal. This preference curtailed the transportation of road building materials more perhaps than of any other commodity and in the aggregate resulted in several thousand additional cars being maintained in the coal service in 1918 than would ordinarily have been the case.

Another important point which should be borne in mind is that the recent increase in bituminous coal production has been most pronounced in the eastern states where the higher grades of coal are mined. In a number of the eastern districts, production has already reached, or closely approximates that of the same period a year ago. If the production of the country as a whole is to be further increased, it must come largely from the central West and beyond. I would refer, in this connection, to the weekly reports of the Geological Survey on the production and shipment of coal, dated July 26 and Aug. 2, 1919, particularly the former which stated "an average of 10,000,000 tons a week will not be exceeded until buying increases in the Middle West."

Since the exceptional expedients mentioned had to be resorted to as war measures in order to move the average of 11,330,000 tons per week for the period of July 28 to Dec. 28, 1918 (and the greater average of 11,900,000 tons per week in the most intense part of that period from July 28 to Nov. 16, 1918) it is evident that without interfering with other business pressing for transportation, it is not likely to prove practicable under the modified conditions which have necessarily resulted from the termination of hostilities, to transport an average of 11,340,000 tons per week during the rest of the present calendar year (which would be necessary to bring up the total production and transportation for the entire year to the suggested 500,000,000 tons). As already stated, however, it is believed that the unified control will admit of such specialization on coal as may be necessary to prevent real hardship.

I do not anticipate any shortages in transportation which will be in any sense exceptional or abnormal or which will justify oppressive prices for coal.

EXHIBIT A

STATEMENT SHOWING CLASSIFICATION AND NUMBER OF RAILROAD-OWNED OPEN-TOP CARS IN THE UNITED STATES, JULY 1, 1919

Classification	Number owned by Federal Operated Railroads	Number Owned by Non-Federal Operated Railroads	Total
Flat bottom gondolas	237,176	14,250	251,426
Drop bottom gondolas	275,782	14,921	290,703
Side dump gondolas	58,984	9,278	68,262
Hopper bottom gondolas	389,693	16,720	406,413
Steel coke cars	30,160	70	30,230
Total	991,795	55,239	1,047,034

NOTE—In addition to these cars there are owned by shippers and in use on Federal and non-Federal railroads privately owned open top cars (customarily called "individual" cars), numbering about 20,000. Non-Federally operated cars include 17,237 of Canadian ownership reglarly available in large numbers for loading at coal mines in the United States.

STATEMENT SHOWING APPROXIMATE CLASSIFICATION AS TO USE OF OPEN-TOP CARS OWNED BY FEDERALLY OPERATED RAILROADS JULY 1, 1919

Classification as to Use	Number in Service
Designed and used for coke, being cars of large cubical capacity	31,000
Designed and used for steel mill products, being cars of small cubical capacity	100,000
Suitable, and used for coal, ore, stone, sand, gravel, crushed stone, blast furnace waste, brick, lumber, sugar cane and sugar beets, and generally for commodities not affected by weather	860,000

EXHIBIT "B"

Week Ended	Per Cent Total	Production	Total Lost All Causes	Lost on Account of: Car Shortage	Labor and Strikes	Mine Disability	No Market	All Other Causes
January 4	100	73.2	26.2	2.8	5.8	3.7	13.7	1.4
January 11	100	72.9	28.3	3.2	3.9	3.3	15.6	1.5
January 18	100	68.0	32.0	2.6	2.9	2.5	23.1	0.9
January 25	100	61.3	37.7	2.0	2.6	2.3	30.9	0.9
February 1	100	56.4	43.6	1.6	2.4	2.1	37.1	0.4
February 8	100	52.5	47.5	1.1	1.2	2.3	41.3	1.6
February 15	100	51.3	48.7	1.3	0.8	2.1	43.4	1.1
February 22	100	51.5	48.5	1.5	1.0	1.5	43.0	1.5
March 1	100	52.9	47.1	1.3	1.0	1.9	41.9	1.0
March 8	100	53.0	47.0	1.5	0.8	1.9	41.8	1.0
March 15	100	52.4	47.6	1.4	1.0	1.8	42.6	0.8
March 22	100	48.8	51.2	1.8	0.9	2.5	45.9	0.8
March 29	100	49.4	50.6	0.8	0.8	1.7	46.5	0.8
April 5	100	47.3	52.7	0.6	7.1	1.9	42.3	0.8
April 12	100	49.3	49.9	0.8	1.5	2.2	45.0	0.4
April 19	100	49.7	50.3	0.9	2.5	2.5	43.9	0.5
April 26	100	50.6	49.4	0.6	3.6	1.8	43.3	0.4
May 3	100	53.3	46.7	0.9	2.1	2.5	40.7	0.5
May 10	100	55.5	44.5	1.1	1.4	2.5	39.2	0.3
May 17	100	56.1	43.9	1.6	2.6	2.9	36.4	0.4
May 24	100	57.9	42.1	1.8	1.7	2.5	35.7	0.4
May 31	100	53.4	46.6	3.1	8.9	2.2	31.8	0.6
June 7	100	59.0	41.0	3.0	2.6	3.0	32.1	0.3
June 14	100	57.5	42.5	4.8	2.3	2.6	32.6	0.2
June 21	100	58.1	41.9	5.8	2.1	3.5	29.3	1.2
June 28	100	61.8	38.2	4.2	2.0	4.0	27.5	0.5
July 5	100	58.6	41.4	3.0	7.0	3.6	26.2	1.6
July 12	100	67.6	32.4	2.8	3.1	3.8	21.1	1.6
July 19	100	64.0	36.0	7.4	2.3	4.1	21.6	0.6

Employees Must Not Talk to Members of Congress

A recent act of Congress forbids government officials and employees from communicating directly with any member of Congress in regard to appropriations. This is expected to have an adverse effect on the technical bureaus, since Congress is less familiar with that class of government work. It has been customary for specialists to explain their particular needs to those members of Congress who are willing to be informed. By removing this personal contact it is feared that Congress cannot be impressed with the full importance of work being done or being contemplated by the bureaus.

At the request of the Swiss government the Bureau of Mines is sampling its purchases of coal in the United States, the expense being met by the purchaser. Other governments are expected to make similar arrangements soon. This has paved the way for the introduction of legislation sanctioning similar work for private consumers.

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Prize is Still the Same, Print as Many Coupons as You Will

Great as is the product of the United States, year by year, it is nevertheless an output expressible in figures—an absolutely definite entity of limited dimensions. Thinking that it is greater than it is will not make it larger. Abstaining from work will however make it less; strikes will reduce it; lack of demand for any part of it will cause that part to fail of production. Every idle day reduces it while every active day increases it; every labor-saving machine and every efficient method of working makes it larger. But great or small what the production is, that it is, and not other. Looking at it through a magnifying glass will not in any way amplify its real proportions.

It is a wonderful aggregate, this output, but, divided into portions, it is not so very large. Whatever the sum total is, that is the prize for which we are collectively striving. If a large body of men succeeds in securing for each of its members a double handful of coupons for that prize, then the other members must get a double handful also or they will suffer in the division. If all get a like double handful of coupons there will be no gain for any one, for while the coupons are doubled the prize remains as small as ever.

Thus it happens that when the members of a body of men by strikes or violence get two coupons in place of one, double wages in short, they practically filch the shares of other men, who must divide the residue among themselves and thus secure a smaller return. When a miner strikes for inordinate pay he is striking for more than his share, and someone will have to go without. It may be a telephone operator in Oshkosh or a school teacher at Oskaloosa, or a professor of argiculture at Urbana. Someone must suffer, for unless there is larger production than before, the size of the prize is fixed; that prize is no more and no less than the whole annual production of the United States.

It is no use becoming disgruntled that cost of living goes up with increase in wages. To do so is to fail to be a good sport. It shows a disposition to see one's own wage raised, and a desire to see the wages of others kept stationary. We must always remember that higher cost of living and wage increases are twins, born the same hour, children of the same parents.

Strikes which close down production reduce product and so decrease wages. The man therefore who strikes and wins his strike not only gets another man's share, but he actually does his fellow workman far more harm than that. The striker reduces the other man's income by more than the striker increases his own.

It seems strange that strikes are popular. They would be had enough if they were always unsuccessful; they are worse when they are won, for, when this is the case, the individuals who watched the strike from afar have to pay the winner his increased wage. Their portion of the aggregate prize—the whole production—is thus decreased in two directions: The prize is smaller because the strike interferes with production and the onlooker's share is yet smaller because the strikers win a larger portion than is their due.

The men who, with threats of violence, first to individuals and then to the state, and with combinations euphemistically called "collective bargaining," have forced the price of labor to an improper height are the same men who cry "profiteer" to those who, without threats of violence and without combinations in restraint of trade, have merely accepted the larger prices offered them. It is easy to tell who are the real profiteers.

A Plunderbund

IN GREAT BRITAIN, there is a combination called the "triple alliance"—a union of the mine workers, the railroad men and the transport workers. It is named after the alliance between England, France and Russia, which was a union merely for defense, as events, indeed, amply proved later. Opposed to it was the "dreibund," a union of Germany, Austria and Italy, which was an alliance for offence; this fact Germany and Austria soon made clearly evident. Italy, as soon as she realized in what evil company she had fallen and how false were the fair promises of the plunderbund with which she was joined, immediately withdrew her alliance.

The new "triple alliance" in Great Britain is a dreibund, or plunderbund, and not entitled to the fair name by which it is honored by friends and enemies alike. It purposes to dominate in complete violation of the one-man-one-vote rule which we all recognize as binding. It would subvert the rule of the majority, and it would arrange for a larger increase in the wages of mine workers, railroad men and transport workers than has been, or will be, provided for the rest of the working public and would dictate legislation on domestic and foreign affairs in accord with its imperial pleasure. It purposes to use its powers as its members alone elect, relying on its ability to starve the public at its will, close the factories in which millions of men work and to let the people freeze to death.

The mine workers and the railroad men, the major powers in the British dreibund, are far greater proportionately to the whole body of citizenry than are the mine workers and railroad men of America. In 1918, for instance, there were 961,000 mine workers in Great Britain in a population of roughly 45,000,000 persons. They and their families represent therefore a little less than 10 per cent. of the whole population. In this country they constitute much less than 5 per cent. of the whole nation. However, this makes but little difference. Their voting power is not so important as their power to do injury by the "silver bullet" of starvation.

The public cries just now are directed to emptying the storage houses which are regarded as sources of the high cost of living. We shall truly be in a pitiable mess if the mine workers and railroad men decide that they will oppose by a strike the replenishment of the

food supply of the cities. Should the alliance of railroad men and mine workers create a panic in this country, or even in Great Britain, their action will so incense the people against them that with their numerical insignificance they will be, for ever, prevented from carrying matters with such a high hand as they now seem to desire to do. This they apparently know full well. They realize that the other workingmen might never forgive them for their arrogance, and that their lot might always be made bitter for them by the reprisals of those they have been seeking to exploit.

In Great Britain they have for this reason decided not to take the evil step that they once contemplated, and the mine workers when asking for an increase far above the ascertained living cost carefully specified that it must be a charge, not on the overburdened consumer, but on the equally overburdened, but not equally popular, taxpayer.

In the United States, according to Thomas Kennedy, the president of the Hazleton District (No. 7) of the United Mine Workers, an organization like that of the British "dreibund"—for that word is preferable—is planned to be brought into being at the coming international convention of mine workers on Sept. 9. The four brotherhoods of the railroad men are going to join with the mine workers in kiting the wages of both and in making political demands on the President. Conferences between the leaders have already been held.

This is a true class struggle—a war between the coal and transport suppliers and the coal and transport users, the latter being the public in general. The alliance is of overwhelming strength, though neither mine workers nor railroad men are as necessary to our existence as are the farmers, but, as the world is now organized, there might well as well be no farmers, if we are not to receive the ministrations of mine workers and railroad men.

And, surely, this is true, that if the mining and railroad industries are so vital that they cannot be freely conducted but must be put under Government ownership, then the men of the mines and of the railroads cannot be free men; their work must be governmentally directed whether they will or no.

The reason why the public discusses binding these industries in chains of iron is because the unions have so often held up the conduct of their operation. The farmers are more numerous, more powerful, more basally important. Their industry might even more reasonably be taken over by the public, and the only thing that preserves them their freedom is the fact that they have so far not conspired against the public.

Individual farmers have repeatedly and almost universally sought the higher prices they could secure by free barter, but they have almost never forced those prices by a nation-wide trust, nor have they ventured to join in with another interest in the hope of jeopardizing the life and liberty of the people and of marching off with the plunder.

The mine workers are our good friends—honest, honorable men for the most part. When they realize the evil work that has been planned for them, one and all—union leaders, union and nonunion men—they will refuse like the British workers to undertake anything so vicious and treasonable as the plunderbund is planning for them, for miners are, as ever, Americans first.

No one should, and it is to be hoped that no one will, prevent them from conspiring to maintain a present wage, equivalent to the wage before the war, based on the price of the commodities regularly bought by them before the war commenced. No one should, and let us hope that no one will, endeavor to keep them from a scale which will automatically raise the proper wage for today's labor to accord with the increased cost of living of tomorrow. But the scales now being sought are not so based, and labor does not seem to be looking for an adjustment predicated on so scientific a plan.

A mine with a low tonnage per man is like any other slothful member of society. It is an institution lacking in the proper sense of obligation to humanity

One May Not Question Fate or Economics

ILLINOIS and especially the Belleville district is passing through a period of stress resulting from the fact that the people of the Middle West have been showing a great preference for Eastern coals. The Belleville district, before the war prosperity, was continually the scene of much trouble because the mines worked so irregularly that no one could make a living.

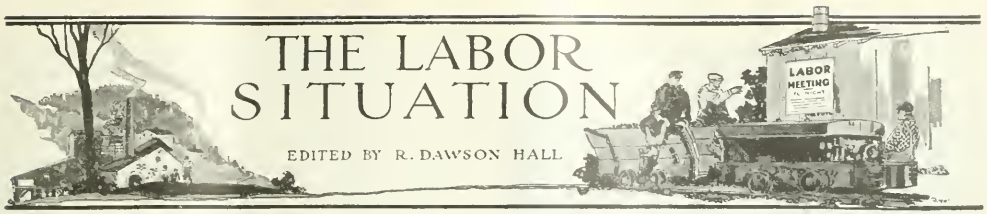
It has been the same again since the armistice was signed and there is a possibility that it will be a chronic condition relieved only at periods of excessive national prosperity when mines, that are normally unworkable, resume active operation to relieve the sore needs of the market.

The Belleville mines are, many of them, small and therefore not economical to operate. Their overhead is too high. The coal is not as good as in surrounding areas. In many cases they are not equipped with machinery. They find it impossible to compete when conditions are normal. The mine workers lay stress on a number of inconsequential matters—the cost of supplies for instance. This may be annoying but not really vital. The big trouble is unemployment.

The correct way to meet the difficulty is to bundle up and quit. Unfortunately most of them do not want to leave old surroundings where life has been pleasant; others have homes and cannot sell them, for the county of St. Clair is none too prosperous, and yet others have not the means to move.

So the men would have the market briskened for them by reducing the national production. That, they hope, will come about by introducing the six-hour day and five-day week. It is only a temporary cure but it appeals. And nationalization of mines also looks good, for the mine workers think the Government would work mines in all districts, whether they produce good or indifferent coal.

They hope that the Director of Mines when appointed would insist on coal being accepted gratefully regardless of quality, just as the Director of Railroads insists on railroad service being endured regardless of the inadequacy and discomfort. Thus Belleville would again find its mines busy and its mine workers making good wages. But unfortunately the Mine Director might be like Walker D. Hines and refuse to take over any but the best properties. As the Railroad Administration refused to take over and run many inefficient railroads, the Mine Director might refuse to buy a few or all the mines in the Belleville district, alleging that he could not operate them with profit.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Perhaps it is not surprising that in the United States the United Mine Workers are thinking of establishing an understanding with the "Big Four"—the railroad brotherhoods—for in this action they only follow British precedent. What the railroad men can find in the mine workers in the way of coöperation it is hard to establish.

When the brotherhoods call a strike they tie up the mines at one end of the line and the factories at the other and they also prevent the householders from getting coal. With the mine workers to aid them, they cannot do any more than they can without them. It is only putting another padlock on the door and that a less secure one.

One cannot see where the brotherhood can gain from affiliation with other union men except in so far as moral support is afforded. On the other hand the mine workers would gain if there were a sympathetic strike because the nonunion mines would have to close if no cars were delivered. The strike would not be local but nationwide. However, the nonunion area is quite small and is continually contracting.

The objection to a change in policy of this kind is the fact that it discloses that the argument for collective bargaining — that it is a labor trust against a hiring trust — is no longer valid. It might be believed by an unthinking public that the United Mine Workers was called into being by a trust of employers, absurd though such a statement be, but it would be hard to believe that the union between mine workers and railroad men was so caused.

BLUEJACKETS KEEP STEAM UP FOR PUMPS DURING YORKSHIRE (ENGLAND) STRIKE

Men of the H. M. S. Lion, who fought valorously in the Jutland battle, filling cars with coal for boilers at Trench pit, Garforth.

As therefore the proposed union between workmen is one between men who cannot aid one another there is little reason for the public to fear it. A strike of railroad men is an ill portent for the operator, as bad as a strike of his own men, but one and one do not in this case make two, for an idle mine is idle and no new strike can make it more idle. However, the public may be much angered by a combination of the men in two industries, and in that case the moral effect of their coöperation may be unfortunate for the mine workers rather than helpful to them.

The facts are these: Thomas Kennedy, of Hazelton, district president, No. 7, has stated that the results of the recent conferences between the leaders of the United Mine Workers and the railroad brotherhoods will be reported at the international convention of the former. Ratification of the movement is confidently expected.

During the present week occurs the tridistrict convention of the United Mine Workers, District No. 1, at Wilkes-Barre. The consensus of opinion is that more pay will be demanded and a complete recognition of the union will be sought. Some believe that the demand for a 6-hour day, which was voiced at Scranton, will be allowed to drop so long as the pumpmen and men in charge of engines are required to work only 8 hours and not 10 and 12 hours as at present. There is a demand that the coal companies provide the miners with drills and tools for their work. The question will be discussed, but how resolutely is, of course, not known.

In central Pennsylvania, John Brophy, president of District No. 2, addressed the following telegram to President Wilson which he dispatched Aug. 10, after addressing a large meeting of local mine workers at Johnstown:

"Following the organizing into labor unions of the employees of the Cambria Steel Co. of Johnstown, Penn., thousands of workers were discharged. This corporation refuses to confer with any group representing organized labor. Much distress has been caused by its arbitrary and coercive attitude, the situation having remained unchanged since the early part of the year.

"The continued refusal of this corporation to meet representatives of the organized workers is causing unrest and will inevitably lead to industrial disturbance.

"It is our desire to avoid, if possible, such a situation. That part of your Aug. 8 address to Congress which deals with the relations between capital and labor leads us to hope that through you the Cambria Steel Co. can be induced to confer with representatives of organized labor for the purpose of establishing bona-fide collective bargaining, thereby assuring industrial peace.

"On behalf of the miners of Johnstown, Penn., who are willing to remedy conditions by frank counsel, I ask that you use your efforts to secure us an opportunity for that counsel."

The Cambria Steel Co. is dealing with its own collective-bargaining association and the unions are of the opinion that company organizations of that kind should be outlawed. The trouble closely resembles that in Manhattan where there is a bitter quarrel between the Brotherhood of Interborough Rapid Transit Employees and the Amalgamated Association.

Declarations of the Federal judge who appointed the receiver of the Brooklyn Rapid Transit and of a state public service commissioner are being quoted with approval by the mine workers. The two authorities mentioned are both alleged to have said that the question of recognition of the union hinged on whether the members of the union constitute a majority of the men. Both the union and the collective-bargaining association in Johnstown claim a clear majority of the employees.

There is a disposition to make the Cambria Steel Co. a test case. Few of the steel companies are operating organized mines. If the union men of the Cambria Steel Co. can have the United Mine Workers of America recognized by the firm, then the more numerous steel-company owned mines in western Pennsylvania will be the next to be subjugated by the union.

The mine workers of District No. 2 are expecting to demand a scale calling for at least $6 a day and a five-day week, with numerous other changes in the present scale and working conditions.

On Aug. 14, several hundred miners at No. 1 mine of the Ford Colleries, near Russelton, Allegheny County, western Pennsylvania, went on strike to compel the reinstatement of a discharged employee. No disorder resulted, and both the company officials and those of the union said the trouble would be adjusted.

Interesting news comes from West Virginia where an agreement was recently signed tentatively between the leaders of the mine workers and the operators. A session of 250 union representatives of District 29, the district affected, was held at Beckley, W. Va. It lasted almost a week and was marked by no little tumult. It commenced Tuesday, Aug. 5, and ended Saturday, Aug. 9. In the end the contract was not signed. It may yet be approved, however, for the contract was submitted to a direct vote of the mine workers on Aug. 18.

Prior to the convention much opposition was exhibited to the agreement although the scale committee of the mine workers had secured, in effect, everything they asked for, even including the closed shop.

There was much opposition manifested by delegates when the convention was opened, but a good part of that opposition was withdrawn when the agreement was explained in detail. The convention, however, evidently did not wish to assume full responsibility for ratifying the agreement in view of the opposition among the various locals, although recommending to the locals that the agreement be ratified. As to whether the agreement will finally be given approval by the miners is a mooted question, as the ultra-radicals in the organization seem to be in the ascendancy.

No Wage Increase in New River Now Sought

The question of wages did not cause so much heart burning as the other provisions of the proposed agreement. The miners of District No. 29 want to be able to strike at will without being hedged about with restrictions such as the new agreement provides in the shape of prescribed methods of appeal and penalties for strikes pending negotiations. The miners object to the deduction for medical attendance. However, it has been pointed out that the deductions are not as large as in other fields. Another source of complaint is the increase in the rate for coal used in the homes of miners from $1 a month to $2 a ton.

IDLE BARROW COLLIERIES IN YORK SHIRE, ENGLAND
Note the little Shetland pit ponies in the foreground.

The contract provides for a mine committee of not more than three men at every mine where there is a foreman. These men must speak English. They must not interfere till the dissatisfied mine worker and foreman have failed to come to an agreement. If they interfere with the operation of the mine they are liable to discharge.

Captain Percy Tetlow, now international statistician of the union, tried hard to bring the delegates to indorse the contract presented to them. The opposition was, however, extremely strong, the mines at Meriden being closed entirely down as the men were all at Beckley lobbying against the approval of the contract.

It is estimated that the earning capacity of 50,000 mine workers in the mining territory traversed by the Chesapeake & Ohio Ry. was stopped during the continuance of the strike of the shopmen of that railroad. Miners have been leaving in large numbers.

No Cars; No Work; So Bolshevism Spreads

It is also feared that the enforced rest of the mine workers may only aggravate the spirit of unrest among them. Though many have been inclined to be skeptical of the extent to which the I. W. W. has made headway, it may be asserted that the radicals among the mine workers have not only become inoculated with the virus of socialism but even with that of more radical doctrines, and that the radicals predominate to such an extent that no one knows just what may happen nor when.

Following the example of the mine workers of District 20, those of District 17, which includes all the organized mines in northern West Virginia as well as those in the Kanawha field and intermediate territory, will also demand a "closed shop" agreement when it comes time to formulate the demands to be incorporated in the new wage contract.

That became apparent when President Frank Keeney, of District 17, in a speech at Eskdale on Aug. 6 in celebration of the organization of the Cabin Creek field, following a bitter struggle there six years ago, said: "No contract will be signed in West Virginia at the coming conference that does not carry the 'closed shop' and uniformity of the wage scale throughout the state. The miners of Cabin Creek shall have the same wages and conditions existing in the other fields of the state."

The celebration referred to was attended by several thousand mine workers from Paint Creek, Cabin Creek and Coal River. The men declare that the recognition of the union on Cabin Creek and Paint Creek was the point at which the entrance of 50,000 West Virginia mine workers into the organization was started. It will be recalled that in 1912 and 1913, when the miners on Paint Creek and Cabin Creek went on strike to enforce their demands for recognition of their organization, serious rioting broke out, it finally becoming necessary to call out the state militia. Eventually the strike reached the courts on an appeal from several court-martial cases, and was even aired in the Senate. Sensational writers did much muck raking and distorted unconscionably the true conditions. At the meeting on Aug. 6 Mother Jones was a speaker.

Rise Not Timed for Beckley Conference

Apparently some have questioned the purpose of the recent action of the Pocahontas and Tug River operators in raising wages just as the agreement in the New River field was up for approval at Beckley. As the southern field is as busy as it can be no sinister purpose could be suspected. The increase was made merely for the purpose of creating such a feeling of satisfaction with conditions that not only would the labor they had be held but an influx of new men would be created. The increase would also tend to keep the men from joining the union. While it is said that not all the Pocahontas operators were consulted and that some were therefore dissatisfied, nevertheless all will join in paying their wages in accord with the new scale which has not yet been given out in detail. The increase may well have caused dissatisfaction among the New River mine workers, whose representatives did not insist very strongly on an advance in wages, but the Pocahontas operators probably had no other thought in mind than to protect their own field.

Recognition of the United Mine Workers as an organization is the issue at stake in two strikes in the northern part of the state. One of these strikes is at Adrian among the mine workers of the Greene Coal Co. and the other among the employees of the Ford-Franklin Run Coal Co. of Meriden, W. Va.

Miners of the Belleville and Collinsville districts of Illinois, who have long rendered only reluctant recognition to the authority of their State organization, are now trying to override and overthrow the administration of State President Frank Farrington. The radicals, for the time in control, have brought about a strike which affects 76 mines and between 15,000 and 16,000 miners in the Twelfth District.

While it is doubtful whether the majority of the miners favor the fight that is being made, the older and more conservative men remain away from the meetings and the radicals have their way. In spite of orders of the strikers' organization that no meetings be held except such as are called by the strike officials, a number of locals have held meetings and most of them have voted to return to work. However, the vote has meant little more than an expression of sentiment, since few of the men have actually reëntered the coal mines.

Reports are conflicting as to the results of active and persistent propaganda to make the strike statewide. The leaders of the strikers say that 60,000 men have joined the strike, but President Farrington declares that few outside of the Belleville and Collinsville districts have struck. None of the men north of Springfield are out, he says, and only three locals at Springfield. Strikers' emissaries are reported to have had a cold reception at various places in southern Illinois and in a few instances have been handled roughly.

Leaders of Insurgents Will Be Ousted

In an effort to strengthen and extend the strike a convention of the Twelfth District, attended by delegates from the other districts, was held Wednesday, Aug. 13, at Belleville. There were about 50 delegates and a large audience of strikers. Resolutions were adopted providing for a convention to be held Aug. 19 at Springfield "to devise ways and means to obtain readjustment of the wage schedule and transact other business." The resolution declared that all local unions were to remain on strike and ask all others to join in the strike, subject to the action of the convention.

While the Belleville convention was in session, President Farrington wired to Walter Nesbit of Belleville, secretary and treasurer of the State organization, to obtain and forward by wire the names of all leaders of the strikers so that steps could be taken to expel them from the organization.

The dissatisfaction with Farrington, so far as it exists, is on account of his conservatism and his insistence that the men adhere to the war-time wage agreement and keep their pledge to remain at work until 60 days after peace has been officially declared. The element opposing him has made trouble before by starting unauthorized strikes, but has always been compelled to submit to authority in the end. The organization has heretofore dealt leniently with the agitators, but it is expected that this time they will all be expelled.

A Few Fear a Permanent Split in Union

If the strikers are able to see the matter through and hold their convention and "reorganize," it will mean a division among the miners, with two distinct organizations, but it is expected that the state organization, with the support of the more conservative members even in the disaffected area, will be able to prevail and that the strikers will be compelled to return to work.

The latest reports indicate that the propagandists are not making progress. Emissaries who went to Saline County received such unwelcome treatment that they left town before the mass meeting was held, at which the men voted to continue at work. At Pana 2000 miners, at a mass meeting at which delegates from Belleville were heard, refused to strike and by a unanimous vote pledged their undivided support and coöperation to the National organization, in response to a plea by wire from the acting international president, John L. Lewis.

PUMPMEN LEAVING TRENCH PIT AT GARFORTH
Even the pumpmen quit work and the sailors had to be brought to replace them

On July 27, the charter of District No. 18 of the United Mine Workers (the British Columbia and Alberta district) was cancelled by the international authority because the men persisted in striking in accord with the instructions of the One Big Union, to which many of the men belong. Rosedale mine in Alberta has been working, its men all being members of the United Mine Workers and discharged soldiers.

The charter was revoked when it was determined by Samuel Ballentyne, Samuel Caddy and William Dalrymple, international representatives, that the district president, P. M. Christopher, had an O. B. U. card and that the vice president and secretary-treasurer of the United Mine Workers had "lined up in favor of dual organization."

Winnipeg is desperately short of coal, due to the long strike. Regina reports that the lack of coal is hampering harvesting operations.

Up to Aug 12, 200,000 British mine workers were still on strike—the men of the important Yorkshire section led by Herbert Smith, who seems even more redoubtably socialistic than Robert Smillie, and Smillie is a man who in America would be regarded as unusually radical. The Yorkshire Miners' Council refused to accept the Government's offer of settlement, overfair, as it was, to the miners and false, as it was, to the interests of the domestic consumer. But the Council decided at last, on Aug. 2, to submit the matter to the local, or, as the British would say, the "branch" unions.

On Aug. 9 the mine workers' leaders were told by the Coal Controller of Great Britain that it was impossible to concede to their demands, as to do so would involve a strike in every coal field of the country, for every mine worker would want the same concessions as were granted to the Yorkshire men. At that time the strikers were being supported by strike pay but the funds of the union were growing low, about $1,250,000 having been expended. It was estimated that by Aug. 24 there would be no more money to dispense and the strike would perforce come to an end.

On Aug. 12 the Yorkshire Miners' Council recommended a return to work, which recommendation was accepted by all but the men in the West Yorkshire section who, on Aug. 15, were still out. At Pontefract 10,000 men voted against a resumption of work.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

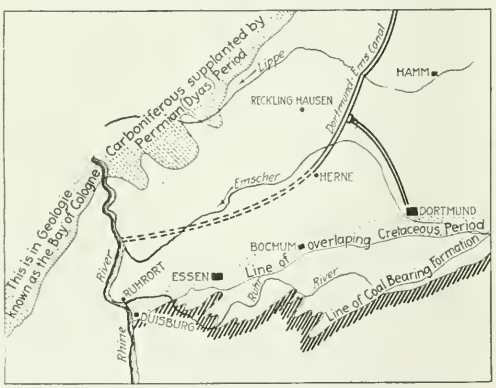
Coal Resources of Germany

Letter No. 2—Since reading the interesting letter of Geologist Eugene Stebinger, *Coal Age*, Apr. 3, p. 632, I have been trying to get together a few data stored among my mining notes collected during a course taken in the mining school at Bochum, Westphalia, 1901-1903, which I thought would be of interest to *Coal Age* and its readers.

The accompanying sketch shows the geographical situation regarding the coal deposits of Germany and the approximate boundary of the Ruhr Basin, which is the most important of the coal fields of that country, in respect to both the output and quality of the coal.

As far as is known, the coal beds of Germany extend about 90 km. (55.92 mi.), east and west, which nearly conforms to the strike of the formation, and 40 km. (24.85 mi.) from north to south, inclosing an area of, approximately, 3000 sq.km. (1158 sq.mi.).

These coal deposits belong entirely to the Carboniferous period. The average thickness of the measures is



THE COAL MEASURES OF GERMANY

about 3000 m. (1.86 mi.). The workable coal seams will aggregate 80 m. (262.4 ft.), divided between from 70 to 75 seams or beds of coal. The quality of the coal in these seams varies from a dry-and-lean anthracite to a very highly-volatile bituminous coal.

Although one-third of the coal measures of Germany is composed of semi-anthracite and anthracite, with from 0.6 to 0.9 per cent. of workable coal, the output is insignificant and entirely confined to the southern edge of the field and, for the present, at an inaccessible depth, in a few collieries to the north. The overlapping formation is a bituminous coal of high-grade, coking quality, the thickness of the formation being given as 600 m. (1968 ft.), with from 4 to 5 per cent. of workable coal having an average calorific value of 8300 lb.-cal. (14,940 B.t.u.). This coal yields from 70 to 75 per cent. of coke of a hard and silver gray substance.

The next grade of bituminous coal is known as the "gas coal." The coal of this class is represented by a thickness of 300 m. (984 ft.), with from 2.5 to 3.5 per cent. of workable coal. The coking quality of this deposit is inferior to that of the class previously mentioned; but the yield in gas and nitrogen is very high, while that of coke is only from 63 to 65 per cent. of the charge.

Owing to the great folding of the strata, many large collieries operate from 10 to 20 or more seams of both classes of coal, at the same time. In almost every instance, the development of the mines is by the refilling method (flushing) and the waste or loss of coal in extraction is therefore insignificant.

The last and most recent of the bituminous formations, in this field, is that known as the "gas-flame coal." As far as this formation has been explored, the aggregate thickness is 1100 m. (3608 ft.), with from 4 to 4.5 per cent. of workable coal. This coal takes its name from the long, yellow flame, which is accompanied with a dense smoke. The coal is quite hard and has a cleavage that causes it to break in a prismatic or rhombic form. The coal has a calorific power varying from 7400 to 7600 lb.-cal. (13,320-13,680 B.t.u.). The coal reserve, in this formation, cannot be estimated, since the northern mines continue to discover new beds of the coal underlying the Cretaceous period.

Silesian Coal Field Second Only to the Ruhr Basin in Importance

The coal field next in importance of output lies in Upper Silesia, the entire area of the Silesian, Moravian and Polish Basin covering 5700 sq.km. (2200 sq.mi.). Slightly more than one-half of this area lies over the Prussian border. Like those of the Ruhr Basin, the deposits of this field belong entirely to the Carboniferous period. The measures lying generally flat are more readily prospected; and, a few years ago, a borehole was sunk to a depth of 2240 m. (7347.2 ft.), but even then failed to reach the bottom of the the coal measures. However, a careful estimation makes the aggregate of workable coal, in this field, 190 m. (623.2 ft.), which makes it the richest coal deposit of the Empire, although the greatest bulk of the deposit is "gas" or "gas-flame" coal, with a lesser amount of good coking coal.

The third coalfield, in rank of importance, is the Saar Valley field, having an area of 600 sq.km. (231.6 sq.mi.) with 90 m. (295.2 ft.) of workable coal. Several of these seams, however, contain dirt bands, which increase the difficulty of mining and lessen the value of the coal. Most of the coal in this field belongs to the upper Carboniferous period, and only a portion to the middle Carboniferous.

Although the thickness of cover or depth of strata overlying the coal beds, in this field, is less than in other fields, it is a remarkable fact that the Saar Valley mines generate more gas than the mines in any other field in Germany. It was stated that, in the development of the Louisenthal mine, there was generated 248 cu.m. (8758 cu.ft.) of gas, per ton of coal mined and hoisted.

There are two smaller coal fields of high-grade fuel, lying west of the Rhine, near Aachen (Aix-la-Chapelle), which produce some valuable semi-anthracite. Another small field located in lower Silesia contains the same grade of coal as the Saar Valley field. But these two fields are unimportant in respect to their output and reserve coal.

Germany's oversea coal trade, if transported via the Rhine, had to pass through a foreign seaport and, for this reason, has always remained an unimportant feature of the coal industry of the Empire. It was for that reason that Germany started, some years ago, to construct the well-known canal (Rhine-Ems). A political disagreement between the liberals and the junkers, in the Prussian diet caused a cessation in the construction of the canal, for a long period. I understand, however, that shortly before the outbreak of the war the two parties compromised and the construction of the canal was completed.

HENRY BOCK.

Carlinville, Ill.

Bolshevism in America

Letter No. 2—I was much interested in reading the letter on this subject, *Coal Age*, July 3, p. 31. It is my belief that if the discussion on this and other subjects, in *Coal Age*, could be read by our foreign class of labor, the effect would be to mold many of them into different ways of thinking and develop in them our ideas and principles.

Bolshevism can be defined as a doctrine based on principles that are diametrically opposed to democracy. It is a doctrine championed by people who are as yet in a state of semicivilization. Bolshevism thrives among people who are not properly disciplined and who do not believe in progress and development, but ignore law and order.

EMPLOYERS MUST COÖPERATE WITH THEIR MEN IF THEY WOULD SECURE THE BEST RESULTS

Operators of large industries can do much toward preventing the spread of this doctrine in America. On the other hand, they can do much toward propagating its growth. All depends on their hearty coöperation and association with their employees, which will knit together the two essential factors of industry. On the other hand, if managers and superintendents hold themselves aloof, preferring to publish their orders as printed notices to be posted where they can be read, instead of meeting and talking with their workmen in a way that would gain their confidence, they erect a barrier of separation.

While coöperation and association of employer with employed will bring about greater efficiency, the lack of these conditions will prove a handicap to the success of any undertaking. To elevate their workers, employers must come down to the same plane or level, mingle with them, line up with them, work with them, and reason with them.

Observation shows that, in most large operations, 90 per cent. of the employees have never seen the men who managed its affairs; and perhaps they have worked for the same concern 10 or 20 years. Is it any wonder that, under such conditions, it is difficult to convince workers that their employers consider their interests in connection with their own? It is always hard to believe what we do not see. How much greater would be their influence over the workers if the management met them and talked with them in a heart-to-heart way.

PERSONALITY AND CHARACTER WINS MEN

During the war, the cry was, "shortage of labor"; but one could observe a difference in this respect between operations paying the same wages to their workers. While one place would be operating short-handed, at another place, in the same vicinity, it would be difficult for a man to secure a position even as miner's laborer. The difference was the result of the kind of treatment the men received at the hands of the officials in charge.

Let me suggest, in closing, that the successful manager, superintendent or foreman is a man having at least two attributes—one a personality and character that wins and holds men, and the other a skill and ability to keep things moving. The superintendent with these attributes brings sunshine into the dark recesses of the mine with every visit. The men are glad to see him come and sorry to see him go. Such a character is in strong contrast with the man who has a grouch and toward whom no one is drawn. Let us remember that success in mining and in every other industry depends on the character and skill of the officials.

West Pittston, Penn. RICHARD BOWEN.

Sealing Up Abandoned Workings

Letter No. 1—Referring to the excellent article on this subject by Joseph C. Thompson, *Coal Age*, June 19, p. 1110, permit me to comment on one or two of the points he has mentioned.

In the first place, Mr. Thompson refers to the necessity of placing a "regulating door across the intake aircourse" wherever a worked-out section or pair of entries on that side of the mine is to be ventilated. Assuming that this is done to ventilate the panels worked out on the air-course side, he suggests that no intelligent and experienced man would take the responsibility of saying that this air charged with the gases generated in those workings would be fit to sustain health and life.

It seems to me that Mr. Thompson has overlooked the fact that if the mine is properly laid out and the circulation of the air arranged to ventilate the panels on either side of the main road by means of overcasts, which would provide separate air splits for each panel or section, it will be entirely feasible to carry the intake air, first, into the live workings, and then return it through the abandoned workings, on its way out of the mine.[1]

Again, Mr. Thompson suggests the probability of stoppings decaying in a comparatively short time. Let me say that this could not be the case if concrete, brick or tile is used in building the stoppings, which is the

[1] This suggestion would apply to the abandoned workings on the return side. The sections or panels on the air-course side, however, assuming a double-entry system for the main road, could not be reached by the return current without overcasting the air twice for those sections.—EDITOR.

practice in many mining districts and is required by the mining laws in some states.

There is, further, suggested a progressive method of sealing off the abandoned panels, by leaving the first pair of panels when finished open and not sealing them until the second pair has been finished, in the meantime ventilating the first pair to keep them free from any accumulation of gas. Then, when the first pair of entries has been sealed, the ventilation of the second pair is continued until the third pair of entries is finished. I am curious to know what would prevent the gas from accumulating in the sealed panels and working back into the live section, which, to my mind, would be worse even than circulating the air first through the abandoned workings.

It is true, of course, that the gases confined in sealed sections of the mine do not have much opportunity to mix with air and become explosive; but, at any moment, a heavy roof fall or other occurrence may cause the sudden liberation of a large body of the pent up gases and we can imagine what would then be the result.

Braznell, Penn. EDWARD H. COXE.

Lawful Examination of a Mine

Letter No. 3—In presenting, at the last meeting of the Illinois Mining Institute, a paper on the subject of the proper and lawful examination of a mine by the examiner, as reported in *Coal Age*, July 3, p. 18, Steve Gosnell chose a subject of the first importance in his state (Illinois), where the mining law permits the examination of a mine to commence eight hours before the time for the dayshift to enter.

With Mr. Gosnell and practically all of our state mine inspectors and mining men, I believe that the examination of a mine should not commence more than three hours before the time for the miners to go to work. That being the case, one is led to ask, What is the reason that the Illinois mining law has set aside such a provision? As has been pointed out, if the examiner goes in earlier than three hours before the time set for work, anything may happen to change the condition in a working place from that which the examiner found when he was in the place some time before.

Conditions That Develop in a Brief Time

A man on the nightshift may have blocked open a door, thus cutting off the circulation and allowing gas to accumulate in a place that was found to be safe by the examiner not long before. A roof fall may take place in a room and release gas, making that place and those adjoining it unsafe for work. There may be 50 or 60 cu.ft. of gas coming from the loosened roof strata, and, although 6000 or 8000 cu.ft. of air is passing in that place, a dangerous condition will surely follow. Indeed, the entire section on the return of that air may be rendered unsafe and an explosion would certainly result when the men entered for work.

My contention is that where a mine is generating gas and the examination is made eight hours or even six hours before the men enter the mine for work, the safety-first principle has not been applied. But, let the examination be made by a competent examiner, within three hours of the time for work to begin and, during that time, let no one be permitted to enter that section who might leave a trapdoor open, and there will be little danger of an explosion occurring, especially if the workmen are provided with electric cap lamps.

Safety is not assured in a mine where the examination is not made in a proper and lawful manner. The examiner must be one of the most efficient men employed in the mine. Having cleaned and assembled his safety lamp with care, he goes to the fan, observes that it is running at the usual speed, takes note of the water gage and proceeds into the mine.

Starting at the intake, he follows the air-course to where his examination of the section in his charge begins. In regular order he examines each working place to detect whatever dangers may exist therein. Lowering his flame, he makes a careful test for gas. His observation and experience seldom fail to inform him where danger lies. The slowing down of the fan or any slight decrease in the circulation of air is known to him at once, and he promptly starts to ascertain its cause.

Dangers Should Be Removed When Found

For years, I have performed the work of mine examiner and many a time wished that I had entered the mine earlier than the time allowed by law. I would much rather have removed the gas found in a place, at the time it was discovered, rather than place a danger sign at the entrance to warn men not to enter. Although the Colorado law says that the examination must commence not sooner than three hours before the dayshift enters the mine, some of our mine examiners go in earlier; and, though the practice is not lawful, they consider it insures the greater safety of the mine.

In Illinois, such a practice would be lawful, but the question of the relative safety of these two methods of examining a mine is open for discussion. In my own experience, I have always advocated the employment of a sufficient number of examiners to enable each one to make a careful examination of his section of the mine and remove at once whatever dangers he may find. Then, when the dayshift enters the mine, another force of examiners or safety inspectors should enter with them and remain with them in the mine during the entire dayshift of eight hours.

It is my opinion that such a plan will pay for itself by reducing the compensation for accidents. In the past, the practice has been too general to employ but one or two examiners, who are forced to go like the wind, in order that each may complete the examination of the section of mine in his charge. I am confident that the management of the Colorado Fuel & Iron Co. and other large coal corporations desire safety first, and will welcome a broad discussion of this question.

Farr, Colo. ROBERT A. MARSHALL.

Firebosses as State Officials

Letter No. 12—Referring to the letter of A. Trubie, *Coal Age*, July 17, p. 119, I recall well the explosion in the Braznell mine that he mentions and which took place Dec. 23, 1899, as I was within seven miles of the place at that time.

In his letter, Mr. Trubie appears to throw the entire responsibility for that explosion on the fireboss and the mine management. It is my opinion that this is only partially true, for reasons that I will explain.

The Braznell mine was only one mine out of a possible fifty, which were located along the Monongahela River, and the workings of these mines were

often connected. Adjoining the Braznell mine was another operation that was known to generate a good deal of gas. It was not looked after any better than the Braznell mine, and it is easy to imagine that the conditions in the two mines were much the same in respect to gas.

Practical mining men will agree with me when I say that the chief source of trouble in these mines arose from the fact that many or most of them were ventilated by furnaces. Moreover, open lights were used exclusively, even where the gobs were full of gas, and in drawing back pillars it was not thought to be necessary to use safety lamps.

The fact that more explosions did not occur may be attributed to the poor circulation in these mines where there was scarcely enough air at the working face to support flame and the lamps burned low. While this lack of ventilation would be considered as reflecting on the management of the mine and the state mine inspectors as well, it may have been the real reason why more explosions did not occur.

Explosions Occur When Fans Are Installed in Place of Furnaces

What would seem to support this conclusion is the fact that, in those mines in which fans were installed and the furnace discarded that had previously been used to ventilate the mine, there were frequent local explosions, which were mostly confined, however, to one or two entries where they started.

The fact of the matter is that everyone connected with the mining of coal in that locality needed to wake up, and it took such an accident as the explosion in the Braznell mine to bring this about. It is the old story, so often proven in the history of coal mining, that we only learn by sad experience to "lock the stable door after the horse is stolen."

In the closing paragraph of his letter, Mr. Trubie seems to think that a state-employed fireboss would improve matters and make the mines more safe. In my opinion, that is not the case. A fireboss who would neglect his lawful duties, in order to avoid losing his job, would also accept a bribe from the mine management and report the mine clear, after finding gas in the workings. A crook is a crook, no matter what clothes we put on him.

As fireboss, I have worked for many different officials, but have never yet been censured for doing my duty. On the contrary, I have been commended many times, both by mine officials and state mine inspectors for the faithful performance of the duties of fireboss.

Wilkinsburg, Penn. A. A. Allan.

Letter No. 13—From the reading of some of the letters on this subject, it would seem that a few of the writers are willing to admit that a fireboss may be justified in failing to make a correct report of his examination of the mine, owing to the fear of losing his place. While I do not wish to appear to boast, let me say that I have yet to see the time when I hesitated to make a correct report of the conditions as I found them in the mine, either as fireboss in this country or as deputy in England.

A man who understands his authority and responsibility when holding the position of fireboss does not need to wish to be employed by the state as a means of increasing his authority. Any mine boss (foreman) who has faith in his firebosses would expect them to give a correct statement or report of their examination, and few mine bosses of my acquaintance would seek to intimidate a fireboss for the purpose of inducing him to change his report.

In his letter No. 9, *Coal Age*, July 17, p. 119, J. H. Taylor expresses the idea that if the firebosses, in Indiana, were clothed with state authority and acted as assistants to the mine inspectors, good results would follow. Let me remind him that state officials are appointed by the party in power at the time, and he must admit that politics should have nothing to do with the question of the qualifications of mine officials.

My experience, acting as fireboss for different operators, convinces me that they all desire their mines examined in a thorough manner, although it may appear that, in a few instances, an operator may regard both the mine inspector and the fireboss he is obliged by law to employ, as necessary evils.

Now, in my opinion, the result of making a fireboss a state official would often give him an exaggerated idea of his own importance and, as Mr. Taylor has admitted, such a fireboss might often ask a mine foreman to perform unreasonable work, which would interfere with the production of coal and increase the cost of operation. I agree with him, however, in the suggestion that firebosses' reports should be sent each day to the state officials, which might often bring needed action more promptly. Fireboss.

Clinton, Ind.

Transporting Powder in Mines

Letter No. 1—The lesson of the Baltimore tunnel disaster, which occurred at Wilkes-Barre, June 5, 1919, comes home to all of us with special significance. Viewed from whatever angle we choose to regard it, the inevitable conclusion is that it was a heedless and inexcusable occurrence; but the lesson taught is well expressed in the words of the Foreword, in *Coal Age*, June 19, "These men shall not die in vain."

Now that the first shock of the disaster has passed, and it is possible to contemplate the situation in a more composed state of mind, one feels that everybody who is at all concerned in promoting mine safety is more or less responsible for this terrible occurrence that has brought sorrow to so many homes. However, instead of aimlessly deploring the past, let us regard the future, and strive to devise some means of protection that will make impossible a recurrence of such a horror as the one that has just been recorded.

When one considers that there are mines throughout the country, where, in the absence of prohibitory laws, or in direct violation of such laws, miners carrying their own powder are permitted to ride to their work, it is surprising that accidents similar to that of the Baltimore tunnel do not occur more frequently. Certainly, the men guilty of such heedless practices can only be regarded as lucky when they escape injury and death. Their escape is not due to their own regard for safety and precautions taken by themselves to prevent accidents, nor is it the result of the protecting laws made to safeguard industrial workers, which they violate so frequently.

For a number of years it has been my custom to have all explosives used in our mines transported into the workings by a separate trip from that which carries

the men to their work. An ammunition car that is dry and properly insulated is provided and contains a dry covered chest, which is itself insulated from the car. As stated, the car is insulated from the motor to which it is attached by a nonconducting coupling. This ammunition car, with its dangerous load of explosives, follows the man-trip into the mine, keeping a safe distance behind it. By this arrangement, it must be agreed that there is little or no chance of the explosives being ignited, by sparks or by electricity.

There has never been a complaint heard from anybody in regard to explosives being stolen or lost. Such a suggestion, coming as it has from the union, would seem to indicate a lack of confidence in each other existing among the members. In actual practice, such fears will generally prove to be groundless.

Law Inadequate, Company Defers to Union

In reference to the Baltimore disaster, two facts stand out prominently. First, the anthracite mine law of Pennsylvania is certainly inadequate, in its relation to the transportation of explosives in mines if the conditions that led to this disaster did not violate its provisions. Second, neither the state nor the mine management can be justified in permitting the United Mine Workers to have their way in a matter that was a menace to the lives of the men employed in the mine.

It is claimed, that the union insisted on the powder being hauled into the mine in a car attached to the rear of the man-trip, to which the company reluctantly agreed. It would seem, however, that even this agreement was not carried out by the men, who appear to have had their powder with them in the cars in which they were riding.

Let me urge, then, that the matter of transporting powder into the mines be given immediate and careful attention by the mining department in every state. While the Baltimore tunnel disaster is a hard lesson, it is to be hoped that it will be a lasting one and that drastic laws will be enacted in every state that will safeguard, in a proper manner, this important feature in coal mining.

Let me suggest the adoption of such an arrangement as I have described and which has been practiced in our mines, successfully, for several years. In the enactment of laws covering this matter, there should be a severe penalty attached for its violation. I am sure that it is possible to make such an enactment as will safeguard mining operations in the future and render another disaster like this impossible. W. H. Noone.

Thomas, W. Va.

Welding Split Gears to Axle

Letter No. 3—In reply to "Mine Mechanic," asking for information regarding the welding of a split gear on an axle, *Coal Age*, July 10, p. 73, let me say that I question the economy of such an operation. Assuming the gear is a trifle too large for the axle, I would ask, Why should it be welded to the axle and the latter thrown on the scrapheap when the gear has been worn too bad for further use?

Let me give a little of my daily experience in the successful use of the arc-welding outfit. Many axles come to our shop badly worn and too small for the gears. They must then be built up. For that purpose a $\frac{3}{16}$-in. welding-rod is used to build up the worn portion of the axle, employing the arc-welder for that purpose. The built-up portion is then turned down in the lathe, until it is of proper size to fit the gear.

Using a $\frac{3}{16}$-in. welding-rod on both ends of a 4-in. axle, where the bearings had been badly worn, it took a machinist 13 hours to build up both ends. The axle was then put in the lathe and the journals turned down, until only $\frac{1}{32}$ in. of the welded metal remained. This was found to be firmly welded to the axle, and the turning down process was a success. In use, the welded metal did not become loose from the shaft to which it was fused in a solid mass.

If acetylene-welding is used on a job, it will pay to protect the metal before beginning the operation. This can be done with charcoal and save money, by its bringing the job up to the fusing point quicker and with less use of the costly oxygen. Whenever the electric current is available, however, the arc-welder will be found most satisfactory to use. By building up the portion of the axle that is too small, and then turning down the built up portion to the proper size, the axle can still be used when the worn gear has been detached and thrown aside. Mechanic.

———, Penn.

Letter No. 4—Referring to the inquiry of "Mine Mechanic," *Coal Age*, July 10, p. 73, regarding the welding of split gears to a locomotive axle, permit me to say that this would be poor economy and should never be done. The gears are made of the split type so that they can be removed when either the axle or the gears become badly worn and must be scrapped.

One chief objection to welding the gears to the axle is that locomotive axles are frequently broken, and if the gears are welded to the axle they cannot be removed for use again, but must be thrown on the scrapheap.

All locomotive axle gears are made standard to fit the axle and if they do not fit the chances are that the axle has become worn at that point and is a trifle too small for the gear. In any case, the gears should never be welded tight to the axle so that they cannot be removed if necessary.

Abuse of Mine Locomotives in Practice

The mounting of a pair of split gears on a locomotive axle must be done in a workmanlike manner, as all mine locomotives are subject to much abuse in service. When running a locomotive in a mine, the motorman is very apt to use the reverse lever to stop the locomotive. This throws all the strain on the pinion and gearwheel. To give satisfactory service, therefore, it is necessary that the gears be properly mounted and made tight to the axle.

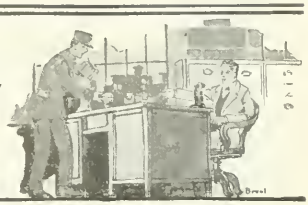
In case the axle has become worn and is a trifle too small, as frequently happens, I have found it good practice to use liners of suitable thickness to take up the play and make a snug fit. In the use of liners, it will be found an advantage to keep on hand different thicknesses of sheet tin. I have found that pieces of good stove piping make excellent liners.

It is a good idea to put in a liner thick enough so that when the two half-gears are drawn up tight, there will be a small gap or opening between them and the hub. When a gear has been mounted properly, and is good and solid it will give a ringing sound if struck with a hammer. T. O. Hughes,

Windber, Penn. Mining Electrician.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

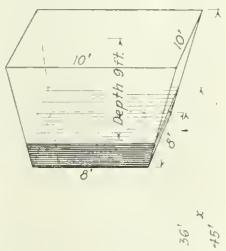


Contents of Mine Sump

The sump at the bottom of the shaft, in our mine, measures 10 ft. square at the top, 8 ft. square at the bottom and is 9 ft. deep. I have been asked to calculate the depth of water in the sump when it is one-third full, but have not been able to get the desired result. Kindly explain the method of solving such a problem.

Johnstown, Penn. STUDENT.

Referring to the accompanying figure, suppose the upper portion represents this sump, which is the frustum of an inverted pyramid whose apex is at *O*. In this position, the upper base of the frustum has an area of $10 \times 10 = 100$ sq.ft., while that of its lower base is $8 \times 8 = 64$ sq.ft.



INVERTED FRUSTUM

Now, it is possible to find the volume of a frustum of a pyramid or a cone by the prismoidal formula, which is to multiply the sum of the areas of the two bases and four times the area of the section half-way between them, by one-sixth of the height of the frustum, or, in this case, the depth of the sump. The area of the middle section of this frustum is $9 \times 9 = 81$ sq.ft. Hence, the volume of the frustum is

$$Vol. = 9/6(100 + 64 + 4 \times 81) = 732 \ cu.ft.$$

Another way of calculating the area of a frustum however, is to first calculate the volumes of the two pyramids whose respective bases are the upper and lower bases of the frustum and whose common apex is at *O*. But, since the volume of a pyramid is equal to its base multiplied by one-third its altitude, it is first necessary to find the altitudes of these two pyramids in the following manners.

It is observed that the opposite sides of this frustum approach each other at the rate of 2 ft. in 9 ft. and will therefore come together, at the apex *O*, at a distance from the upper base of the frustum, $9(10 \div 2) = 45$ ft., which is the altitude of the greater pyramid, whose base is 100 sq.ft. Again, since the altitude of the frustum is 9 ft., the altitude of the smaller pyramid, having a base of 64 sq.ft. is $45 - 9 = 36$ ft. The respective volumes of these two pyramids are, therefore, $1/3(45 \times 100) = 1500$ cu.ft.; and $1/3(36 \times 64) = 768$ cu.ft. The difference between these two volumes, which is evidently the desired volume of the frustum, is, then, $1500 - 768 = 732$ cu.ft., as found before.

By the conditions of the problem, one-third of the volume of the frustum, or $1/3 \times 732 = 244$ cu.ft., is the volume of the water contained in the sump, it being one-third full. Therefore, adding this volume of the water to that of the smaller pyramid gives the volume of a third pyramid, whose base is the surface of the water in the sump and whose altitude (x) is the perpendicular distance of the apex *O*, below the surface of the water. Thus, the volume of this pyramid is $768 + 244 = 1012$ cu.ft.

By a principle of geometry, these pyramids, being all similar, their volumes are proportional to the cubes of their respective altitudes. In other words, the altitude ratio is equal to the cube foot of the volume ratio.

$$\frac{x}{36} = \sqrt[3]{\frac{1012}{768}} = 1.096$$

and $$x = 36 \times 1.096 = 39.456 \ ft.$$

Finally, therefore, the depth of the water when the sump is one-third full is the difference in the altitudes of these two last pyramids, or $39.46 - 36 = 3.46$ ft., or 3 ft. 5½ in., nearly.

A Fluid Ounce

Kindly explain the derivation of the term "fluid ounce," which has always been a puzzle to me, though in constant daily use. CHEMIST.

Denver, Colo.

A fluid ounce is a liquid measure having a volume equal to that of one ounce, avoirdupois, of pure water, at maximum density (4° C.). This volume is calculated as follows:

$$1 \ lb. \ (av.) = 7000 \ grains$$

Then, since there are 16 oz. in a pound (av.),

$$1 \ oz. \ (av.) = 7000 \div 16 = 437.5 \ grains.$$

But, 1 c.c. of pure water, at maximum density = 1 gram or 15.43236 grains. Hence, there being 437.5 grains in the avoirdupois ounce, the volume of 1 oz. of the water or a fluid ounce is $437.5 \div 15.43236 = 28.3495$ c.c.

In like manner, the "minim" (a drop) which is the smallest liquid measure, has a volume equal to that of 1 grain of pure water, at maximum density. This volume is $1 \div 15.43236 = 0.0648$ c.c. There are, therefore, $28.3495 \div 0.0648 = 437.5$ minims or drops in a fluid ounce.

There are practically 16¾ fluid ounces in a pint (liquid measure, U. S.), since 1 pint is equal to 0.43718 liters or 437.18 c.c., and $437.18 \div 28.3495 = 16.69$, say 16¾ fl. oz.

It is common to estimate the volume of the liquid pint in this country as 16 fluid ounces, and there being 16 ounces in the pound, avoirdupois, gave rise to the old ditty, "A pint is a pound, the world around."

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Alabama First-Class Examination, Birmingham, July 21-24, 1919

(Selected Questions)

Ques.—What is termed a "dead hole" and what is a windy shot? Explain fully.

Ans.—A "dead hole" is one that is drilled in such a direction and to such a depth that the charge has no opportunity to perform its work properly. In other words, the line of least resistance corresponds to the axis of the hole, which makes it practically certain that the explosion of the charge will blow the tamping instead of breaking down the coal.

A "windy shot" is one in which the force of the explosion is spent largely on the air, causing a heavy concussion in the mine atmosphere and doing poor execution in respect to breaking down the coal.

Ques.—The anemometer makes 120 r.p.m., in an airway 8 ft. high and 10 ft. wide; what is the quantity of air passing per minute?

Ans.—The sectional area of this airway is $8 \times 10 = 80$ sq.ft. Then, assuming that the reading of the anemometer is an average reading for the entire cross-section of the airway, the quantity of air passing is $120 \times 80 = 9600$ cu.ft. per min. In general mining practice, it is not necessary to make allowance for the inertia of the instrument, as the reading only approximates the actual velocity of the air. It is more important to take the readings in such a manner that they will represent more or less closely the average velocity of the air current for the entire cross-section.

Ques.—If you had charge of a mine and the fan engine suddenly broke down, what would you expect to be the condition of the ventilation, and how would you continue to run the mine the rest of the day?

Ans.—The breaking down of the fan would mean a serious interruption of the circulation of air in the mine, which would then depend wholly on what natural ventilation might exist by reason of an air column existing in the shaft or dip workings. If the mine is generating gas it would be unsafe to continue operations in the workings, and the men should be promptly notified to withdraw from the mine. In any case, it would not be practicable to continue work, and orders should be given to shut down the mine, notifying the men to withdraw, unless some means is available and can be used to maintain the circulation sufficiently to permit the men to continue loading their coal.

In that case, however, no blasting should be permitted, and it will generally be better to discontinue the hauling, hoisting and dumping of coal. This must be determined by the mine officials, in accordance with the conditions found to prevail in the mine, but no chances should be taken in respect to safety.

Ques.—What instructions would you give in reference to the care and preparation of safety lamps, before giving them to the workmen, and how would you instruct the workmen as to their use?

Ans.—Where safety lamps are used by the workmen in the mine a regular system of caring for the lamps should be employed. These lamps should be owned and cared for by the company, who should employ competent men to take charge of the lamproom and to clean, inspect and deliver all lamps to workmen as they go into the mine and receive the same from them on their return to the surface. Every lamp should be stamped with a number and, as far as practicable, each workman should receive the same lamp, day after day, and be held responsible for its use and condition. No lamp should be given to a man who has not been carefully instructed and drilled in reference to its proper use and handling.

Each miner should be taught the danger of tampering with his lamp or handling it in a careless manner. He should be shown the effect of gas on the lamp flame and instructed how to proceed when he observes the same indication or notes the presence of a cap in the lamp when working in the mine. He should be told to hold his lamp in an upright position and never to swing or allow it to fall, but always protect it against a sudden rush of air such as may be caused by a blast in the mine. Each man, on receiving his lamp in the morning should examine it himself to see that it is in proper condition and return it at night to the lamproom in the same condition.

Ques.—If, on examination, a large territory was found to be filled with explosive gas, what steps would you take to remove the same, a continuous current being used?

Ans.—Before taking any steps to remove the gas and promptly on its discovery, notify all the men on the return to that section of the mine to withdraw from their places at once, instructing them to extinguish their lights and guiding them by the safest course out of the mine. It may be necessary to notify and remove the men from the adjoining places on the intake side; and, at times, all of the men may need to be withdrawn from the mine before starting to remove a large body of gas.

Having withdrawn the men in danger, the work of removing the gas should be commenced by increasing the circulation of air in that section of the mine. First, however, place reliable men at all points of entrance to the return air-course and equip them with good safety lamps. Then start at the intake end of the section and watch the progress made, by deflecting the air current into the places where the gas is lodged, erecting brattices when necessary to carry the air forward so that it will sweep the faces clear of gas. While performing this work, a close watch must be kept on the lamps, which should always be protected from a rush of gas due to a possible fall of roof.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

May Loose Foreign Coal Markets Through Misrepresentation

Officials of the Bureau of Mines lately have been worried over certain export coal problems. With Switzerland, Netherlands, Italy and France in need of many million tons of coal, experts in Washington have expressed some anxiety as to the methods employed by the American coal exporter in getting the European business, and, it is believed, unless the present American methods of selling coal to the European countries are changed, there is grave danger of losing that export trade.

It is alleged that certain American exporters have over-represented their goods to foreign buyers, and that, as a consequence, European manufacturers have been disappointed in the American product. In the opinion of Bureau of Mines experts, it would be good business policy for American coal exporters to represent to foreign buyers a quality of coal that they can guarantee; or even to sell a quality of coal that is a little better than the representation.

The countries of central Europe are in need of coal for industrial purposes and gas-making, and western Pennsylvania, West Virginia and Pocahontas coal has been found to satisfy the needs of these countries.

Coal Imports Into Switzerland

The German-Swiss press announces that during the first half of May about 70 per cent. of the Swiss coal demand was covered by imports. The following quantities were imported between May 1 and 14: From right Rhine bank of Germany, 4107; left Rhine bank of Germany, 14,349 tons; Belgium, 46,055 tons; France, 2852 tons; Austria, 336 tons; and from other countries 74 tons.

Russian Coal Situation Serious

The coal output of the Moscow mine district increased from 600,000 tons before the war to 750,000 tons in 1918, states *Finanstidende*, Copenhagen, of June 4, 1919. The Donetz district, which normally produced 19,000,000 tons a year, was taken by the Reds in the beginning of 1919, but had already been partly ruined by the Cossacks. In spite of the present possibilities for new production, the coal shortage of the Bolshevists is very serious, owing to the destruction of the railroad.

When the war broke out Russia had in all only 50,000 miles of railroad, 4500 miles of which belonged to Poland and Finland. Russia proper had 30,000 locomotives and 570,000 cars. On Mar. 1, 1919, the Russian railroads were reduced to 36,000 miles, 4000 locomotives and 95,000 cars. If conditions do not improve—and of this there is no prospect—all railroad traffic in European Russia will soon be stopped. While Russia in 1914 made 800 locomotives, the production in 1918 was only 20. During the last four months of 1918 the three largest shops—Kolomensky, Brjansky and Sormowsky—repaired only 44 locomotives, and in January-February, 1919, all Russian works together repaired only 30.

Since January of this year private freight is no longer carried, while passenger traffic is kept up only on a few lines. The Don coals and Turkestan cotton cannot get to the cities; grain and sugar from the Ukraine must stay where they are, and in the end the railroads themselves must stop because of their inability to transport coal for their own consumption. Russia needs at least 25,000 locomotives, 400,000 freight cars, 50,000 passenger cars and 50 railroad shops.

Finance Commissioner Gukowsky has recently made a budget for the first half of the year 1919, in which he calculates a deficit of 29,000,000,000 rubles. Judging from last year's result the deficit will probably be even greater. In 1918 a deficit of 31,000,000,000 rubles was expected, but this was a great miscalculation, as two-thirds of the income failed. In certain cases only 8 per cent. of the taxes on the bourgeoisie could be collected. The Red Army cost in 1918 about 17,000,000,000 rubles, and the rate of expense has more than doubled in 1919. Nationalization has up till now cost 2,000,000,000 rubles.

Fuel Situation in South China

Unless the output of coal in Japan is greatly increased or the industrial situation in Japan is greatly modified, there is every reason to anticipate that Japan will lose its hold on the fuel trade of South China in the very near future. For a decade or more Japan has had about 70 per cent. of the entire coal trade of South China, North China and Indo-China having most of the remainder. The price of Japanese coal of ordinary grades is so high in Japan at the present time, however, that in spite of the greatly reduced freight rates on coal for Hongkong and South China, Australian coal can cut under the Japanese quotations in this market, and is already taking a share of the business.

Only the present lack of tonnage moving from Australia to this part of the world prevents Australian mines from taking the whole of the trade. At the present time Japanese coal is being sold in Japan at higher rates than last year, quotations running at from 22 to 26 yen, or from $11 to $13 gold per ton, while Australian coal of the first quality—a far better fuel from every standpoint—can be had at Australian ports at from 15 to 16 shillings, or from $3.60 to $3.85 per ton. Several cargoes of Australian coal have already come into the Hongkong market so far this year and negotiations are now on for a large portion of the supply of the port.

Were it not for the fact that the chief users of coal in South China have yearly contracts for Japanese coal, trade would be almost revolutionized at once. The increasingly easier situation from a freight standpoint renders the increased use of the Australian product inevitable. Australian coal is going into the Philippines in a similar manner, the best Wallsend coal being landed there at about $14 gold per ton, as compared with $12.75 per ton for Japanese coal f.o.b. Japan port.

There has been an increase in the imports of Kailin or North China coal into Hongkong during the current year over 1918 for similar reasons, but quality and all considered, Australian coal will take the market if present conditions continue.

American Coal in Europe

The upset position of the coal-mining industry in Great Britain these days has given rise to much discussion as to American methods of production and even the possibility of American coal being brought into the British market. The question has even got into Parliament, according to the American Chamber of Commerce in London.

The American Chamber reports that in reply to a question put in the House of Commons, the Secretary to the Board of Trade said he understood that it was a fact that contracts have been made for American coal for delivery to European ports, but that the cost of American coal delivered in European ports is at the present time higher than the corresponding price for British coal, owing to the higher rates of freight from America. There was no restriction on the importation of coal into Great Britain, but according to the statement American coal can only be delivered in Great Britain at very much higher prices than that at which British coal is now obtainable.

Coal Situation in New South Wales

In 1913 the total production of coal in New South Wales was 10,414,165 tons and in 1914, 10,390,622 tons; in 1915 it decreased in consequence of the war to 9,449,008 tons, and reached the low-water mark in 1916, when there was only 8,127,161 tons produced. The production has increased again to 9,063,176 tons, and if there is no further disturbance in the trade the probabilities are that the trade will continue to materially increase, and there will be a better prospect for export and doubtless a better prospect for tonnage on American vessels to Australia, as they can discharge at Sydney and load coal at Newcastle, which is only about 6 hr. away.

The Government of New South Wales appointed a Federal commission to examine into the coal situation and ascertain whether an increase in wages which would imply a sharp advance in the price of coal would be justified. Following the appointment of the royal commission, the Federal Government issued an order commandeering all the coal in the Commonwealth, and the miners have received their increase by about 3s. (72 cents) per ton from May 5, 1919.

American Coal Offered Germany

A dispatch to the New York *Tribune* under date of Aug. 10 refers to a statement in the Berlin *Tageblatt* which reports that offers have been received in the Essen coal region, of American coal at $26 a ton, to be delivered through Rotterdam or Antwerp.

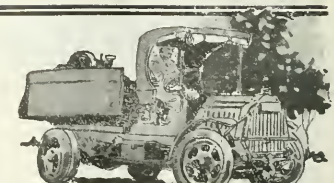
While a serious coal famine is threatened in Germany this winter, it is hardly expected the reported offers will be accepted, since the price, at the present rate of exchange, amounts to about 400 marks, whereas German coal of the best grade is sold for 70 marks. The paper is inclined to doubt the correctness of the report, in view of recent statements that America is unable to supply the coal requirements of France and Italy.

South African Coal

The fear was expressed by some of the witnesses before the Coal Commission in Great Britain that the United States might capture the British coal trade with the South American states. The Americans are not the only menace, however, for in South Africa they have also got their eye on this market. The South African coal owners have awakened to the possibilities of the export trade during the war, and it is claimed that South African coal can be landed on the east coast of South America at a much lower price than North American or European coal. The coal interests are urging upon the Union Government and the big shipping companies in the South African trade the desirability of establishing a direct service of steamships between South Africa and Buenos Ayres.

The low cost of production in South Africa is greatly in favor of the South African mines. Since the outbreak of the war the production has grown rapidly, and in 1917 amounted to 10,382,623 tons as against 8,801,216 tons in 1913. The increase is due mainly to the increasing quantity of coal bunkered and exported, which in 1917 reached 2,343,552 tons. It is a slight output compared with that of Great Britain, but there is great room for development in the coal-mining industry in South Africa. The available reserves of coal in the Union were estimated in 1911 at 56,200,000,000 tons, an estimate which is now generally conceded to have erred considerably on the conservative side. It is urged that a detailed survey of the South-African coal fields should be made on the lines recommended by the Fuel Research Board in Great Britain.

COAL AND COKE NEWS



What Happened in July

[The bracketed figures in the text refer to the volume in which references to the matter noted may be found and should the reader desire further information he can obtain it in the place indicated.]

July 1—Striking miners stop operations at mines of Loup Creek Colliery Co., at Page, W. Va. [XVI, 111]—The East Gulf Coal Co., of the New River field in West Virginia, is formed by consolidation of two large companies [XVI, 125]—W. A. Hurst, of Williamson, W. Va., dies [XVI, 127]—W. G. Sharp, president of U. S. Smelting, Refining and Mining Co., dies in Boston, Mass. [XVI, 232]—The miners strike at the Kathleen mine of the Union Colliery Co., near Duquoin, Ill. The grievance is over a question of wages [XVI, 64]—Anthracite Conciliation Board takes effective measures to adjust matters between employers and employees of West End Coal Co., at Mocanaqua, Penn. [XVI, 111]—Amendments to the Coal Mines Regulation Act, of Canada, come into effect. They have to do with the examination of coal mine officials and miners [XVI, 78]—The Southwestern Coal Operators' Association holds its annual meeting at Kansas City, Mo. [XVI, 79].

July 2—Employees of West End Coal Co., at Mocanaqua, Penn., return to work [XVI, 111].

July 4—The first-aid field meet of the employees of the Alabama Fuel and Iron Co. is held at Acmar, Ala., under auspices of U. S. Bureau of Mines [XVI, 275].

July 5—Employees (3000) in the Belleville mining district of Illinois, near St. Louis, Mo., go on strike [XVI, 284].

July 7—Three men are killed and seven others seriously injured by fall of rock and earth at O'Neill mine of Pittsburgh Coal Co., near Fayette City, Penn. [XVI, 125].

July 7—Rocky Mountain Institute meets at Salt Lake City, Utah. Papers are read and discussed and mines visited [XVI, 196].

July 8—Breaker boys at No. 10 colliery of Lehigh Coal and Navigation Co., of Lansford, Penn., strike and tie up the plant [XVI, 111]—The surface plant of the Hafer Washed Coal Co., at Carterville, Ill., is destroyed by fire [XVI, 126].

July 9—The board of directors of the National Coal Association hold a meeting in Kansas City, at which important questions are discussed [XVI, 124]—Six men are killed and ten others are seriously injured in explosion at colliery of Lehigh Coal and Navigation Co., Lansford, Penn. [XVI, 125].

July 8-11—The tenth annual meeting of the Mine Inspectors' Institute of America is held at Indianapolis, Ind. [XVI, 144].

July 11—F. M. Chase, vice president of Lehigh Valley Coal Co., Wilkes-Barre, Penn., gives his annual dinner and reception to staff of his organization [XVI, 171].

July 12—Important meeting of southern West Virginia coal operators is held at White Sulphur Springs, W. Va. [XVI, 169]—The Washington Gas Coal Co., of Washington, Penn., is organized [XVI, 170].

July 14—The agreements entered into with the War Trade Board by parties in the United States in connection with sale or delivery of coal, coke and oils, are cancelled [XVI, 155].

July 15—The Leggetts Creek colliery of the Hudson Coal Co., Scranton, Penn., is purchased by syndicate of Boston and Cleveland capitalists [XVI, 170].

July 17—At Ridge colliery of Hudson Coal Co., Parsons, Penn., 1500 employees strike [XVI, 158]—Boys at Evans colliery, Beaver Meadow, Penn., strike and tie up the plant [XVI, 158]—Some 2500 miners strike at the mines of the Central Coal and Coke Co., in Missouri and Kansas [XVI, 200].

July 18—The Commissioner of Internal Revenue announces that $1,500,000 will be returned to exporters of coal [XVI, 154]—An explosion of gas at the Carswell mine of the Houston Collieries Co., near Welch, W. Va., causes the death of six men [XVI, 191]—An investigation to determine whether the steady advance in the price of coal since the signing of the armistice is due to economic causes or to profiteering, is proposed in a resolution introduced in the Senate by Senator Frelinghuysen, of New Jersey.

July 21—The miners strike at the Allegheny Steel Co.'s mine in Brackenridge, Penn. [XVI, 200]—The increase of six shillings ($1.50) per ton on price of coal in Great Britain comes into effect [XVI, 158]—Announcement is made of the retirement of F. J. Hayes from the presidency of the United Mine Workers [XVI, 243].

July 22—The operators and mine workers of the New River, W. Va., field hold a conference at Charleston [XVI, 260]—The Attorney General of Pennsylvania hands down an important "boundary pillar" decision [XVI, 209].

July 24—Governor Sproul, of Pennsylvania, approves the amendments to the Workmen's Compensation Insurance acts [XVI, 209]—Lenroot introduces a bill in the United States Senate to provide for the leasing of coal deposits owned by this country outside of Alaska [XVI, 240]—Senator Lenroot introduces a bill in the Senate at Washington to provide for the disposal of non-metalliferous mineral deposits owned by the United States separate from the surface of the lands wherein they lie, and for other purposes [XVI, 240].

July 25—The Oklahoma Coal Producers' Association holds a special session at McAlester, Okla., to discuss fuel oil competition [XVI, 253]—The 15th annual convention of the Pennsylvania Retail Coal Merchants' Association is held at Reading, Penn. [XVI, 253]—The strike of the miners of Great Britain (with the exception of the Yorkshire men) ends [XVI, 199]—District No. 1, of the United Mine Workers of America, holds an important meeting at Scranton, Penn. [XVI, 243]—The men at the Webb mine at Shadyside (near Bellaire) Belmont County, Ohio, decide to go on strike [XVI, 283].

July 26—Fifteen teams participate in the first-aid contest held at Norton, Va., under auspices of the Bureau of Mines and the Virginia Coal Operators' Association [XVI, 277]—Secretary Glass signs decision relative to insurance of discharged soldiers [XVI, 240].

July 28—The miners of four companies at Adrian, in Upshur County, W. Va., go on strike [XVI, 284]

July 30—The 1000 employees of the Locust Gap colliery of the Philadelphia & Reading Coal and Iron Co. strike [XVI, 243].

Harrisburg, Penn.

Decrease in total fatalities of first half of 1919 compared with similar period for 1918—Mines fatalities greater this year, comparatively. Chief Button, of Department of Mines, to investigate mine-cave situation at Scranton.

A total of 1,589 persons were killed as the result of accidents on public service lines, in the coal mines, and industrial plants of Pennsylvania during the period Jan. 1 to July 31, of the present year, according to a report received at the Workmen's Compensation Bureau of the state. As compared with 1918, when 1,808 people were accidently killed in the first seven months of the year, the figures for 1919 indicate a decrease of 219 in the number of fatalities.

This may be accounted for by letting down from war-time speed in production at industrial plants and in the mines. In spite of the disaster at the Baltimore Tunnel of the Hudson Coal Co., in Wilkes-Barre, where ninety two lives were snuffed out, the record for the total of the seven months compares favorably with a similar period previous to the war and would indicate that 1919 will show a decrease over 1918 fatal accidents by about 400. Analyzing these totals the total fatalities for the seven months of this year were divided as follows: Industrials, 606; public service, 300; mines, 683; in 1918 the figures were as follows: Industrials, 801; public service, 348 and mines 659. The Baltimore Tunnel disaster does affect the mine fatalities, causing the 1919 figure to exceed somewhat the number of mines fatalities for 1918.

Seward E. Button, Chief of the State Department of Mines, has gone to Scranton to look after the state's interest in the mine-cave situation which has assumed serious proportions on account of recent developments. For the last few weeks several mine caves have occurred in the Hyde Park section of Scranton and, since the death of the Warburton boy, the people of this community have become aroused and are demanding that the state take action on the matter.

Various suggestions have been made for dealing effectively with the mine-cave problem; the residents of the hard coal fields believe the most practical plan is to call a special session of the Pennsylvania Legislature for the passage of a law that will safeguard the people of the community against the continuance of this peril

Scranton, Penn.

Mine cave causes death of one boy and injury of another. Meeting of Scranton Surface Protective Association held. District attorney asked to investigate death of boy. Coroner called upon to hold inquest. Telegram sent to Governor Sproul asking for remedy for cave menace.

The mine-cave situation in Scranton, Penn., reached an acute stage on Aug. 12, when a boy—Peter Warburton—was buried alive in a cave which occurred in West Scranton at the Diamond mine workings of the Delaware, Lackawanna & Western R.R. Coal Department. The victim was one of three boys who were playing on Roberts Court; one escaped injury, another was partly buried and the Warburton boy was covered by tons of earth and rock. The boy partly buried was rescued from the surface and the body of the Warburton boy was recovered from the interior of the workings by a mine rescue party. This accident, following a series of caves that considerably damaged private and public property in the vicinity, caused great indignation and it is said that this is the first death of the kind due directly to a mine cave.

On the night following this accident a meeting of the Scranton Surface Protective Association was held at which a number of citizens not affiliated with the society were present. The greater portion of the evening was taken up with a discussion of the cave accident. Resolutions were unanimously passed calling upon the district attorney of Lackawanna County to investigate the death of the Warburton boy, to prosecute on charges of homicide all responsible parties and to conduct an inquest in the case. A telegram was also ordered sent to Governor William C. Sproul criticising his attitude toward remedial mine-cave legislation and asking him to offer a solution of the mine-cave menace. A committee was appointed to look after the Warburton case; to spread news of

the accident, to inform state officials who had promised to try to remedy conditions here, to carry the case to court and to insist on its vigorous prosecution. Another committee was appointed to draft an ordinance regulating mining in the city, to present the measure to the city council and to urge its passage.

Philadelphia, Penn.

Midvale Steel and Ordnance Co. establishes pension plan—applicable to coal corporations—$30 a month to male employees at 65 years of age, if 25 years of service have been given. Home-building plan also established by Midvale company. Employees paying 10 per cent., company loans 90 per cent. of value of building property.

Many of the big corporations of the country have worked out comprehensive pension and home-building plans. Some of these concerns have no direct connection with the coal industry, others have subsidiary companies engaged in the production of coal and coke and still others are essentially coal corporations. The plans of all these concerns should be interesting to coal men. Among those of the middle class may be mentioned the Midvale Steel and Ordnance Co. On May 7, 1919, this company established a plan under which pensions are paid to its employees. What appears to be distinctive, says *Iron Age*, is the provision for the payment of a uniform pension of $30 a month to employees eligible under the requirements, regardless of position or wage or salary previous to retirement. This amount is somewhat more than experience has shown to be the average paid under some industrial pension plans heretofore in operation. Attention has frequently been called to the desirability of establishing a basis under which the allowance will come as practicable to provide for the physical wants of the pensioner. The Midvale plan provides that all male employees of the company are eligible to a pension on reaching the age of 65 and women employees on reaching the age of 55, provided in both cases that a service of 25 years has been completed. This plan was effective on July 1 and will be administered by a pension committee appointed by the president of the company, who is the court of last appeal in case of questions arising.

Another matter of considerable interest in connection with the Midvale company is its home-building plan which came up for initial public discussion on May 10, 1919, at a meeting of the elected representatives of employees and officers of this company, says *Iron Age*. The employees' representatives asked that the Midvale extend its activities in the direction of improving conditions in the various communities in which its works are located by acquiring property and building homes for employees. At a meeting of the board of directors held on June 4, a fund of $2,500,000 was voted for carrying out a home-building plan. This plan includes assistance to employees to acquire their own home and they are urged to build rather than buy existing houses; the object being to increase the number of houses in the communities in which the several works of the company are located. In accepting this Midvale plan, the employee is required to provide at least ten per cent. of the total value of the building property; the remaining 90 per cent. will be loaned by the company at five per cent. interest. No loan will be in excess of $8000 and payments are to be made in monthly installments to be deducted from wages. While the maximum term of the loan is 12 years, the purchaser has the right at any time to pay off any part or all of the loan. Taxes are paid by the company and charged against the loan account of the purchaser, and the same provision is made as to insurance. Monthly payments include interest and this is charged against the net balance due at the beginning of each month.

Ownership of a home carries with it an entirely different attitude of mind toward the community in which a person lives; the proprietor of a home tends to be a good citizen and the company encouraging its employees by the kind of practical assistance offered by the Midvale corporation, generally reaps the additional benefit of more loyal service from its employees.

Charleston, W. Va.

Little coal mined in the C. & O. territory—loss 375,000 tons. Car supply in most fields fully 50 per cent. below normal—aftermath, shortage of labor in some districts. Food supplies running low. Navy may be seriously inconvenienced for coal.

Production reached the vanishing point in at least three of the largest producing sections of West Virginia during the week ended August 9, the mines in the districts shutting down pending the return of striking Chesapeake & Ohio shopmen. Operators had been sanguine that it would be possible to resume producing coal by August 11, but the strikers refused to return to work, in response to the orders of their national officers, and consequently no attempt was made to operate any coal trains whatsoever on the C. & O. system. The Big Sandy, Logan, Kanawha, and New River fields were, therefore, without cars and motive power. Under such circumstances operations were not attempted and production at the rate of 125,000 tons a day was being lost. It is estimated that the loss for the three days of the week ended August 9 was 375,000 tons.

Mining was also curtailed in other parts of the state, indirectly from the same cause; the car supply in most fields being short fully 50 per cent., it is difficult to estimate just how seriously the output was affected throughout the state. The supply of cars was so short in fact that producers were holding meetings to deal with that situation. Even when the strike which has brought production to a stop is settled, one of the aftermaths will be a shortage of labor in the fields affected by the strike, as there has been a general exodus of miners from the Logan and other fields since the strike began. While some will return as soon as conditions are normal there is certain to be, according to interviews given by leading producers, a shortage of labor whenever present conditions are overcome.

The shipment of food having been suspended at the same time coal trains were annulled, many mining communities have not had new food supplies for almost a week and consequently such supplies are running low. In the event it is necessary, emergency trains could be operated; but with thousands of miners out of work and with the food supply lessening, conditions are serious from the standpoint of the welfare of miners and their families.

The output for the few days the mines of the New River field were able to operate during the week ended Aug. 9 was limited to about 40,000 tons or less, or about 25 or 35 per cent. of capacity; the prospects were that production would be even lower than that for the following week. While the Virginian Ry., which touches the New River district, was moving some New River coal, there was a complete paralysis, otherwise, in operations at the outset of the week. As the New River field supplies the Navy with a large tonnage of coal, there is a possibility that this branch of the Government may be seriously inconvenienced until supplied wholly from the Pocahontas district.

In common with other districts on the Chesapeake & Ohio system, the Kanawha continued to feel the effect of the strike of the C. & O. shopmen. No coal or any other kind of freight trains being moved during the first part of the week ended Aug. 9. Production was paralyzed on August 7, 8 and 9. It continued to be at a standstill when the following week began, except on the north side of the Kanawha River reached by the Kanawha & Michigan Railroad. The large mines on Paint Creek, Cabin Creek, and Coal River were all shut down having no cars and with no coal loaded out. As far as it is possible to estimate not more than 30 per cent. of the normal output was mined during the week in question, amounting probably to 60,000 tons, and that was produced during the first three days of the week.

Fairmont, W. Va.

Northern West Virginia Coal Operators' Association aroused over poor transportation. Large mine opens in Monongalia County—Active operation in Monongalia and Preston counties.

While there was a plentiful supply of cars on hand in the Fairmont region and in other northern West Virginia districts at the outset of the week ended Aug. 9, representing a Sunday accumulation, the supply rapidly dwindled until by the end of the week there were only 648 cars available in the Fairmont region, the same proportion being furnished other districts in the northern part of the state. There were sixty-nine mines on the Monongahela Ry. alone not in operation on Aug. 9 because of no cars. The poor car supply has retarded production throughout northern West Virginia to such an extent recently that producers are aroused; two meetings of the directors of the Northern West Virginia Coal Operators' Association being held on Aug. 8 to see if something could not be done toward getting a better supply of cars. It was decided to keep hammering away at Railroad Administration and railroad officials until a better run of cars is furnished. Directors of the northern association will even employ extra help in taking care of the car supply problem, which has been extremely aggravating during the last month.

Though the embargo on coal to tidewater has been lifted there was a comparatively light run of coal to Curtis Bay and St. George during the week, attributable in large part to the curtailed car supply. Shipments of railroad fuel were much below the average and Lake shipments during the last few days of the week were almost insignificant. One of the principal events of the week ended Aug. 16 was the opening of the large mine of the New England Fuel and Transportation Co., on the Empire tract, in Monongalia County; this plant is on the Indian Creek branch of the Northern R. R., near Lowesville.

Developments during the first two weeks in August encouraged more active operations among the mines of Monongalia and Preston counties, every mine being in operation except where a shortage of cars has made that impossible. Shipments from Monongalia County have been greatly stimulated by an increased Canadian demand.

Huntington, W. Va.

C. & O. mines resume work on Aug. 18—Ten days' production lost for three big fields. Strike causes loss of 65 per cent. of capacity. Practically month of August will see little coal produced in C. & O. territory.

When shopmen of the Chesapeake & Ohio Ry., who had been on strike, returned to work Thursday night and Friday morning, Aug. 14 and 15, it made it possible to resume operations in the Logan, Big Sandy and Kanawha fields after a total suspension of traffic lasting for more than a week. Even though work was resumed in the shops it was impossible to have motive power ready for use before Aug. 18; consequently little or no coal was produced in any of the fields mentioned before Aug. 18 so that the suspension of operations meant the loss of ten days' production in practically three large fields. As the output of coal in the 300 mines supplied by the C. & O., in which 40,000 miners are employed, has been averaging about 2,250,000 tons of coal a month, the strike cut off the production of about 750,000 tons of coal. It prevented the production of approximately 280,000 tons in the Logan field alone beside seriously aggravating a pre-existing labor shortage of 25 per cent. By the time the shopmen had returned to work food was beginning to run quite low in the Guyandotte Valley which was almost completely marooned as a result of the strike. Losses sustained during the week ended Aug. 9, amounting to 278,000 tons, afford an idea of just how production was crippled, the total production loss being 84,000 tons in excess of the previous week. The loss directly attributable to the strike was 259,000 tons or 65 per cent. of capacity. During the week ended Aug. 9, mines were operated only for three days or for a total of only 1801 hours, the loss in time being 4193 hours. Production dropped with a dull thud from 197,000 tons to 119,000 tons as compared with 222,000 tons for the corresponding week of 1918. It will be several weeks before the mines of the Big Sandy are able to work under anything like favorable conditions so that the month of August will be virtually a loss as far as the production of coal is concerned. Striking shopmen would not have returned to work when they did had not the saner element among them finally dominated the radicals who advocated an indefinite strike.

The C. & O. coal freight movement for July, 1919, made it plain as to the extent to which a scarcity of cars had affected shipments. Few Government cars had been assigned to service by the end of July although allocated to such service.

Williamson, W. Va.

Pocahontas actually gains in production in face of demoralized transportation. Kenova-Thacker output far below same period of last year—Production 68 per cent. —Demand for this coal growing.

In spite of demoralized transportation conditions, the output in the Pocahonta-

field showed a slight gain, the total production for the week ended Aug. 2 and the week ended Aug. 9 being 282,000 tons and 283,000 tons, respectively, even though the car shortage loss was increased from 131,708 tons to 140,000 tons; the loss in working time from a car shortage was 1285 hours and this was mainly responsible for cutting down the working time to the extent of about 300 hours. Despite such a reduction in working time, more coal was produced and the tonnage loss was not so large, amounting to 148,000 tons instead of 159,000 tons for the week ended Aug. 2. Thus it will be seen that a car shortage was responsible for the loss of all but 8000 tons, the remaining 8000-ton loss being equally distributed between a labor shortage and mine disability. The labor shortage loss was reduced from 10,000 to 4,000 tons. There was a slight increase in coke production but it was still far below normal, the tons of coal coked being 6600 as against 5900 for the previous week. With no coal being produced in the New River region, the demand for Pocahontas coal was extremely urgent.

Though the output in the Kenova-Thacker district for the week ended Aug. 9—115,000 tons—was far below the output of 164,000 tons for the same period of last year, there was a decrease in the amount of coal mined as compared with the previous week of only about 2000 tons. While there was rather a marked increase—1800 tons—in the loss from car shortage which shot upward from 21,000 tons to 39,000 tons (or from 12 to 21 per cent.) nevertheless the loss from other sources was reduced so that the total increase in the production loss was only the difference between 51,000 and 58,000 tons. During the week ended Aug. 2 the mines had an output of 72 per cent. That was decreased to 68 per cent. during the week ended Aug. 9. The principal loss in working time was of course due to a somewhat limited car supply. The demand for Kenova-Thacker coal is gradually growing in volume and under favorable conditions production will be materially stimulated.

Nanaimo, B. C.

Move to have duty on fuel oil into Canada removed—To force down price of coal—Opposed by coal men. Annual contest in first-aid and mine-rescue work on Sept. 1.

On his return from Ottawa recently, Senator Planta made some statements with reference to the efforts which had been made at the capital to have the duty on fuel oil into Canada removed. He said that strong pressure has been brought to bear on the Government to this end; petitions having been forwarded with the support of the Vancouver Board of Trade and other Vancouver organizations. The reason advanced for the move being to force down the price of coal. Senator Planta thought that it was the big interests who were behind the movement and he referred in this connection to the Canadian Pacific R. R., the Canadian Pacific Steamship Co. and the Manufacturers' Association. The Minister of Finance, it is stated, had been strongly impressed with the advisability of taking this action, but it was so strongly opposed by representatves of the coal mining constituencies that no action was taken.

The Vancouver Island Mine Safety Association will hold its annual contest in first-aid and mine-rescue work on Sept. 1, at Nanaimo, B. C. Seven or eight teams are entered representing the various mines of the Nanaimo district and there will be teams from coal-producing sections of the mainland as far east as the Crows Nest Pass. The Provincial Government has made a substantial grant this year to assist the association in providing an attractive programme and interest is high among those who will compete. They have been in training for months and it is expected that the meet will be the most successful held in the Province for the last four or five years.

Victoria, B. C.

Esquimalt & Nanaimo Ry. belt coal is decided to be property of the Province. Claim of H. W. Treat valid. Large coal beds established—Are they available for commercial development?

The Privy Council has upheld the judgment of Canadian courts to the effect that the coal lying under the foreshore within the Esquimalt & Nanaimo Ry. belt is the property of the Province. The E. & N. Ry., it will be recalled, laid claim not only to all the coal within the railway belt proper, but all that might be found under foreshore lands. Their title was contested by H. W. Treat, of Seattle, Wash., who had staked some foreshore near Chemainus and was proceeding under provincial license to do some boring with the intention of developing the coal should it prove to be in sufficient quantity. When the railway questioned his right and took the matter to the courts, Mr. Treat was successful. The case, however, was appealed but now with the Privy Council on record, there is no further question of the validity of his claim.

Following the publication of this decision, mining men are interested in the development of the coal leases at Oyster Bay and other points in the neighborhood of Chemainus. Mr. Treat is reported to have drilled through coal at Chemainus in two places. It has been established that there are large coal beds in this section but whether they are available for commercial development remains to be established. It is understood that Mr. Treat and his associates propose to continue with their work, being confident that this foreshore coal can be mined at a profit.

PENNSYLVANIA

Anthracite

Scranton — The Ronna Coal Co. will rebuild its coal washery with extensions and installation of new equipment at a reported cost of $100,000. W. P. Jennings, of Dunmore, is general manager of this company.

Hazleton—There is a report of a 3-ft. seam of coal being struck by diamond drillers on property of the Lehigh & Wilkes-Barre Coal Co., south of this place. It is said the company will develop the tract.

Harrisburg—Seward E. Button, Chief of the Department of Mines, and his deputy, Frank Hall, have been holding a series of conferences with mine inspectors in various sections of the state, looking into safety matters. Special attention has also been given to the labor and car situations.

Wilkes-Barre—The Anthracite Forest Protective Association, in which an acreage of about 100,000 is represented, is conducting an advertising campaign in the hard coal region to get every landowner on the membership rolls. The association, which numbers coal companies, water companies, rod and gun clubs and individual citizens in its membership, hopes ultimately to reduce forest fires throughout the whole region to a minimum and to encourage the reforesting of what are now waste lands. Part of its existing equipment is in the shape of observation towers, whereby all the land from Wilkes-Barre to Pottsville can be viewed and fires spotted before they gain much headway.

Bituminous

Canonsburg—The Canonsburg Gas Coal Co., of this place (in Washington County), and with general offices at Pittsburgh, plans to open up a new plant at Tylerdale, Penn. Some 700 acres of coal will be developed by a 250-ft. shaft. Modern equipment is to be installed throughout. Holmes A. Davis, of Washington, Penn., is president, and J. H. Hillman of Pittsburgh is vice president of the company.

Ebensburg — E. M. Burns and W. H. Smith, of this place, in Cambria County, are said to have purchased the coal lands and plant of the Nelson Coal Co., in West Carroll Township, Cambria County, for $80,000. The company has a modern tipple and two mine openings. Improvements contemplated by the new owners, it is said, will double the present capacity of the plant.

Robertsdale — It is rumored that the New York Edison Co. has solved the problem of its fuel supply by purchasing outright the East Broad Top R.R. running from Mount Union to Robertsdale, Shade Gap and Jacobs, together with the coal mines along the line of the road in Huntington, Bedford and Fulton counties. It is said the consideration was $5,250,000. The coal mines were opened up and the railroad built in 1873.

Harrisburg—The executive committee of the Bituminous Mine Inspectors' Association of Pennsylvania, held a special meeting at this place, on Aug. 8. The meeting followed the vetoing by Governor Sproul of the bill passed by the last Legislature increasing the salaries of mine inspectors $500 per year, and much disappointment was expressed by those in attendance, due to the fact that salaries of mine inspectors have not been advanced since before the commencement of war. Thomas K. Adams is president.

Pittsburgh—Richard W. Gardner, commissioner of the Pittsburgh Coal Operators' Association, was notified recently by Van H. Manning, director of the national Bureau of Mines, that hereafter no license will be required for the purchase, possession or sale of explosives or ingredients. Until a condition of peace is reached, however, licenses must be had for the manufacture of explosives and the exportation and importation of such products.

The sum of $1,800,000 has been allotted by Congress for the improvement of the Allegheny River, and half of this amount is to be spent in the erection of dam No. 4 at Natrona. This will extend the slack water 7½ miles, permitting a pool stage a short distance above the Kiskiminetas River. It is expected that it will take two seasons to finish the work. It will poen up a means to ship millions of tons of coal which is being developed along and adjacent to the river. A system calling for eight dams is under way for the Allegheny. Plans have been about finished for dam No. 5 and work on the plans for dams Nos. 6, 7 and 8 is well under way. No. 8 will be 61 miles above the mouth of the river.

Brownsville—The Snowdon Coke Co., of Pittsburgh, has contracted with the Wood Equipment Co., of Chicago, for the installation of a 28-car revolving dump at its mine at Linn Station, Fayette County, near here. A full trip of 28 cars will be dumped at one operation. This is said to be the longest revolving dump attempted as yet; the longest one in use being an 18-car dump at the Lamont plant of the H. C. Frick Coke Co., at Lamont, Fayette County, Penn., installed some seven years ago. The wood, drop-bottom mine cars now in use at the Snowdon plant will be replaced with solid steel-body cars to be furnished by the Koppel Industrial Car and Equipment Co., of Koppel, Penn. It is exepected that the installation, which is to be made without interrupting the operation of the mine, will be completed about the first of the next year.

WEST VIRGINIA

Fairmont — Government cars are apparently now being assigned to coal carrying service after considerable pressure has been brought to bear, about 1500 of such cars having been observed in empty trains passing through this city. The number of such cars allotted for use in the Fairmont region so far has been rather small.

Princeton, W. Va.—The building of a branch line by the Virginian Railway from Maben on its main line into the Milam Fork district of Wyoming county, will make possible the development of a considerable acreage of Pocahontas coal hitherto untouched, it being estimated that there are at least 100,000 acres of land in that section underlaid with coal of merchantable thickness. The presence of engineers at Maben leads to the belief that the building of 27 miles of branch line will soon be undertaken.

Thirty thousand acres in the Milam Fork area are owned by the Wyoming-Pocahontas Land Company, headed by Andrew Squires, in which Cleveland capitalists are largely interested.

Ten thousand acres of coal land in the same section are under lease by the Raleigh-Wyoming Coal Co., it is stated, this company having been organized only a few months ago with a capital of $500,000. To develop the 10,000 acres will represent an outlay of approximately $5,000,000 it is said.

KENTUCKY

Hazard—There are now seven operating companies on Lotts Creek and the Indian Head Coal Co., will start shipping shortly, which will make the eighth operation; a ninth is in prospect. The Hardy-Burlingham Coal Co., is planning to increase production to 5,000 tons, it is said.

OHIO

Columbus—Coal operators in Columbus and central Ohio are opposed to the plan of President Wilson, as announced in his recent message to Congress, to bring the coal industry again under the control of the Federal Government. A canvass of the situation shows that coal producers and distributors do not want Federal control again and believe that if price fixing is brought about, the agency fixing the price should take into account the fact that practically every mining proposition must money during the early months of the present year and that higher prices for the latter part of the year are necessary for operators to make a fair profit on the years' operations.

Corning—Considerable activity in coal mining circles has sprung up recently in the Corning field, which was one of the important mining sections of the Hocking Valley field 25 years ago. The Central Power Co., has secured a franchise to furnish electrical current to the village of Corning and with the coming of the high power line several mines will reopen. The Sunday Creek Coal Co., has made contracts with the power company to pump out mines No. 5, 9, 11 and 13 which have been idle since 1903. When these mines are pumped out they will be leased. One of the mines (No. 9) has been leased to Monsarrat Bros., of Columbus; operators will soon start up operations. New tipples will be erected and electrical equipment installed. Mine No. 8 of the Sunday Creek Co., has been leased to Harry Kelly, of Nelsonville, who is organizing a company to make the necessary improvements before starting operations. This mine has been idle since 1903. Mines Nos. 11 and 13 which are adjoining will be combined into one operation.

ILLINOIS

Edwardsville—Miners employed by the Donk Bros. Coal and Coke Co. have voted to name the new Donk Mine here "Thermal."

Braidwood—Negotiations are in progress for the consolidation of the Oswald-Young mine, long identified with Braidwood (Will County) business interests, and the Skinner Brothers & Co. mine. It is planned to retain Messrs. Young and Oswald to manage the mines and to operate both properties as heretofore.

Zeigler—Aug. 1, the first commercial coal was hoisted through the main shaft of mine No. 2 of the Bell & Zoller Mining Co. here. Work was started over a year ago on the shaft. It is one of the large mines of the county. The reservoir, covering over ten acres, was recently finished. This mine will have particularly large storage tracks for empties.

West Frankfort—The Old Ben Coal Corporation is equipping all its mines with dust-barrier apparatus which is intended to localize explosions. The apparatus includes V-shaped troughs containing slate dust; the troughs are so placed in entries as to be easily overturned in case of an explosion. The Bureau of Mines carried on extensive experiments and succeeded in localizing explosions by dust barriers. This action of the Old Ben Corporation followed an investigation of the matter at the Pittsburgh Experiment Station last year. The corporation has installed a grinding plant and, it is understood, it will furnish dust for other companies equipping their mines with such protection.

ALABAMA

Birmingham—The new byproduct coke ovens of the Sloss-Sheffield Steel and Iron Co., at North Birmingham are expected to be in operation about Nov. 1. The cost of the plant was estimated at about $6,000,000.

S. L. Yerkes, representing the Alabama Coal Operators' Association, has in conjunction with the Harlan County Coal Operators' Association, Hazard Coal Operators' Exchange and Southern Appalachian Coal Operators' Association, filed a petition with Director General Hines, of the Railroad Administration, protesting against the operations of the Eastern Car Pool. This pool is said to be greatly depleting the supply of coal cars being furnished the southern region of the Railroad Administration territory; it is asserted that many mines throughout the southern coal fields are suffering serious delays due to the shortage of cars caused by the manipulations of the pool.

MISSOURI

Kansas City—An executive meeting of the Southwestern Interstate Coal Operators' Association was held on Aug. 14 to make arrangements to deal with conditions that were expected to result from the strike scheduled for Aug. 18 in Kansas and Missouri union mines. It is said that the operators have no idea of attempting to effect a settlement now but will arrange to obtain coal from other sources to supply the demand in this territory

Personals

H. D. Thompson, former state mine examiner for Williamson and Johnson counties, has been appointed State Inspector for Madison and Bond counties.

C. G. Wood has been appointed superintendent of the New River mines, at Kilsyth, succeeding J. K. Hobaugh, resigned. For the last six years Mr. Wood has been located at Tamroy.

Edward Brewer has resigned as district mine inspector for the eighth district, at Charleston, to accept the post as manager of the Wet Branch Coal Co. operating at Dry Branch, W. Va.

O. J. Jenkins has succeeded W. C. Thompson as superintendent of the Macdonald plant of the New River Co. Mr. Jenkins up until the time of his appointment, was mine foreman at Macdonald.

W. C. Thompson has been transferred from Macdonald where he was the superintendent of the plant of the New River Co. to the Cranberry No. 1 mine of the company where he succeeds Thomas Mackey.

George Carter, of Hazleton, Penn., who was chief inspector for the Fuel Administration here during the war, has been appointed to a similar position for the Harwood Electric Co., Cranberry Creek Coal Co., Harwood Coal Co. and Alliance Coal Company.

R. S. Weiner has been appointed district manager for the Sullivan Machinery Co., at El Paso, Texas, succeeding Don M. Sutor. The latter has been transferred to the company's St. Louis office as district manager for Missouri, eastern Texas, Oklahoma, Kansas, Western Kentucky and western Tennessee.

Peter McLinden, the new mine inspector for the Eighth West Virginia inspection district of Fairmont, has just been appointed by W. J. Heatherman, Chief of the West Virginia Department of Mines. Mr. McLinden has been for several years one of the assistant chemists and inspectors of the Consolidation Coal Co. He succeeds Edward Brewer, resigned. Mr. McLinden's headquarters will be at Charleston.

James E. Strong, for the past several years general superintendent of mines for the Sloss-Sheffield Steel & Iron Co. resigned his position Aug. 1. Mr. Strong has been identified with the coal mining industry for the past twenty-five years in an executive capacity in this district; he has not announced his future plans. His position with the Sloss company is being temporarily filled by **Howard Thomas** assistant general superintendent.

Obituary

Oswald Jones, age sixty-seven years, died at his home in Marion, Ill. on July 31, after a long illness. Previous to ten years ago he was a resident of Scranton, Penn. He came to Marion as a representative of the Scranton Big Muddy Coal Co. and sunk and equipped the Scranton mine east of Marion and was general manager of it for several years. He leaves a widow and five children.

Trade Catalogs

Industrial Transportation. Issued by the Bicycle Manufacturers' Association of Joseph Goodman, secretary, 36 Pearl St., Hartford, Conn. Pp. 24; 7¼ x 10 in.; illustrated. Includes communications from various corporations relative to accommodations for bicycles at their plants; excellent illustrations accompany.

"Pennsylvania" Hammer Crushers, Bradford Breakers and Single Roll Crushers. Pennsylvania Crusher Co., Philadelphia, Penn. Bulletins 1004, 1006 and 4005, respectively. Pp. 4, 4 and 2, respectively; 8½ x 11¼ in.; illustrated. These bulletins are included in a binder. The apparatus is illustrated and described.

Industrial News

Sharples, W. Va.—The Boone County Coal Corp., with headquarters in the Bullitt Building, Philadelphia, Penn., has recently increased its capital from $3,000,000 to $12,000,000, to provide for general business expansion. William J. Clothier is president.

Du Bois, Penn.—The Diamond Drilling and Exploration Co. has been organized by local capitalists to take over the diamond drill contracting department of the Birdsboro Steel Foundry and Machine Co., of Birdsboro, Penn. C. C. Hover is president and general manager of the new corporation.

Scranton, Penn.—Staple & Bill, Inc., has awarded final contracts to Wheeler & Railey, Dorranceton, for the erection of the proposed coal breaker and plant at its property at West Nanticoke. The project is estimated to cost about $100,000. Frank B. Davenport Coal Exchange Building, Wilkes-Barre, is engineer for the company.

Cleveland, Ohio.—The Fate-Root-Heath Co., of Plymouth, Ohio, has been incorporated with a capital stock of $1,000,000 and has taken over the property and business of the J. D. Fate Co. and the Root-Heath Mannufacturing Co.; the plants of the two companies adjoin. It is stated that fully $150,000 will be expended in new construction and equipment, all contracts having been placed and equipment purchased.

Huntington, W. Va. — The Harianla Coal Co. has been formed with a capital of $300,000, for the purpose of developing a tract of coal at Colcord, W. Va. Huntington business men compose the company for the most part, it having been organized by the following men: George H. Weise, Julius Friedman, Emanuel Biern, C. Egri, and C. H. Egri. By the end of the year it is believed the railroad will be completed and the mine ready for operation.

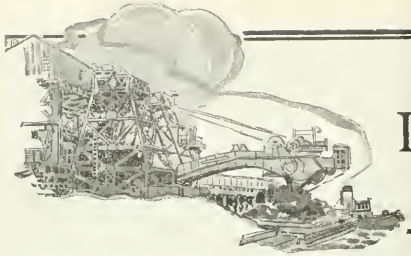
Beckley, W. Va.—Among the improvements being made by the Winding Gulf Colliery Co at Winding Gulf, W. Va., are the installation of a water tube boiler and a 250-K.W. unit at its power house. The company is also putting up about 25 new miners' houses and is building an addition to its store and office building. Furthermore, a 20,000-gal. mechanical gravity system to purify the water in use at the plant being installed. The company is under the management of George Wolfe.

Providence, Penn.—The Hudson Coal Co., is working on plans for a new breaker on the present site of Marvine No. 2 breaker, now used as a washery, where all coal mined by the company in the Green Ridge and Providence sections would be prepared for market. The new breaker, will cost about $500,000 and will be built of steel. The plan will care for all the coal mined at Von Storch, Dickson and Marvine collieries; some of the breakers, at these plants have been in operation for the past fifty years.

Webster Station, W. Va.—The Holly Coal and Timber Co. has been organized by Cleveland business men, with a capital stock of $1,500,000. The new company plans to establish operations on Laurel Creek in Braxton County, near Palmer. The company proposes to develop its resources along the Coal and Coke R.R. and the Baltimore & Ohio R.R. Cleveland capitalists who are back of the new company include Peter Mueller, William Muth, Dr. Carper, R. Schmitz, Charles Ihrig and Alphonso Schmitz. Address Braxton Central.

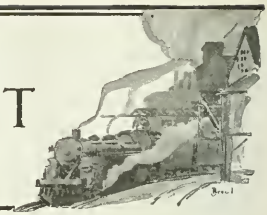
Wilmerding, Penn.—The Westinghouse Air Brake Home Building Co. has been organized, with a capital of $1,000,000, for the purpose of transacting all business relative to the real estate and dwellings which have been transferred to this company by the Westinghouse Air Brake Co. It includes the ownership of over 400 houses and considerable vacant property in Wilmerding and vicinity. The officials of the new organization are: A. L. Humphrey, chairman of board of directors; C. A. Rowan, president; S. R. Gittens, manager; H. C. Tewer, secretary. Since the Westinghouse company built its first houses for employees in 1890 there has never been an increase in rents and it is said that the new company will carry out the same policy.

Philadelphia, Penn. — According to the Anthracite Bureau of Information production of the three domestic sizes of anthracite, nut, stove and egg, has been maintained so satisfactorily during the four months beginning with April that the markets have received more than 15 per cent. in excess of the total for the corresponding period in 1916, which was the last normal year in the American coal business, and which was taken by the United States Fuel Administration as the basic year upon which all anthracite allotments were determined. For the four months ended July 31, the total shipments of the three sizes mentioned have been in excess of 13,440,000 tons, while in the corresponding period of 1916 the total shipments were but slightly over 11,600,000 tons, leaving a difference of nearly 2,000,000 tons in favor of this coal year to date. Under a continuance of existing conditions there is no reason to believe that the anthracite industry will not maintain a good production record during the late summer and fall.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Prices on Bituminous Generally Firmer and in Some Cases Higher—Railroad Embargoes Shift the Flow of Coal—Labor Unrest Everywhere—Car Shortage Hampering Production in Many Fields.

FROM several points come reports of increasing prices on bituminous coal and everywhere the market on this commodity appears firm. Those consumers who have not yet laid in their winter's supply, those who have held off in the hope of a decline, have apparently been deceived in their expectations. So far as may now be discerned, the market shows no sign of a retrograde movement.

During the past week embargoes were in force upon many of the railroads, particularly the carriers of New England, as well as some roads traversing southern Illinois and Indiana. These had the effect of stopping the movement of coal in the territory affected and diverting its flow to new channels. Thus the coal from Pennsylvania normally moving to New England all-rail flowed to such points as Philadelphia, Baltimore and New York. Instead of producing a glut in these places, this extra supply was absorbed without serious difficulty. No great inconvenience was reported in New England territory as arising from this diversion.

Labor unrest is everywhere; the coal industry is neither immune from nor has it a monopoly upon this movement. All great wars leave in their wake a period of instability and industrial confusion. In the present instance this condition has developed much more quickly than has usually been the case in the past. After the Civil War it was well into the '70's before labor troubles became acute. This country is perhaps at least as free from difficulties of this kind as are other nations. Scarcity and high prices of fuel in European ports — the direct result of strikes in England — have caused many ocean liners to bunker on this side for the round trip. This practice did much during the past week to alleviate the possible congestion that might have existed at various Middle Atlantic ports as a result of the shunting of coal to them from New England destinations.

Car shortage is becoming more acute. Practically all fields are experiencing this difficulty to a greater or less extent, and more production probably is now being lost from this cause than at any other time during the present calendar year. This condition is particularly acute in southern Illinois, although Ohio, Kentucky, West Virginia and Pennsylvania fields are by no means immune.

During the recent past one market influence has largely tended to offset or nullify the effects of another. The strikes of workmen along the Great Lakes and in New England released coal to be absorbed somewhere else. The small supply to certain inland manufacturing districts such as Michigan was counterbalanced by small demand because of labor difficulty in the factories. If market factors all tended in one direction the net result might quite conceivably be decidedly different.

WEEKLY COAL PRODUCTION

The production of bituminous coal decreased from 9,947,000 net tons in the week of Aug. 2, to 9,407,000 tons the week of Aug. 9. Transportation difficulties arising from the various railroad employees' strikes of that week are the cause to which the decline is attributed. The market is generally improving, but the demand is yet mainly for the better grades of coal, the mines producing the lower grades still reporting time lost because of no demand. The average daily rate of production in the week of Aug. 9 was 1,568,000 tons, compared with more than 2,000,000 tons a year ago when the market was strong enough to absorb any coal produced.

The production of anthracite after a slight slump in the last half of July increased to 1,870,000 net tons in the week of Aug. 9, a figure exceeded this year only in the weeks of Jan. 25 and July 12, a figure, however, 9 per cent below the output in the corresponding week of last year.

The records of the four weks ended Aug. 2 show an average of about 4 days' operation per week, compared with 5 days a week in the corresponding period, last summer. Lack of market is responsible for one of the two days a week being lost, this year, and other causes, principally car shortage, for the other day. A year ago losses on account of car shortage averaged less than half a day a week, over the country.

In a number of eastern fields, notably the Pittsburgh district, Westmoreland, and neighboring fields, Somerset, the southern West Virginia fields, both high and low volatile, and the Hazard and Harlan fields in eastern Kentucky and Virginia, lack of market has ceased to be a factor limiting production. Labor trouble in Kansas and Missouri was responsible for about 20 per cent. loss of operating time, the last half of July.

The production of beehive coke continues to increase, the estimates for the week of Aug. 9 placing the output at 383,000 tons, compared with 379,000 tons the preceding week. The gain was almost entirely in Pennsylvania, the other states, except Colorado and New Mexico, recording decreases.

Lake cargo loading in the week of Aug. 2 was 660,000 tons, a considerable decrease below the loading in the previous week (893,000), and the lowest this year since the first week in May at the beginning of the season. The total Lake shipments to date are now less than 1,300,000 tons ahead of last year, and the lead gained early in the season is diminishing for the weekly loadings are now decreasing whereas last year at this time they had just begun to increase.

Atlantic Seaboard

BOSTON

Embargoes lifted. No reaction as yet. Another week expected to give better line on market. Gas coals higher in price. Active demand at New York and Baltimore piers. Hampton Roads coals firm. Light stocks in hands of distributors at this end. Reading tugs still tied up. Public does not realize small tonnages now in hands of retailers.

Bituminous—The Boston & Maine embargo against commercial coal was lifted Aug. 15, after just a week's operation. The Boston & Albany followed promptly, and it is understood the New Haven will also raise the ban shortly. New England will then be open once more to the movement of coal all-rail. The restriction did not last long enough to have any effect on spot prices, so far as can be judged at this writing. Stocks are ample, certainly for the present, and no cases of distress were heard during the week. The four weeks previous showed a heavier movement all-rail than for several months previously, and more than likely the week just passed would have shown receipts of equal volume except for the embargoes. The coal that headed elsewhere will now doubtless be replaced to a large extent, although some contractors will be likely to consider the period of embargo as practically a cancellation of what weekly deliveries would otherwise have been made. By and large, less harm was done than the trade feared, and now all hands are looking forward to a good fall market.

One result of the embargo is the almost total lack of offerings for spot shipment. Apparently most of the shippers felt that the tie-up was of uncertain duration and that meanwhile other territory would absorb all the free coal being mined from day to day. This turned out to be the case, for except in scattered instances consignments were easily furnished for all the New England coal that had to be diverted at the various scales and prices showed no softening in any direction. Without doubt the market will open this week on the same basis that obtained when the embargo was declared, and prices quoted a week ago will be operative now.

It is difficult to determine now whether or not there will be a further hardening of prices during the next fortnight. It will take at least the present week to get a line on car-supply and longer still to measure the full result of the railway shopmen's

walk-out in various sections. The fact that no wage settlement has yet been made, and that further turmoil is possible should induce steam-users here to attempt even more buying than during the past month. There are few now who have not at least 60 days' supply, although it is doubtful if those consumers who are depending upon Hampton Roads coals have really much in excess of that. There is a feeling in the trade that a considerable number of buyers are relying implicitly on contracts and that any one of a number of possible happenings will deprive them to quite an extent of the supply expected. Should heavy export demand continue as it now promises there is bound to be a more or less irregular movement of the smokeless coals to tide-water and consequent delay in loading bottoms. The recent wage advances granted in the Pocahontas and New River districts and now being added to contracts will also have some bearing on the volume of these coals to be shipped on New England contracts.

High volatiles, especially adapted for producing gas, are especially firm in price. So large a proportion of this tonnage is sold on contract that the few shippers who reserve coal for the spot market are now beginning to reap a harvest. Certain grades from Westmoreland County are now commanding a full dollar a ton more than the price at which contracts were offered early in the season. Delays at Norfolk and Newport News are causing some of the gas companies to look for acceptable coals outside their contracts and a continued spot demand is counted on.

Renewed buying for the bunker trade has developed at Baltimore and New York the past week, and as a result the eligible grades are being quoted at prices a shade firmer. Inquiries from coastwise buyers, partly because of the rail embargo, have been more active, and while the tonnages involved are small there is some difficulty in arranging for prompt shipments. At Baltimore even Peel 11 coal is being sold at around $5.20 per gross ton f.o.b. vessel, and this is notably firmer than a few weeks ago.

At Hampton Roads the price situation is firm. All the agencies are following closely developments in the export market and every cargo they can spare from coastwise contracts is being applied in that direction. Dispatch varies from week to week with the movement of coal, but practically all the time there is an accumulation of boats waiting at the piers. Railroad difficulties around Chicago have had a tendency to increase somewhat the supply of coal for the piers, and it is possible that some spot fuel may again be offered in this market. Up to this time there have been no quotations here that were at all comparable with the prices prevailing offshore, and should there be any offering now it would be instructive to see what price could be had.

Distributors here who re-handle the smokeless coals for shipment inland have only light stocks on hand. In no case are they forwarding coal to consumers in advance of their obligations, so far as has been heard, and the few scattering inquiries that developed during the embargo disclosed how little coal had been taken on during May, June and July. Record figures show that this trade has materially diminished this season as compared with 1918. A year ago a large number of steamers had been furnished to help supply New England, but this year the great bulk of tonnage for this territory has been arranged for all-rail shipment. In some cases factors here are re-handling 65 to 70 per cent less coal for inland points than was the case a year ago. To that extent have been changed the usual channels of supply through the largely increased cost of sending coal by water.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambria and Somersets
F. o. b. mines, net tons	$2 60@3.10	$3.00@3.60
F. o. b. Philadelphia, gross tons	4.79@5.35	5.20@5.80
F. o. b. New York, gross tons	5.10@5 70	5.50@6.20
Alongside Boston (water coal), gross tons	6.85@7 35	7 10@7 85

Georges Creek is quoted at $3.70 per net ton, f. o. b. mines.

Pocahontas and New River are quoted at $6.25 @6 60 per gross ton f. o. b. Norfolk and Newport News, Va., in response to export demand. There continue practically no sales for coastwise shipment.

Anthracite—The situation on hard coal continues without material change. It was rumored during the week [illegible] wage difficulty with the crews of [illegible] tugs was in process of adjustme[illegible] at this writing there has been no s[illegible] from Port Richmond (Philadelphia) since [illegible] 5. At last reports there were tied up [illegible] the loading piers 8 tugs and 44 barges, nearly all the latter being loaded. This will prove a serious setback to the large number of retail dealers all along the New England coast who rely almost entirely for their supply on the movement of this fleet. All rail receipts will be light for ten days or so because of the recent embargo, and within a short time people returning from their holidays will begin clamoring for coal.

It is perhaps as well that the public does not realize how small are the stocks now in the hands of the dealers. There have been so many interruptions to movement and production is so small that the trade is beginning to wonder what will be the outcome.

Steam sizes are now practically without market in this territory. Low prices are quoted f.o.b. mines on barley especially, but freights are so high to every point that there is no inducement to buy.

NEW YORK

Demand for stove and egg is strong. Consumers of small steam sizes are buying mostly for immediate consumption. Rail embargoes to New England tended to cause accumulation at New York piers, but bunkering demand tended to relieve this. Business in general active.

Anthracite—The demand for stove and egg sizes shows no let up. So heavy is this demand that the principal producers are now recrushing broken coal so that they may be able to in part at least, satiate the call for these two much favored sizes. As a consequence of this treatment of broken at the mines, supplies of this size at tidewater are so low certain shippers are finding it difficult to secure sufficient quantities to apply on their contracts.

The retail trade throughout Greater New York is about as active as one could expect during a summer month. Retail dealers are not able to create any surplus except on chestnut and pea.

Considerable is heard in the trade about premium prices being paid on stove and egg. In some sections $5 cents per ton is freely paid for straight shipments of stove. In other sections, premiums reaching as high as $1.50 are offered.

The strike of the railroad shopmen in New England brought about embargoes on shipments of coal to practically all of this territory. This gave dealers in these states much worry, and up until the moment the strikers were ordered back to work, many of the tidewater dealers in position to receive coal at tidewater ports for interior distribution, were concerned in trying to make arrangements for water transportation in case the railroad embargoes were further extended. These embargoes were in full effect up to the first of this week.

The situation in the steam coals is not materially changed. Buckwheat is active with some shippers, while others find it sluggish. So far, consumers are not concerned about storing rice or barley, and purchases of these coals are for the most part for immediate consumption. The two latter sizes are in large accumulation, except coals of the higher grades.

Quotations for company white ash coals, per gross ton at the mines and f.o.b. New York tidewater lower ports, during August, follow:

	Mine	Tidewater
Broken	$5 95	$7 80
Egg	6 25	8.10
Stove	6 50	8 35
Chestnut	6 60	8.45
Pea	5 20	6.95
Buckwheat	3 40	5 15
Rice	2 75	4 50
Barley	2 25	4.00

Bituminous—Notwithstanding the embargoes against shipment of coal by rail into New England for account of the railway shopmen's strike, which embargo has been in effect for more than ten days, the distribution of mine output has not been disturbed to the extent that prices have suffered.

Naturally, with New England territory shut off from rail deliveries, one could expect an accumulation at the tidewater ports, and that coal would be so free at the New York piers, especially, that sellers would be making concessions in order to move it and escape demurrage. Such, however, has not been the case, the high-grade coals being taken freely at former prices. The only weakness has been on coals of inferior grade.

The New England railroad strike has greatly accelerated the movement of waterborne coal into that territory. Transportation lines running from New York piers to Sound points have found their business greatly increased.

There has been also an increased call for Pennsylvania coals for export, and as a result some of the high-grade low volatile varieties have advanced in prices from 15 to 25 cents. Bunker inquiry has been much stronger. Strikes at English ports, the scarcity of coal over there, and its high price, has caused some shipowners to bunker at American ports for the round trip.

Coal operators take sharp issue with Railroad Director General Hine's statement issued on Saturday, denying that there is a shortage of coal cars. Some of them say that while the statement on its face may be true—that there may be ample coal cars—yet it is an evident truth that these cars are not being placed at the mines so that a full day's output can be attained for six days a week.

High-grade coals are short of actual requirements despite the New England embargoes, and with the re-opening of this territory coal men expect the full output of the cheaper grades to be well taken.

Prices quoted for the various tidewater pools show an increase, the quotations ranging about as follows:

Pools 1 and 71	$5 70 @ $5.85
Pool 9	5.60 @ 5.75
Pool 10	5.50 @ 5.60
Pool 11	5.15 @ 5.35
Pool 18	4 75 @ 4.85

There were not many changes in the current quotations for the various grades of coal at the mines. They range as follows:

	Spot
South Fork (best)	$3.25 @$3.50
Cambria (best)	3.00 @ 3 25
Cambria (ordinary)	2.65 @ 2.90
Clearfield (best)	3.00 @ 3.25
Clearfield (ordinary)	2 70 @ 3 00
Reynoldsville	2 70 @ 2.90
Quemahoning	3 10 @ 3.25
Somerset (best)	3 00 @ 3 25
Somerset (poor)	2.65 @ 2.75
Western Maryland	2.50 @ 2.75
Fairmont	2.10 @ 2.35
Latrobe	2.60 @ 2.65
Greensburg	2.50 @ 2.60
Westmoreland, ¾ in.	2.75 @ 2.90
Westmoreland run-of-mine	2 50 @ 2.60

PHILADELPHIA

Anthracite production keeps up. Better receipts locally. Rail strike helps local retailers temporarily. Possibility of price-fixing board. Egg badly wanted. Stove still scarce, but chestnut plentiful. Pea moving better. Slow movement at tide. Buckwheat only active steam size. Bituminous in more plentiful supply. Rail strike makes better coals freer. Prices hold firm.

Anthracite—With the production in mid-August well up to normal there is a general feeling that the fuel situation will be successfully met. There are many things that might happen to prevent this, such as car and labor shortages, but even at that a good tonnage is now in the cellars of consumers. The local retailers are still calling for coal, but it is mostly for egg and stove. A fair supply of all sizes came into the market this week and in more than one instance a dealer asked to have his orders on chestnut and pea coal held.

The labor troubles affecting New England have not reached the railroads in this territory as yet, and with embargoes issued by all the roads entering the above territory a considerable tonnage came in this direction. Even at that it was not heavy, and the report is that the companies took advantage of the situation to increase shipments to the West, both all-rail and via the Lake ports.

The difficulty in the local situation is that the rail strike might become so serious as to seriously interrupt mining, for it would only take a single week with production at the present rate to swamp the local market if no other outlet was to be had. It is believed that the individual shippers are particularly anxious under present conditions as to whether they can maintain their present margin of prices above the company circular. It will be remembered that this differential runs all the way from 45c. to $1.60 a ton and should coal suddenly become plentiful it

only stands to reason that the retailer will hold up the fuel that costs him the most.

The retailers are actually hoping that rail trouble will be adjusted promptly so as to remove the necessity of their holding orders. They realize that they will need all the coal they can get this winter at any price and do not want to be placed in the position where they might cut off some of their sources of supply.

All dealers continue to be fairly busy. Without exception they have much undelivered tonnage on their books, principally of egg and stove sizes. Egg has by no means become free and they are becoming just a trifle impatient now that summer is fast slipping away. It would take only a little tonnage to fill the local demand, even though it is larger than normal, and if the big companies should start shipping it would only take two weeks at the most before all orders for egg would be filled. Stove is another question, as the demand for this size is going to be strong until next spring. Not only do the dealers have a plenitude of orders on their books for this size, but 75 per cent of all the new business they receive is for stove. Chestnut orders are well taken care of, and it is the usual thing now to see accumulations of this size in the yards. Pea is picking up slightly and the dealers seem to be sending out a little more each week lately, although this has little effect on their storage stocks, as these are constantly being added to.

There has been some slight difficulty in moving coal at the tide piers on account of labor. A larger tonnage than usual was shipped to the piers on account of the checking of rail movement by embargoes. Vessels were far from able to load the coal promptly and much of it has accumulated in the storage piles.

In the steam trade buckwheat is the only active size and seems to be displaying greater activity, although not to the point of absorbing the entire production. While there is a fair demand for rice, as a number of large plants using it are speeding up stocking, yet it is still necessary to place a heavy tonnage of this size, as well as barley, in the storage yards. There has been no change in prices.

Bituminous. For the past week there has been a rather good supply of soft coal in this market. This was the natural effect of the freight embargo on all roads entering New England. Such good coals as were offered were quickly taken, as there is a steady call for these grades. However, this did not appear to affect the movement of other coals, as there seems to be a general tendency now to get fuel, especially by the plants that are in position to store heavily.

The small buyer, too, seems at last to be awake, the upward movement of prices during the past several weeks probably having impressed him at last with the notion that there can be no falling in the prices until next spring. Some moderate buyers who have hung off awaiting a more favorable price market are seeking contract protection, but are finding scant opportunity to get contracts and are compelled to buy at the market.

There has been an improvement in labor conditions at tide, but the one great drawback continues to be the lack of bottoms and in many instances owners of vessels chafe at fixed rates of freight under which they are still compelled to operate. There is a heavy demand for fuel from Italy, with all sorts of pressure being brought to bear to secure tonnage, but with the continuing scarcity of ships it is not seen how the situation is to be met.

Owing to the more plentiful supply of coal coming into the local markets prices held fairly firm during the week, although a few slight increases were recorded. Prices per net ton at mines rule about as follows:

Georges Creek Big Vein	$3 25@3.40
South Fork Miller Vein	3.25@3.40
Clearfield (ordinary)	3.00@3.10
Somerset (ordinary)	2.90@3.05
Fairmont lump	2.90@3.00
Fairmont mine-run	2.70@2.80
Fairmont slack	2.20@2.35
Fairmont lump (ordinary)	2.55@2.65
Fairmont mine-run (ordinary)	2.35@2.45
Fairmont slack (ordinary)	2.25@2.35

BALTIMORE

Export market the liveliest in years. Gas coals strengthen. Local call for steam fuels steady, with prices still tightening. Hard coal men now cleaning up last of summer orders.

Bituminous—There can be no doubt but that the export movement is the feature of the present fuel situation here, as the market is the most lively in years. Under the call gas coals have stiffened greatly, and three-quarter is now generally commanding around $3 mine basis to the trade. Practically no coal is to be picked up at tide, the only way to assure cargoes being to ship into the pools. Despite a long-shoremen's strike which prevented vessel movement for two days and caused a brief embargo by the Baltimore & Ohio against Curtis Bay, the first ten days of August saw a loading here on coal ships of more than 70,000 tons.

There is now every promise that August will exceed the month of July in export coal handled here—a total of 258,496 tons having been dumped into coal-bearing ships during last month. The local call for steam coals continues strong, although it lacks the excitement of some two weeks ago when consumers began to rush orders for coals for storage, fearing a general railroad strike would catch them short of reserves. There is still a steady demand and all supplies are readily assimilated. Little of the best grade of coal is offering and the few sales of pool 71 are close to the $4 line.

Pools 9 and 10 are recording some sales at from $3.50 to $3.75 to the trade, while pools 11 and 18 are good generally at from $3 to $3.25, thus setting for the most part a $3 or better market. Because the tonnage coming through is readily taken up the purchasing is on a less discriminatory scale than is normally the case. The movement from the mines keeps improving and while there is some talk of car shortage it is not general. Maryland reports the movement of loaded cars as being from one-quarter to one-third improved over what it was two weeks ago.

Anthracite—Supplies of hard coal are easing up, and the principal shortage exists now only in stove and chestnut sizes. The trade is now working on the last of the summer orders and will probably clean these up early in September, as the run here from the mines is steadily improving. The proportion of company coal coming in is also growing, as was promised for August, and this is quite pleasing to retailers in the face of a 75c premium generally on independent coals, with a broker's commission added in some cases.

The advance of 25c a ton on Aug. 1 may be the last for a time, unless there is a freight-rate increase, as there is some talk of not making another jump on Sept. 1. The trade plans to be guided in this by the margin of profit as placed by the National Fuel Administration for Baltimore during the war. It is now traveling on a $2.50 a ton margin of profit basis as a whole. In view of this conservative stand the trade is not unduly excited by talk of including an inquiry into the cost of domestic coal in Baltimore in the scope of a state high-cost-of-living investigation now in progress.

BIRMINGHAM

Strike of railroad shopmen seriously cripples production and movement of coal. Many mines idle entire week on account of the embargo by railroads. Demand somewhat improved and orders in hand ample to take care of output under present operating conditions.

During the past week coal production was seriously curtailed by the failure of the railroads to furnish equipment for loading. Practically all the mines in the Walker County field served by the Frisco Lines were idle the entire week, while the Southern, Louisville & Nashville and other coal carriers could only furnish a 50 to 60 per cent car supply. However, embargoes and other limitations in connection with the strike of the railroad shopmen have now been taken off, but there is still a pronounced car shortage. While sales of steam fuel have not come up to expectations the past week, there is a fair volume of orders and contracts being taken right along, and it is stated that more business is now in hand at the mines than can be taken care of under present operating difficulties. Prices on mine-run coal range from $2.45 to $2.90, prepared sizes $2.75 to $3.86 per net ton mines.

Domestic lump and egg are scarce and in good demand. Cahaba and Black Creek are quoted at $4.15, Acmar big seam $3.30, Carbon Hill $3.45, these being schedule prices. Sales of small spot lots are made at from $4 to $5 per net ton mines, but there is little free coal to be found in the domestic sizes.

Lake Markets

PITTSBURGH

Reports of fancy prices on small lots. General market slightly higher. More labor unrest, as in other industries. Car shortages pronounced, and restricting output.

Some coal operators are circulating reports of high prices received, attempting to give the market the appearance of greater strength than it possesses, as sales at fancy prices are exceptional and involve only small lots. Conservative operators decry this policy for it not only misrepresents the situation, but is likely to react unfavorably upon the coal industry, which has already been charged in uninformed quarters with profiteering.

Car shortages have been pronounced the past week, and at nearly all mines have taken the place of lack of orders as the immediate cause of restricted output. There has been a heavier volume of buying and contract requirements are somewhat heavy, so that all or nearly all the operators desire to increase their production, but on account of car shortage there is scarcely any increase in actual shipments.

Labor is showing somewhat more restlessness, but this is now coming to be recognized as a feature of labor in all industries and the coal industry is beginning to realize that it has no monopoly of the condition.

Coal and Coke Securities

NEW YORK STOCK EXCHANGE CLOSING QUOTATIONS, AUG. 18, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co., of Allegheny	(ACL)	45	....
Burns Brothers, Com	(BB)	135	140
Buros Brothers, Pfd	(BB)	99½	118½
Central Coal & Coke, Com	(CK)	55	....
Central Coal & Coke, pfd	(CK	63	....
Colorado Fuel & Iron, Com	(CF)	40½	41½
Colorado Fuel & Iron, Pfd	(CF)	..	125
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com.	(EH)	36	36½
Elk Horn Coal, Pfd	(EH)	42	47
Island Creek Coal, Com	(ICR)	39	....
Island Creek Coal, Pfd	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd.	(JF)	63	....
New Central Coal of West Va	(NCC)	5	....
Pittsburgh Coal, Com	(PC)	63	64
Pittsburgh Coal, Pfd	(PC)	93	96½
Pond Creek Coal	(PD)	17½	17¾
Virginia Iron, Coal & Coke	(VK)	60	64

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	96½	....
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	75½	....
Colorado Fuel & Iron, Gen. 5s, 1943	90½	92
Colorado Indus, 1st Mtg. & Col. Tr. 5s, 1934	79	79½
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	85½	88
Jefferson & Clearfield Coal & Iron, Sec. Mort, 5s, 1926	96	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99½	100
Lehigh Valley Coal, Gtd. Int. Red. to 4%, 1913	74	....
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	..	83½
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	..	87
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	93	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	..	80½
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	89½	....
Utah Fuel, 1st Sinking Fund 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	84	85½

Coal production is now at between 80 and 90 per cent of full output based on full time work of men on payrolls, and at 60 to 70 per cent based on full ratings of mines. Nearly all the operators would be producing more coal if they had full supplies of cars and labor.

The market generally is quotable about 10c higher on slack and 5c higher on steam mine-run, though occasionally small lots go at higher prices than here quoted. The following approximate prices obtain: Steam slack, $1.90@2.10; gas slack, $2.10@2.35; steam mine-run, $2.35 @2.50; gas mine-run, $2.50@2.75; ¾-in. gas, $2.80@3 per net ton at mine, Pittsburgh district.

BUFFALO

Car shortage increasing. Bituminous slowly firming up. No boom looked for now. Canada buying better. Anthracite more plentiful locally. Lake trade active.

Bituminous—The trade grows slowly stronger. Nobody reports anything like a boom and in fact all idea of a rushing market immediately has now been dropped. If there is eagernes developed on the part of the consumer to buy it will not happen before cool weather sets in and there is no indication of it now. At the rate of improvement now making the early winter demand ought to be fully normal and if the war and its violent consequences are out of the way business will settle down and progress will be satisfactory.

Some special activity is shown by Youghiogheny gas coal, but it is not thought best to make a quotation of it apart from regular Pittsburgh. Shippers are not eager to push up prices at present, lest the Government take a hand in the business again. Quotations remain at $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for Pittsburgh three-quarter, $4.20 for mine run and $3.80 for slack, with smokeless at $4.60 and Pennsylvania smithing at $5.70.

Anthracite—The trade is active, with demand in excess of supply and likely to remain so till winter is over. The surplus will be small, if any, and it may turn out that there will not be enough to carry consumers through. Shippers do not all think there is a shortage that cannot be met, but the figures are not reassuring. With proper handling the supply ought to be sufficient.

Of late the city trade has received coal quite liberally, but it goes out as fast as it comes in. Much more has already been delivered to residences than is common at this time of the year, but unfortunately the amount in storage cannot be computed, as it is not known how much was carried over. A mild winter will make the problem easy.

Lake shipments are liberal, being for the week 122,200 net tons, of which 42,400 tons cleared for Chicago, 34,600 tons for Duluth-Superior, 14,300 tons for Sheboygan, 9,000 tons for Milwaukee, 7,200 tons for Green Bay, 6,000 tons for Menominee, 3,200 tons for Fort William, 3,000 tons for Racine and 2,500 tons for Calcite.

Freight rates are 60 cents to Chicago, 57½ cents to Racine, 47½ cents to Milwaukee and 42½ cents to Duluth, Fort William, Sheboygan and Green Bay.

The August prices of anthracite are as follows:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8.55	$10.20
Egg	8.75	10.60
Stove	8.95	10.80
Chestnut	9.00	10.90
Pea	7.40	9.25
Buckwheat	5.70	7.75

TORONTO

Stove coal practically off the market. Shipment of anthracite slow and price advanced. No serious shortage feared. Demand for bituminous still below normal.

Stove coal is practically off the market, such limited supplies as are received being used by the dealers to fill long delayed orders. Some firms are refusing to accept any more orders for anthracite until they can overtake deliveries, and others are taking orders only for egg and nut subject to price when delivered

Shipments from the mine are arriving slowly in about equal volume to the orders coming in, and prices have advanced $1 per ton. Dealers are generally of the opinion that there will be no serious shortage during the winter as many consumers have already laid in supplies. The yards are well stocked with bituminous, the demand for which though gradually increasing remains considerably below normal.

Retail:

Anthracite, egg, stove, nut and grate	$12 50
Pea	11 00
Bituminous steam	8 00
Slack	7 00
Domestic lump	10 00
Cannel	11.50
Wholesale f.o.b. cars at destination:	
Three-quarter lump	6.25
Slack	5.15

CLEVELAND

Coal is decidedly tighter in northern Ohio. Because of a strike, Lake shipments have decreased one-third. Labor troubles are keeping some large steam-coal users idle, but dwindling car supplies at the mines have more than offset decreased demand from these sources. Prices on practically every grade have advanced during the week.

Bituminous—This market this week presents the unusual aspect of being firmer while production and demand are off. Restive labor and shrinking car supplies have cut the output of southern and eastern Ohio mines probably 15 per cent, bringing their average now not much over 50 per cent. At the same time the strike of upper Lake dockmen has cut 50 per cent into vessel fuel and 30 per cent into cargo coal demands. Strikes, keeping idle several of the largest steam-coal users in the Cleveland district, have temporarily shut off these avenues of need.

The result of this muddled situation is that steam coal appears scarcer than at any time this season. Operators could sell 40 per cent more were the tonnage at their disposal. Desire to stock is more in evidence now than at any time in the past year. Surplus stocks of slack at the mines are coming into this district as fast as the carriers and their limited supply of cars can bring them. Despite agitation over high costs and threats of federal investigations, the Cleveland coal market presents a solid front of strength. Ten to 20c a ton has been tacked onto all coal prices by dealers, and further advances are looked for in another week or ten days.

Anthracite and Pocahontas—Retail dealers are getting not more than 15 per cent of their desired supplies of these grades and in most cases 10 per cent is nearer the maximum. In the meanwhile, demand shows no letup, and receipts are in yards scarcely over night, as a rule. On these grades, too, dealers have chalked up quotations, and some plan further increases as they have not passed on to the consumer all of the stated monthly increases.

Lake Trade—Upper Lake dockmen are returning to work at some of the coal docks at the head of the Great Lakes, but shipments still are far behind and are probably not much over 700,000 tons a week, compared with 850,000 tons before the strike and 1,000,000 to 1,100,000 tons a week in a normal year. Much coal still is on the docks at the head of the Lakes and the strike is proving of less harm to the trade than might generally be thought. With most of the Great Lake freighters temporarily tied up, fuel-coal demands have been cut virtually in half. Were all conditions on the Lakes and at upper Lake ports normal, car supply at Lake Erie ports is such that shipments would be drastically curtailed.

Prices of coal per net ton delivered in Cleveland are as follows:

Anthracite:	
Egg	*11 35@ $11.80
Chestnut	11 65@ 11 90
Grate	11 45@ 11 75
Stove	11 55@ 11 80
Pocahontas:	
Forked	9 50
Lump	8 75@ 9 00
Mine-run	7 50
Domestic Bituminous:	
West Virginia splint	8 00@ 8 25
No. 8 Pittsburgh	6 60@ 6.90
Massillon lump	7 60@ 7.95
Steam coal:	
No. 6 slack	4 50@ 4 70
No. 8 slack	5 00@ 5 30
Youghiogheny slack	5 20@ 5 50
No. 8, ¾-in	5 65@ 5 95
No. 6 mine-run	4 70@ 4 95
No. 8 mine-run	5 10@ 5 30

DETROIT

Curtailment of Detroit's coal supply due to the railroad labor troubles shows a mildly stimulative effect on buyers of bituminous.

Bituminous—Complacence of the buyers of steam coal who have been withholding their orders has been somewhat shaken, jobbers say, by the walkout of railroad employees and the subsequent developments in their relation to transportation of coal. The embargo placed on coal shipments by the Chesapeake & Ohio R.R. evidently gave material for thought to some of the backward consumers, as jobbers report a slight increase in inquiries from that division of the market.

Detroit jobbers say that nearly 95 per cent of the bituminous coal supply of the city comes from West Virginia and Kentucky and that nearly half of the shipments are handled over the Chesapeake & Ohio. That road's embargo consequently occasioned considerable anxiety because of its direct effect in cutting off coal supply and because of the disorganization likely to follow the interruption of transportation operations.

The volume of busines coming to jobbers from buyers of steam coal is still pronounced smaller than it should be, and some of the industrial plants are yet delaying the placing of orders. Jobbers say there is little coal on tracks and that shipments are largely restricted to fuel sent directly to consumers. West Virginia 4-in. lump is quoted at $3.25 to $3.50, with 2-in. at $3, mine run at $2.25 to $2.50, and slack at $1.85 to $1.90. For Hocking domestic lump the quotation is $2.75 and for Pittsburgh No. 8 three-quarter lump $2.50. Mine run from Ohio districts averages about $2, and slack from $1.50 to $1.85. It is difficult to obtain smokeless and for mine run $2.75 to $3 is asked.

Anthracite—Detroit is not receiving much anthracite, jobbers assert. The retail dealers are complaining that their orders are not being filled promptly and that troublesome delays are experienced in the delivery of shipments from the mines. While most of the retailers have some anthracite in stock, the supply would be quickly cleaned out with an active buying movement. Some of the retailers are said to be refusing to accept orders for anthracite, owing to the uncertainty of obtaining stock to fill them.

Lake Trade—Shipments over the Lake routes have been greatly curtained in the last few weeks, and the greater proportion of Lake freighters are now idle, pending settlement of labor troubles at the head of the Lakes.

CINCINNATI

Strike of railroad shopmen demoralized local trade. Many mines shut down. No prospect of immediate improvement.

The strike of railroad shopmen, while it lasted only a week, practically demoralized the local coal situation. The mines in the Kentucky and West Virginia fields where not enough cars could be had to keep the miners busy had to shut down. A few of the mines where cars were available opened this week, but the majority will not resume operations until next week. Three hundred mines were closed down in the Kanawha, New River and Logan districts.

Local dealers are advocating that the consumers get together and place large orders so that deliveries can be made more promptly. They point out that delivery of coal, ordered in this manner, will be more certain. Coal now selling here at $6 and $7 a ton will be much higher, the dealers say, if deliveries are not made until October.

Dealers point to the fact that there are large quantities of coal near this city but on account of labor conditions and inadequate transportation facilities, deliveries are doubtful.

The car shortage in the West Virginia and Kentucky fields so far this month has been very acute. Some operators report that they have had on an average sufficient cars to run 4½ days out of 15 days of the month. The prospects are not bright for an immediate remedy of the conditions.

LOUISVILLE

Car shortage becoming even more serious. Prices showing steady advancement because of short production and active demand. Southern market buying freely.

Because of lax methods of repairing cars with curtailed shop forces together with added stress as a result of the recent shopmen's strikes cars are in even worse re-

pair, and the shortage is more serious than formerly. Mines are operating two to three days a week in western and southeastern Kentucky. Mines in the pooling zone of eastern Kentucky are in slightly better shape.

Prices are showing steady advancement because of the low production and the fact that, with block coal, demand is greater than supply, while small production is resulting in only a minimum quantity of low-priced spot coal being on the market. Some few lots of low-priced mine-run were offered last week when strikes made it impossible to ship on certain orders. Block coal is strong, and buyers in the field are forcing up prices, operators placing high prices as production for the most part is sold and they cannot handle the business. The low prices on steam grades and the reduced production resulting from car shortage have made operating costs higher, and to meet these the price of block coal is being raised. Block coal has sold at as high as $5 at the mines during the past week, with the general market at $4.50 to $4.75 per ton.

Operators are somewhat disturbed over President Wilson's statement relative to profiteering, and discussion of re-establishment of coal-trade regulation. Producers, jobbers and retailers are generally opposed to further Federal control, but point out that profits today are not as good as they were at this time last year. The entire blame, however, is laid on the Railroad Administration in its failure to supply cars and keep cars in repair. With an adequate car supply it is held that prices would be much lower.

The jobber is not making any money as he is only handling mine-run, 4 in. steam and a little nut and slack. The operators are not offering any block coal through jobbers as buyers are in the field with ready cash looking for this grade.

Retailers in Louisville are thoroughly dissatisfied and disgusted. Block coal in eastern Kentucky is quoted at $4.50 a ton, and carries a freight rate and war tax of $1.60, making this coal cost $6.10 laid down in Louisville. Such coal is retailing at $7 a ton, leaving a margin of 90 cents for delivery, overhead expenses, profit, etc., whereas the margin should be $2, and the retail price $8.10 a ton. Within the past four months there has been an increase from $2.85 a ton to $4.50 or $4.75 a ton, resulting in an actual increase per ton of $1.75 to $2 on block coal. Competition with river coal from West Virginia, and with one retail concern owned by an operator, has been largely responsible for the low prices quoted at retail. This will eventually result in retailers being forced to make a big increase, which will result in a general howl from the public.

The principal demand for coal at this time is coming from the South where prices are strong, and where cotton manufacturing interests are laying in a three to four months supply, and where retailers are buying well. There is also some coal going to the Lakes and Northwest.

Prices at mines are as follows:

	Eastern Kentucky	Western Kentucky
Block	4.25@$4 75	$2.50
Mine-run	2 40@ 2 85	2 25@2.40
Nut and slack	2.10@ 2.85	1.75@2.10
Pea and slack		1.25@1.50

Coke

CONNELLSVILLE

Furnace coke slightly improved, foundry coke much stronger. Some contract negotiations for furnace coke. Contract prices withdrawn on foundry coke.

The market has improved a trifle as to prices for prompt, in furnace grade on account of absorption of part of the stocks, and in foundry grade on account of heavy demand coupled with shortage of labor for the special preparation required in making and shipping foundry coke.

There has been a moderate volume of buying of spot and prompt furnace coke, apparently by furnaces that were not receiving full shipments under contracts, though it is likely some furnaces have been adding to their stocks. There is always also an incentive to furnaces to pick up odd lots when they can be had at so much under contract prices.

The usual asking price for spot and prompt furnace coke continues to be $4, concessions being made when actual business develops, but the extreme concession now is about 10c, against 20c easily obtainable ten days ago. There are some negotiations for furnace coke for delivery over the remainder of the year, by idle furnaces that cannot yet set a definite date for their blowing in, and these negotiations lag as the furnaces want to buy at not far from the going market on spot coke while operators want a much higher price as they expect the spot market to be very high in the late months of the year.

Foundry coke has undergone a farther stiffening. There are some indifferent brands to be had at $5 for spot or prompt shipment, but it is harder to pick up such coke now at $5 than it was two or three months ago to get it at $4.50. The best known brands, which recently were going freely at $5.25 and $5.50, are now higher, several being set at $6 as minimum, and some sales have been put through at that level. Contract prices are no longer quoted for foundry coke. Operators find much difficulty in securing the extra labor necessary for producing and shipping foundry coke, and do not wish to increase their obligations. The market is quotable as follows: Spot furnace, $3.90@4; contract furnace, $4.25@4.50; spot and prompt foundry, $5@6 per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Aug. 9 at 222,170 tons, an increase of 13,070 tons. Production has thus increased about 125,000 tons weekly since the low point last May.

Buffalo—The trade is fairly good, though the operations of the furnaces are not what they were expected to be. Some of them are getting heavy amounts of iron ore on their docks, as it does not move, either to the fires or out by rail as had been planned. The receipts of ore by Lake are reduced considerably by the Lake Superior strikes, but only the vessels appear to care much about them. Coke prices are fairly strong at $7.60 for 72-hr. foundry, $7.25 for 48-hr. furnace, $7 for off grades, with $6.75 for domestic sizes and $5.75 for breeze.

Middle West

MILWAUKEE

All soft coal, including Pocahontas, advanced 25c per ton. Demand for domestic grades of coal growing stronger. Stove and nut anthracite scarce. Lake receipts slowing up.

The entire soft-coal price list, including the different grades of Pocahontas were marked up 25c. per ton on Aug. 15. Anthracite and coke were left undisturbed. This makes the third raise in Pocahontas since the opening of the coal year. Lump, egg and nut are now held at $10.75 and mine run at $8.50. All other grades of bituminous coal have been advanced twice since May, and are now 50 cents higher than the opening schedule promulgated on the first of the month. In addition, the carrying-in charge has been increased from 50c per ton to 75c.

The demand for coal for domestic use is growing stronger as the season advances and consumers realize that nothing can be gained by postponing their orders. Dealers find it difficult to supply the demand for stove and nut anthracite, as there are a scarcity of these grades.

The demand for soft coal from industrial points in the interior is not in sufficient volume to keep the docks in such shape that they can take care of the inward flow of coal by Lake. Cargo receipts have slowed up somewhat of late, but the sum total is still ahead of the record of last year. Cargoes number 285 thus far, and embrace 467,000 tons of anthracite and 1,792,850 tons of bituminous coal, a gain of 163,498 tons of the former and 108,484 tons of the latter over last year.

ST. LOUIS

Practically the entire Standard and Mt. Olive fields on strike, with nearby districts affected. Car supply limited to one and two days a week where mines are working. Railroads in other districts embargoing against commercial loading. Some Indiana coal moving in, but no general demand for steam fuel, and situation is well in hand. Business in a general way is slow to buy.

Something like 75 mines are idle in the Standard and Mt. Olive fields on account of the Belleville leaders rebelling against President Farrington and the officials of the United Mine Workers in Illinois. Various meetings have been held at different places and while the actual number of open rebels is in the minority, yet they manage to dominate the situation. The mines at Marissa and Coulterville, on the Illinois Central and all points on the Mobile & Ohio are not affected. These miners would not listen to the agitators from Belleville. As a matter of fact they were not given a hearing at several places. Toward the latter part of the week they were beginning to get some results at Sparta.

The trouble has spread to the Mt. Olive district and all the mines there are idle, as well as a few bordering on the edge of the Springfield district.

There was local trouble in the Franklin County field, but it was not on account of the Belleville affair. Perry County has not been affected by this strike either.

The few mines on the Illinois Central in the Standard field that are working are only getting about two or three days work a week on account of no cars. While many of the miners want to go to work the rebel element within their ranks prevents responding to the cause. As a matter of fact at many mines the fighting element stands guard to keep the other miners from going down. In the Mt. Olive district miners from Benld and other places to the number of 400 threatened the miners at Staunton and Mt. Olive if they went to work. The visiting strikers surrounded the mining properties and openly defied the miners who were not on strike to make any attempt to go underground.

The dissatisfied element is holding off for the meeting at Springfield on the 19th, at which time they hope to be able to carry out their program by ousting President Farrington and the other officials who insisted upon sticking by the agreement with the operators until the Cleveland meeting. Until then there is no prospect of the field going to work. As a matter of fact, there is some feeling here that if President Farrington carries out his intentions of excluding the rebels from membership that they will cause trouble anyway. It is the most serious problem that has confronted the operators for a long time, for there is no reasonable head to the uprising that seems to have any conception of the condition that has arisen.

St. Louis is not suffering, however, for coal from the Standard district. There is little doing in the industrial line and little call for coal, although a few carloads from Indiana have been brought in for emergency.

The few mines that are working are getting as high as $3 for lump, $2.50 for mine run and $2 to $2.25 for screenings.

The domestic demand is easy and the dealers are standing pat and waiting until things blow over. Only those who must have coal for immediate purposes are taking any.

The Standard situation represents to some extent the Mt. Olive conditions, only that there are no mines working in the Mt. Olive field, and the last ones to work were taking care of their regular trade at the regular price without any shadow of profiteering.

In Perry county the mines are working one day a week. In the Carterville field of Williamson and Franklin County the Old Ben mines were on strike over a request that the mine manager be discharged. This, however, has been settled and every mine in the field is at work as far as labor troubles are concerned. The Iron Mt. R.R. embargoed the mines against loading commercial coal. Most of the cars it furnishes must be loaded with company coal and it is only furnishing about two days supply a week.

The railroad tonnage has been exceptionally heavy on account of the threatened strike of the miners in Missouri, Kansas and Oklahoma, which will severely tax the western roads as to their fuel supply. The Burlington railroad is giving the best service in this field and the Chicago & Eastern Illinois next, with the Illinois Central and the Iron Mt. dragging along far in the rear.

Miners working for mines depending upon car supply on the Illinois Central and Iron Mt. are going to the mines on the other roads where they get steadier work. As a rule coal from this district has been selling at the regular circular price excepting in a few instances where mine run has gone up to as high as $2.75, screenings to $2.50, and lump and egg as high as $3.25. This for the most part is off grade coal.

Some operators are charging jobbers more than the circular, thus forcing the jobbers to create higher prices.

COAL AGE

Volume 16 New York, August 28, 1919 Number 9

Consumers' Lockouts

By R. Dawson Hall

A FEW years ago employers' lockouts were common enough. Today public opinion will tolerate them only under most unusual circumstances. However, not all lockouts are the work of employers of labor. Quite frequently consumers make up their mind to refuse to buy in order to force down wages, or at least with the expectation that a lower wage rate will be obtained.

There was such a lockout on the signing of the armistice. Everybody believed that prices were going to fall and needed to be lowered, not only prices of commodities, but the prices of the labor by which those commodities were produced. As a result the public waited, and the workingman—the mine workers at least—became quite restive under the delay. Their feeling was not against the operator or the manufacturer, but against society in general, that it should ordain such a lockout, after demanding of the worker miracles of production.

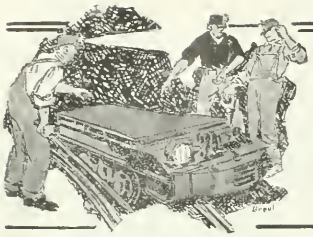
Somehow society failed to realize that any obligation rested upon it. It has always bought when it would and desisted when it would. In the summer it bought at its pleasure and refused to put by its coal for the winter. The average citizen does not care much if the mine worker has only a half year's work, so long as he comes around and fills the coal hod in the winter.

The consumer has been taught that he is an irresponsible sort of being, allowed to buy when he will and use what he buys as he will. There is no "Whole Duty of Man" written for him. Because, for him, no law or gospel had been written, he lets his duty slide, and the locked-out workingman accordingly thinks in terms of Bolshevism, wants double pay for every working day to make up for short time, seeks a shorter day and fewer days a week to make the mine capacity fit the demand for coal, and longs for nationalization of industry in the hope that when it comes about the mine worker will be given steady employment. He overlooks the significant fact that, under the present railroad nationalization, the Railroad Administration has laid off shopmen even when railroad cars were being damaged more rapidly than they were being repaired.

Public opinion has ended the producers' and the manufacturers' lockouts, but the consumer still continues to maintain the right to use that weapon. However, not all the consumers' failures to buy should be reprobated. Sometimes he lacks the money to carry a stock; at times he is willing, but afraid to buy what may depreciate in price; at others he purchases but does it in another market, realizing that what he thought was a good article is exceeded in value by another. But, however justifiable his action may be, it leads to unrest.

Some day the larger corporations will order coal and make their improvements whenever the market gets weak, largely with the purpose of creating a stimulation that must inevitably in time return them large dividends. Idle time produces discontented men and means unused capital. The burden of a buying philanthropy of this kind will not be felt when many corporations attempt it; for the stimulation of industry will be so great that the trade depression, lower wages and lower prices will fail to materialize, and the thing purchased, the work done or the material manufactured will fetch in the market the money expended on it; while with the steady work resulting every one will be happier.

That country alone can be prosperous that continuously produces the wherewithal for material prosperity.



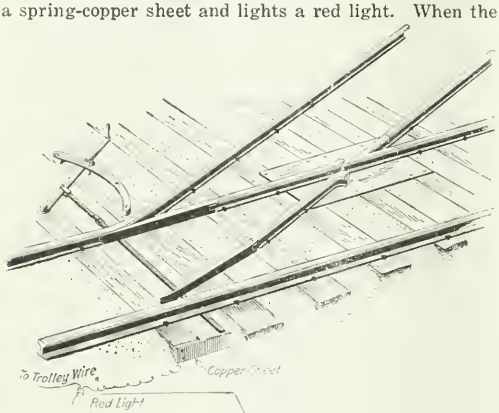
IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

A Homemade Switch Throw

By Joe Povich
Ziegler, Ill.

The switch throw shown is homemade and is being used in conjunction with a light switch. When the switch is thrown over, the bridle makes contact with a spring-copper sheet and lights a red light. When the



DETAILS OF A HOMEMADE SWITCH THROW

switch is set for straight track the light is out. The light switch is mounted on a piece of fiber over which a 1-in. board is placed to cover and protect it from dirt and injury. The illustration is so comprehensive that no detailed description of the device is necessary.

When the Boss Loses His Control

By Observer

A successful mine foreman was made superintendent of a difficult colliery which had been turned back to the owners, through losses, in a poor condition. For a time his direction of the operation was a success, then a sudden series of mishaps occurred, fire and fatal accidents combined. Right here he seemed to lose his grip on the situation. He went down into a new shaft and took part in the actual manual labor of sinking. From then on his generalship lost its compelling force. He seemed unable to guide because he had left the wheel, and his resignation came as the logical outcome of a situation which developed through first stepping down from the place of authority.

Another man, now dead, was given a stripping foremanship which was an injustice to him. He was a fine miner and could not entrust the mining to the men hired to do that work. Working several lifts with little groups of men on each lift, his time would have been amply taken up supervising group by group, yet we found him nearly always high up in the face drilling holes or hand-picking, while his men "bummed" safely out of his sight on the other levels. He worked very hard and wore himself out thereby, and with constant worry over the work. Finally he took a minor position with another company, but his broken health did not mend and he died before the allotted span.

Wages are high, in fact everything connected with mining is now costly. Yet no cry of this will find an appreciative audience from the general public. They will not believe that a colliery is not paying so long as the colliery continues operating. They reason that a coal company is too wise to play a losing game, and figure that a plant pays or it would close down. It seems that the day of swivel-chair superintendency, like telephone salesmanship, is done, and that where the colliery heads, from the big boss down, refuse to don overalls and "get next to the ground," costs will run up and swallow profits. We will likely see more intensive bossing in the paying mines of tomorrow. If the uncalled-for six-hour day comes, it will mean two shifts under pressure in order to get out the coal.

I have observed the night-shift work at different collieries, and it has never seemed to pay in the way that daylight work does. Night drivers are hard to get and they quit with painful regularity; in fact, it seems that nobody wants night-shift work. Everybody concerned tries to get done as quickly as possible simply because daylight supervision is withdrawn; if there is a handy manway, the shift ends at many queer times. Men will not be driven, and no sane mine executive expects to get work done that way; but if nobody ever sees the boss, and if the mine foreman's wife sees the "super" drive away early every day while her husband works twelve hours or worse, some one will ease up, then some one else, and so on, all the way down to the mule skinner. And that colliery will lose its morale and its ability to cope with ever-mounting costs. Long-range, white-shirt generalship seems doomed by the new demands of our time.

Homemade Voltmeter Switch

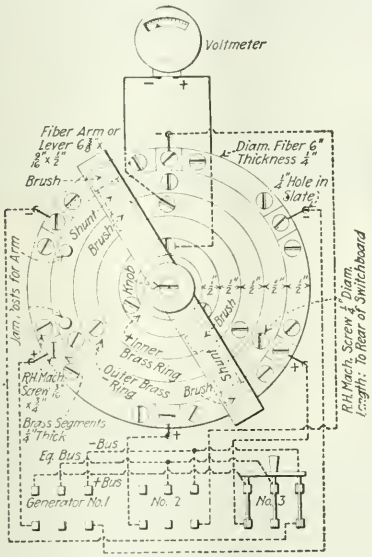
By John J. Nolan
Linton, Ind.

The diagram herewith shows a three-way voltmeter switch to be used on the board when three generators are operated in parallel. I have two of these devices in use and they are working satisfactorily. Almost any mechanic or electrician can construct them, as only two pieces need to be machined or made in a lathe, these being the brass rings. If convenient, however, the fiber base should be turned also. The rest of the construction is not difficult.

The company with which I am connected had two plants using three generators in parallel, all old equipment such as is usually found around old coal mines.

Of course, two voltmeters were used, one being connected to one of the generators and the other to a double-pole double-throw switch on the other two machines. Usually meters in isolated plants are never calibrated, and switching generators together in this way is conceded to be bad practice.

The brushes under the arm or lever (not seen on main sketch) are of phosphor bronze spring ribbon. A small homemade fuse block was assembled on fiber and attached to the front of the board just under the three-way switch. This is single-pole, connected to the positive side only, and uses a small fuse. It offers protec-



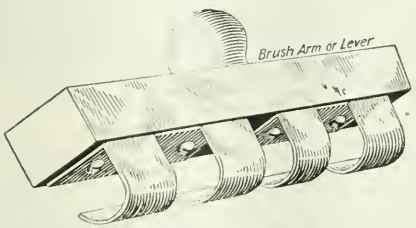


DIAGRAM OF THREE-WAY VOLTMETER SWITCH AND DETAIL OF BRUSH ARM

tion to the switch in case something should happen from rough usage. The main fiber base extends out from the slate about ½ in. Short pieces of ¾-in. pipe were placed on the long bolts which go through the board, so as to enable one to easily connect or disconnect the wires leading to the switch studs and meter. By leaving some slack in the wires on the rear of the board and loosening the three bolts, the switch can be pulled out to adjust the tension of the brushes on the rings.

A DISPATCH from London says that Great Britain will be more than 1,000,000 tons short of her expected shipbuilding program this year, which was to have been 2,500,000 tons, according to estimates.

Stepping-Stone Street Crossing

BY RALPH W. MAYER
California, Penn.

Some mining towns do not boast paved or macadamized streets. Slabs of stone laid flat and extending across the street soon become covered with mud, and it is then necessary to wade in order to cross the street from one side to the other. In order to obviate this difficulty a certain coal company in West Virginia uses

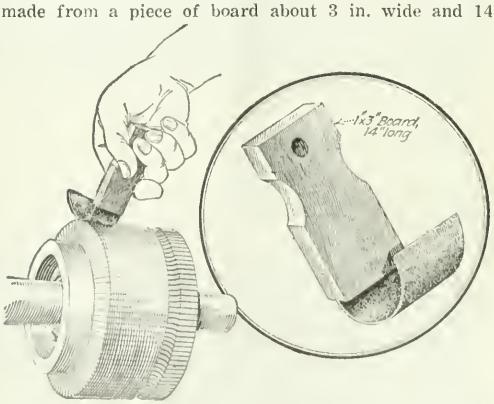
MAKES EASY WALKING ACROSS MUDDY STREETS

heavy slabs of stone, about 4 ft. square and 6 in. thick. These are set on edge and buried, all except about 8 in. to 1 ft. The slabs are placed about 2 ft. apart, so that horses and the wheels of wagons can pass between the stones. A person may cross the street dryshod by stepping from one stone to the next, since the travel of the horses and wagons never drags the mud to the level of the top of the stones.

Handy Sandpaper Holder

BY ELECTRICIAN
Ziegler, Ill.

The accompanying illustration shows a device for holding sandpaper while sanding or polishing commutators on motors, generators or other machinery. It is made from a piece of board about 3 in. wide and 14



DEVICE IS HANDY FOR HOLDING SANDPAPER WHEN POLISHING COMMUTATORS

in. long, with a suitable slot cut in one end. The handle or upper end of the holder may be made in any desired shape. For convenience, however, it may be advantageously provided with a hole or some other means whereby the device may be hung upon a nail or some convenient hook.

VIEW OF THE LOREE BREAKER TAKEN AFTER IT HAD BEEN REBUILT FOLLOWING A FIRE

Rebuilding the Loree Breaker

By W. S. Hutchinson
Bethlehem, Penn.

ON THE 22d day of January, 1919, the Loree coal breaker of the Hudson Coal Co., located near Larksville, Penn., was burned to the ground. Nothing was left except a tangled mass of rubbish and old iron. This was a 4000-ton breaker, and the catastrophe came at a time when it was running full. In view of the fact that this structure handled the output of a number of shafts in its immediate locality worked by this company, and prepared a fine quality of coal comparing favorably with the best premium anthracite on the market, the officials of the Hudson company felt constrained to take immediate and heroic measures to effect the replacement of the burned breaker.

By a peculiar coincidence, without consultation between the two, both the Scranton operating office and the New York executive office got into communication with the Bethlehem Fabricators, Inc., within a few hours of the fire, requesting them to send their representative to go into the matter of replacing the burned structure with a steel breaker. After a few days spent in preliminary estimates and preparation of tentative machinery and steel layout, the coal company finally determined to go ahead on the basis of a structural steel proposition, and the order was given to the Bethlehem Fabricators, Inc., on Jan. 27, 1919.

It was the general feeling and belief, on the part of the owner and the engineering company, that it would be possible to complete this structure so that coal could be shipped from it within six months' time. It was believed to be the best policy by the owner, nevertheless, to publish the determined length of time as five months. To that end, therefore, a monster sign was placed on the site, reading as follows:

> A new 6000-ton-per-day steel breaker in five months! We hope with the help of everyone on this job to have the breaker running on or before June 22, 1919. and thus give employment to all the former force at Plymouth. January 22 to June 22—150 days.

A space on this sign was left for the insertion of figures to represent the number of days remaining before the completion of the five-month period. The breaker was completely finished and coal shipments started and continued from then on, 20 days ahead of the 150-day limit. As the sign then stated, "With the help of every man on the job we did it in 130 days—Thank you."

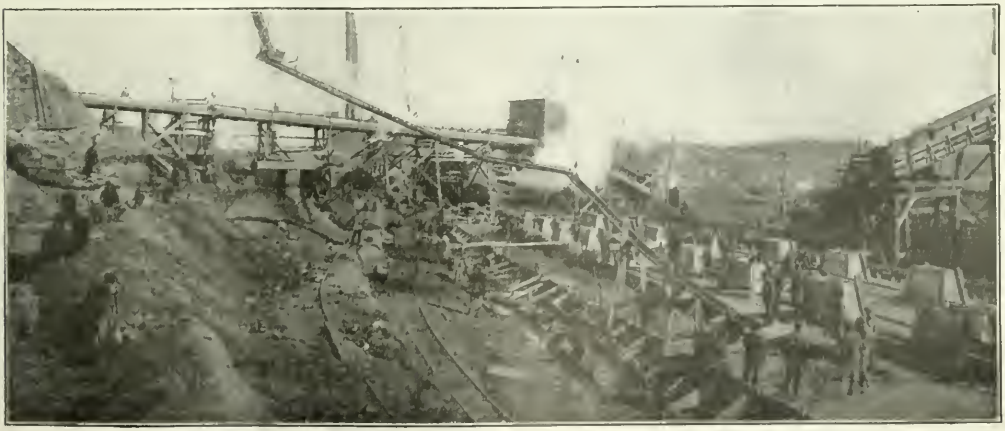
Before giving the salient points of the construction of the job, it might be interesting to note the comparison between the new and old breakers. These were in the main as follows: The old breaker shipped 4000 tons per day, the new breaker has a 6000-ton-per-day capacity. It has 36 Lehigh instead of 11 Lehigh and 21 Simplex jigs. It has 56 decks of main shakers as against 42 in the old breaker; four decks in each building were designed to handle lump. Each building was provided with one set of main rolls and one set of No. 3 rolls, but the new breaker has two sets of No. 2 rolls against one set of No. 2 rolls in the old building. The old breaker had one 500-hp., two 200-hp. and one 150-hp. engines, while the new breaker has none. The old breaker had one 200-hp. and five 75-hp. motors, making the total motor horsepower 1450. This means that the old breaker had a total of 1625 hp. in engines and motors as against 1450 hp. in the new breaker. The old structure had one 360-ft. and one 363-ft. main conveyor. The new structure has one 328-ft. and one 395-ft. conveyor. The new breaker is equipped with two Manierre box-car loaders and two Jeffrey pulverizers, the same as the old one. There was no provision for recovery of fine coal in the old breaker, but in the new structure a stirring separator and storage conveyor have been installed.

Prompt action was taken on the part of the coal company to clear the site of the new structure, and 11 days after the fire all débris was entirely cleaned up. A concrete tower was then erected and arrangements made to carry on the installation of the plain and reinforced-concrete mats and the footings for the steel frame by day and night. Unusually open weather for the time of year permitted the work to go along without interruption, although preparations were made to cover over the site or maintain heat, if necessary, in order to permit continuous work on the footings.

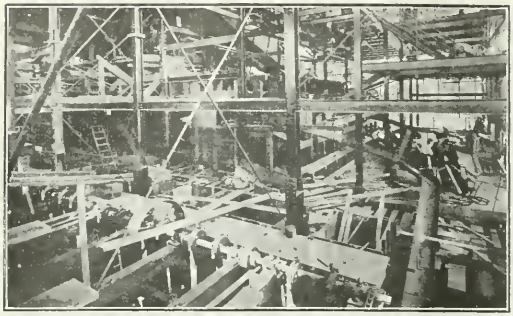
Final concrete forms were in place 33 days after the

HOW THE BREAKER LOOKED TWO DAYS AFTER THE FIRE—NOTHING BUT RUBBISH AND OLD IRON

ELEVEN DAYS AFTER THE FIRE THE BREAKER SITE WAS CLEARED AND CONCRETE TOWER ERECTED



TWENTY-SIX DAYS AFTER THE FIRE EXCAVATION AND POURING OF CONCRETE FORMS BEGAN



JIGS AND PICKING TABLES IN OPERATION 130 DAYS AFTER THE FIRE

fire; and 47 days after the fire the steel framework for a considerable portion of the structure was not only on the ground, but the roof over the loading tracks was practically completely erected. Eighty-two days after the fire the building was completed, although the up-hill conveyor was not completely installed because of the fact that to keep up continuous working of the up-hill shaft the old wooden conveyor was still in operation.

Not only was remarkable efficiency shown in the design and assembly of the structural steel and in its erection, but similar results were effected in the securing of the machinery and equipment for the building. Thus 96 days after the fire the main rolls were set in place in the new structure. One hundred and eleven days after the fire the structural steel was complete throughout. A large force of carpenters and mechanics was at work on the building from the moment that riveting was completed in order to enable the other workmen to install the equipment. The illustration of the east side jigs and eccentrics for the front jigs on the lower level, taken 117 days after the fire, will give an idea of how closely the machinery installation followed up the work of erection. The entire building was finished and heated 130 days after the fire. There have been upward of 2100 mine cars of coal put through this breaker per day on a number of occasions since it was started.

It might be mentioned that there is approximately 1150 tons of material in this breaker, that the furnishing and erection of the steel work was done on a bonus and penalty contract, and that a considerable amount of bonus was earned by the contracting company. The work of erection was handled by a Bay City locomotive crane with an 80-ft. boom and a 25-ft. jib, with a 40-ton capacity, as well as a 15-ton Browning hoist with a 60-ft. boom. A guy derrick with a 79-ft. boom was also used in the erection, and the conveyors were hung into place with a stiffleg derrick.

The actual erection of steelwork was started on Mar. 5 and completed on Apr. 19. There has never been a record of this character made in coal-breaker construction, and only close coördination of efforts and interest on the part of both the owner and the contracting company accomplished anything like the results shown in the erection of this building, with its complement of coal-preparing machinery.

Texas has an area of lignite of nearly 60,000 square miles—an area nearly as large as the State of Missouri and somewhat larger than the area of the New England states.

Coke Industry in South Africa

Most of the Natal coals and much of the coal found in the Central Wirbank district of the Transvaal yield good serviceable coke, well adapted to blast furnace and foundry purposes, although unfortunately as a rule rather high in sulphur. Until the middle of 1918 only two companies were producing coke, but recently as a result of the increased demand for coke created by the erection of blast furnaces for the production of iron at Pretoria and Vereeniging and in Natal, the coke industry has undergone considerable expansion and at least five other Natal companies will shortly enter the market.

None of the ovens at present in operation is designed for the recovery of byproducts. War conditions again have had their effect in stimulating enterprise. The embargo placed on the export of coal tar from the United Kingdom has caused a shortage and sent up prices in the Union, and another effort is being made at Wirbank to produce coke, tar, ammonium, sulphate and benzol, while as soon as the requisite equipment is available a large byproduct recovery coking plant is to be erected at Dundee. If successful, there is no doubt that the installation of these plants will be followed by others.

One of the most important developments that have taken place in recent years in the South African coal industry has been the erection in Natal of a large modern plant of the Mond type for the production of ammonium sulphate. At the present time the output is at the rate of about 250 tons per month, and it is hoped to increase this to 350 tons in the near future. Most of the ammonium sulphate is exported to Mauritius. The industry appears to be capable of very considerable expansion, as there are other coals in this and the adjoining districts of Natal which are equally well adapted to coke manufacture.

CONSIDERING that comparatively a small part of the energy in coal is utilized in the steam engine, why should fuel be transported long distances to power stations when electric transmission lines 100 miles in length are in common use? Transmission lines up to 250 miles in length exist and are practical. But suppose a 200-mile radius be taken as a possible standard for the limit of electric transmission. Then circles with that radius drawn around centers of coal production will include a considerable portion of the industrial territory of the country. Thus the power demand of a large area could be supplied by wire rather than by rail from the coal fields. Incidentally a large amount of railroad equipment would be released for other purposes.

Illinois Coal-Mine Power Plants

By E. Steck
Hillsboro, Ill.

SYNOPSIS — *The cost of operating power-plant equipment has received less attention than it should have received in the past. The purchase of power brings its cost prominently to the notice of the management periodically.*

FEW of the Illinois coal operators have made attempts to accumulate data relative to the cost of operation of their power-plant equipment. Such information would be of great value to them in determining how to operate with the greatest economy. The plants in question can be placed in three general classifications; namely, those having no electrical equipment, those completely or partially electrified with their own generated power, and those completely or partially electrified with purchased power.

Generally, the amount of coal burned under the boilers is only estimated. These estimations are invariably low and the fuel consumed is not figured at the selling price. Cost of repairs and of supplies are either not considered at all or are only partially charged up to the plant. Labor costs are inaccurate, as a number of the men employed are carried on general top labor account.

Where the power is purchased its cost cannot be concealed, as the monthly power bills show the exact amount. Consequently, a comparison is generally not favorable to purchased power. In fairness to the mine operator and the central station, the cost of a steam-operated plant should be carefully investigated in order to determine which parts should be electrified and whether it will be cheaper to purchase or generate electricity for the operation of such equipment.

The general equipment to be considered consists of: Coal conveyors, feed water pumps, hoisting engines, generators, transforming equipment (transformers, rotaries, motor-generator sets), tipple equipment, car pullers, shop machinery, cutting machines, gathering locomotives, haulage locomotives and mine pumps. In some of the old mines we find no electrical equipment. All the machinery is driven by engines, and the coal is hauled by mules and mined by pick. These are the exceptions, but some are still in operation. On one property I have counted 14 small engines, the largest being 25 hp. The steam lines to some were buried not over 6 in. underground, while others were supported on poles and had no covering. These engines are all extremely uneconomical, and because of condensation and leaky joints their steam consumption is high.

One of the first steps ordinarily taken in the evolution to reduce haulage cost was to replace the mules bringing the coal to the bottom by locomotives. This necessitated some electrical equipment on top and either a steam-driven generator, a motor generator or a rotary convertor was purchased, depending upon whether the operator guessed if he could manufacture or purchase his power the cheaper. As a rule no attention was given to the economy of the engine or the transforming apparatus. The next step was the introduction of cutting machines and gathering locomotives, requiring larger equipment on top. Generally, the small unit was replaced by a large one, as two units were hardly ever operated in parallel. The economical operation of the other machinery was neglected on the supposition that the steam taken to drive such equipment as the fan, car puller, tipple and shop was negligible.

The cost of operating will be greatly reduced by replacing all the small engines with motors, which entail a saving in coal and a lowering in maintenance costs. For instance, take a typical case where the power requirements are as follows: Coal conveyor, 5 hp.; shop, 10 hp.; car puller, 25 hp. intermittent, 10 hp. continuous; tipple engines, 35 hp.; fan, 40 hp. In all a total of 100 hp. At 75 lb. of steam per indicated-horsepower-hour, this equals 7500 lb. of steam per hour. With machines motor-driven, allow 80 per cent. efficiency back to the generator. If the mine generator is driven by a corliss engine with a consumption of 25 lb. per indicated-horsepower-hour, and allowing a generator efficiency of 85 per cent. and an efficiency of engine of 90 per cent., the amount of steam per actual horsepower-hour of motors will be $\frac{25}{0.80 \times 90 \times 85} = 41$ lb.; 100-hp.-hr. at 41 lb. equals 4100 lb. of steam per hour. The saving will thus be 7500 — 4100 = 3400 lb. of steam, or $\frac{3400}{4.5} = 750$ lb. of coal. This is $\frac{750 \times 8}{2000} = 3$ tons, which at $2.15 per ton equals $6.50 per day.

This saving of $6.50 per day takes into consideration the coal only, and there will be a considerable saving in maintenance, repair charges and boiler capacity. In this particular case there will be over 100 hp. in boiler capacity released.

The hoisting equipment must be carefully considered regardless of whether power is generated or purchased. If generated, it will not as a rule be advisable to electrify the hoist where a large motor is required, because of the large generator capacity thus made necessary and the disturbances arising from frequent starting. Power companies furnishing power to mines do not permit the use of alternating-current motors of comparatively large size for hoisting purposes. They require for large hoists fly-wheel motor-generator sets which take the hoisting peaks off of the line. The cost of this equipment for an old mine is prohibitive.

TABLE I—COSTS FOR MINE NO. 1

1918	Tons Hoisted	Total Kw.-Hr.	Cost of Power			Cost in Cents per Kw.-Hr.			Kw.-Hr. per Ton	Cost per Ton
			Primary	Secondary	Total	Primary	Secondary	Total		Cents
July	12,242	270,333	$1,341	$1,918	$3,259	$0 50	$0.71	$1.21	2 22	2 69
Aug	63,818	219,667	1,550	1,817	3,367	70	84	1 54	3 44	5 30
Sept	63,662	195,520	1,550	1,619	3,169	78	83	1 61	3 07	4 95
Oct	37,032	142,080	1,550	1,200	2,750	1 10	84	1 94	3 84	7 45
Nov	55,184	175,680	1,550	1,474	3,024	88	84	1 72	3 18	5 47
Dec	57,778	160,900	1,550	1,369	2,919	96	85	1 81	2 79	5 05
1919										
Jan	35,446	98,240	1,550	892	2,442	1 59	90	2 49	2 77	6 90
Feb	28,000	121,920	1,451	1,075	2,526	1 19	88	2 07	4 35	9 10
Mar	32,676	139,520	1,451	1,208	2,659	1 04	86	1 90	4 27	8 12
Apr	42,722	155,200	1,451	1,330	2,781	94	85	1 79	3 63	6 52
May	25,185									
June										
July										
Aug										
Sept										
Oct										
Nov										
Dec										

In the case of an old mine where it is desired to install cutting machines, haulage and gathering motors, and to electrify the top equipment, the question naturally arises where purchased power is available whether to use it or generate electrical energy. In considering purchased power it is highly important to determine how free from interruptions the service will be. If the service is bad, causing frequent idle days, no matter how cheaply it can be obtained it is a losing proposition. A shutdown of a single day during the busy season will

TABLE II—COSTS FOR MINE No. 4

1918	Tons	Total, Kw.-Hr.	Cost of Power Primary	Cost of Power Secondary	Cost of Power Total	Cost in Cents per Kw.-Hr. Primary	Cost in Cents per Kw.-Hr. Secondary	Cost in Cents per Kw.-Hr. Total	Kw.-Hr. per Ton	Cost per Ton Cents
July	50,282	50,000	$375	$765	$1,140	$0 75	$1.53	$2.28	0.99	2 27
Aug	44,486	45,200	375	697	1,072	.83	1.54	2 37	1.02	2.42
Sept	40,083	43,200	375	666	1,041	.87	1.54	2 41	1.08	2 61
Oct	46,100	46,400	375	705	1,080	.81	1.52	2.33	1 00	2.33
Nov	38,292	43,200	375	656	1,031	.87	1.52	2 39	1.13	2.70
Dec	28,401	33,200	375	513	888	1 13	1.54	2.67	1.17	3.13
1919										
Jan	20,451	32,800	375	502	877	1 14	1.53	2.67	1.60	4 28
Feb	18,176	31,600	375	482	857	1 19	1 53	2.72	1 74	4 72
Mar	20,101	26,400	375	442	817	1 42	1 67	3.09	1.31	4 05
Apr	16,553	24,180	343	405	748	1 43	1.67	3.10	1.45	4.51

cause greater losses than any saving that may result from the most economical operation during the remainder of the month.

The next point to be considered is the primary rate or, in other words, the method of measuring the maximum demand and the price per kilowatt-hour therefor. Generally, the primary rate charge is based on the average of the three highest short-time peaks which have occurred any time previously in the twelve months during which the power is consumed. These peaks naturally occur at a time when the mine is producing its maximum output. Then, when the mine is working on short time or is shut down, this charge remains in effect for twelve months after it has occurred. By referring to the accompanying tables it may be seen how this primary charge is increased per kilowatt-hour as the production of the mine drops.

The charge for the maximum demand was originally made on the basis that for every kilowatt of maximum demand that the consumer created the central station was required to have ready for his use a kilowatt of station capacity. This kilowatt of capacity was estimated at an installation cost of $100, and the fixed charges amounted to 15 per cent. per year, or $1.25 per month. On careful investigation it is doubtful if there is any justice in this charge. It is not fair to the consumer and is one of the greatest stumbling blocks for the central station in obtaining and holding a mine load. There is no room for argument in regard to the $100 cost per kilowatt of station capacity installed or the 15 per cent. charge for depreciation, taxes and interest, but there is a wide discrepancy between the sum of all the consumer's maximum demands and the normal rating of the station capacity. The station equipment is generally purchased with a continuous or an overload capacity rating. The maximum demand is measured on a 5 or 15 minute peak with no consideration given to the diversity factory; that is, all the maximum demands for the various loads carried by the central station do not occur at the same time.

As a rule the day and night load are of an entirely different character. The maximum demand should be greatly reduced. For example, at a certain mine the maximum demand on the basis of the average of three 5-minute peaks was measured by the power company as 400 kw. When the service was down the same load was carried by a 200-kw. engine-driven generator. It should be borne in mind that the maximum reading was taken on the alternating-current side of a motor-generator set and the direct-current output was at that time only 80 per cent. of 400 kw. It must also be remembered that the central station in carrying this load has the advantage of the diversity factor mentioned above.

If the central station does not derive sufficient revenue with a reduced primary charge, the secondary charge should be increased. Referring to the tables again, it will be seen that there is a large variation in the primary rate per kilowatt-hour, the maximum being about three times the minimum, depending on the output of the mine, while the secondary rate per kilowatt-hour remains nearly constant. In a large mine the primary may be over $1500 per month even with the mine shut down, and for a period of months.

If a contract is given a central station for service, the primary rate should have most careful consideration. A competent engineer should be employed to investigate conditions, to determine whether power can be bought or generated to advantage. Much depends on the average daily output in relation to the maximum daily output, the rate offered by the central station (both primary and secondary), the type and capacity of boilers, engines and generators, and the additional men required to operate the equipment.

Often a small electrical unit can be installed without increasing the boiler capacity or employing additional men. The electrification of the top machinery will release considerable boiler capacity and the electrician winding armatures, etc., can be located in the generator room. With such conditions the investment and operating charges will be small, and it will be difficult for the central station to make a rate which will be lower. On the other hand, the addition of such a unit may require additional boilers, stacks, buildings and men. The cost of production here may be higher than the price at which power can be purchased.

No general rule can be given in regard to whether it will be advisable to purchase or generate power, as in each case the conditions are different. The decision should be made by a competent engineer after a careful

TABLE III—COSTS FOR MINE NO. 14

1918	Tons Hoisted	Total, Kw.-Hr.	Cost of Power Primary	Cost of Power Secondary	Cost of Power Total	Cost in Cents per Kw.-Hr. Primary	Cost in Cents per Kw.-Hr. Secondary	Cost in Cents per Kw.-Hr. Total	Kw.-Hr. per Ton	Cost per Ton Cents
July	69,462	56,855	$340	$405	$745	$0.60	$0.71	$1.31	0.82	1 07
Aug	68,046	33,366	395	273	668	1.20	.81	2 01	0 49	0 98
Sept	52,858	49,694	395	411	806	.80	.83	1 63	0 94	1 52
Oct	63,465	30,260	395	266	661	1 31	.88	2 19	0 48	1 04
Nov	41,131	23,279	395	198	593	1 71	.85	2 56	0 57	1.44

study of the existing conditions at the mine, the proposed future development and the power rate of the central station.

With a new mine the conditions are simplified, as it is possible to make more accurate comparisons. The ultimate daily maximum capacity is the determining factor in the cost of power and the type of equipment, whether power is purchased or generated. The fixed charges on the power-plant equipment consisting of interest, depreciation, taxes and insurance should be compared with the primary charge and the expense for coal, oil, repairs, firemen, engineers, etc., compared with the secondary charge. These comparisons should be made for maximum and average daily output and idle days.

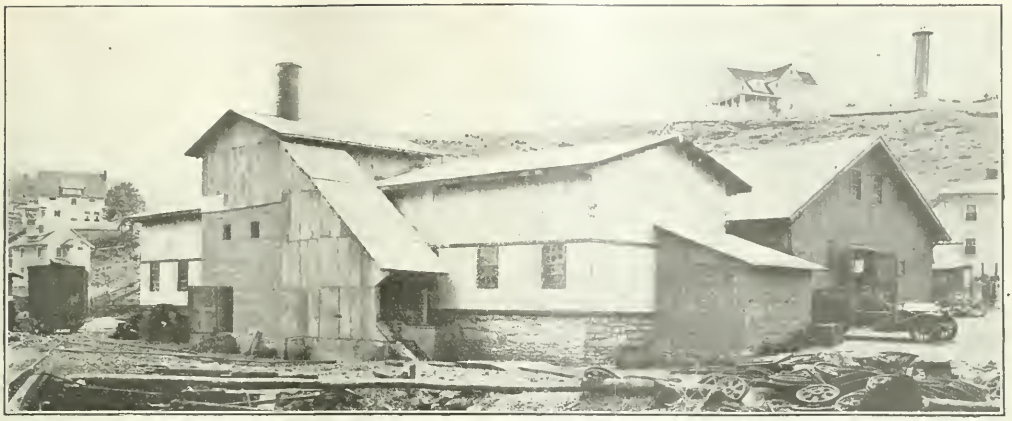


FIG. 1. GENERAL VIEW OF THE FOUNDRY BUILDING AND ITS SURROUNDINGS

A Foundry at a Coal Mine

By A. A. Liggett
Cincinnati, Ohio

THE Raleigh Coal and Coke Co., with general offices in Cincinnati, Ohio, and mines in the New River district, has recently installed a foundry at Raleigh, W. Va. While small castings of brass, copper, bronze or even iron made at not a few mining plants, a full-fledged foundry like this one is decidedly out of the ordinary.

Fig. 1 shows a general view of the foundry building and its surroundings. The cupola may plainly be seen rising through the roof of the building, which is served from outside by means of the skip or special car running on the inclined track. Thus the coke and iron used for a charge is hauled up to the charging floor electrically. A railroad sidetrack connects with this skipway.

FIG. 2. INTERIOR VIEW OF FOUNDRY, SHOWING THE POURING OF MOLTEN METAL

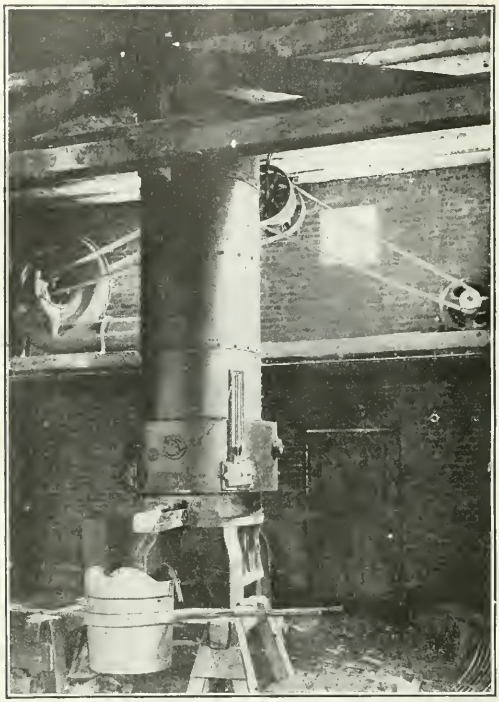


FIG. 3. VIEW OF CUPOLA AND MOTOR FURNISHING BLAST

At the right of the building may be seen the core oven and annealing pit, where hard castings may be annealed. All castings used in and about the mine plant are made in this foundry.

Fig. 2 is an interior view of the building while molten metal is being poured from the "bull ladle" to a hand ladle by which it is transported to the waiting molds. This illustration affords a good idea of the construction of the building.

Fig. 3 shows the cupola, which averages 10 lb. of iron melted per pound of coke consumed and has a capacity of from 3 to 5 tons of iron per hour. The blower, countershaft and motor furnishing the blast may be seen clearly. The fan has a capacity of 2000 cu.ft. of free air per minute, while the motor is of 30 hp. Ordinarily, or unless unusually heavy castings are to be made, the metal is tapped into the bull ladle, from which it is poured to hand ladles and thus taken to the molds.

The soot, which is the main constituent of visible smoke, is formed at, or very near, the surface of the fuel bed and not at the place where the furnace gases strike the heating surfaces of the boiler. The heating surfaces merely cool the gases surrounding the soot, thereby preventing its combustion. The formation of soot at the surface of the fuel bed is caused by the high furnace temperature and absence of oxygen. It is possible that if oxygen was present in sufficient quantity at the time of distillation of volatile matter, the heavy hydrocarbons would burn directly to products of complete combustion, CO_2 and H_2O, without first decomposing and depositing soot.

Coal-Mining Situation in Belgium in 1919

The first official data on the situation of the Belgian industries at the beginning of 1919 have just reached this country. The latest issue of the *Annales des Mines de Belgique* received here contains a report of the investigation instituted by the Belgian Department of Industry and Labor of some mining and metallurgical industries.[1] The following is a short abstract of this report as it refers to the coal industry:

It can be said that of all the Belgian industries that of coal mining suffered the least from wanton destruction. This is explained not by the thought that the Germans had any consideration for the Belgians and

TABLE I—COAL PRODUCTION IN BELGIUM, METRIC TONS

Year	Mons	Centre	Charleroi	Namur	Liege	Total
1913	4,406,550	3,454,640	8,148,020	829,900	5,990,480	22,841,590
1914	3,578,840	2,701,550	5,764,410	534,180	4,135,070	16,714,050
1915	3,310,200	2,573,430	3,875,690	410,660	4,007,520	14,177,500
1916	3,705,540	3,212,860	5,223,970	497,150	4,223,350	16,862,870
1917	3,869,680	2,785,400	4,671,240	437,070	3,155,510	14,919,700
1918	3,281,720	2,559,610	4,493,630	374,440	3,112,530	13,821,930

their coal industry, but by the fact that during the first four years of the war they treated the coal mines as theirs, and only the lack of time during the last few months of the war saved the Belgian mines from the fate suffered by the mines of northern France. The mining situation is best shown by Table I, which gives the production for 1913 to 1918 by coal districts and totals.

In the new coal district of Campine, which was ready to start actual mining Aug. 4, 1914, and from which

TABLE II—COKE PRODUCTION IN BELGIUM, METRIC TONS

Year	Hainaut	Liege	Other Provinces	Total
1913	2,220,180	877,130	445,690	3,523,000
1914	1,406,460	595,210	?	2,001,670
1915	424,460	90,140	?	514,600
1916	667,530	124,820	?	792,350
1917	648,210	27,830	?	676,040
1918	509,150	13,060	?	522,210

the Belgians reasonably expected to get the needed additional fuel, the total mining amounted to 11,640 tons in 1917 and 65,670 tons in 1918.

Of the Belgian coke ovens it is stated: Some have been in operation without the needed repairs, some have been totally destroyed (especially those of the Cockerill plants) and the remainder have been totally dismantled, and the installations for byproduct recovery carried away or destroyed. The results of this policy are

TABLE III—BRIQUET PRODUCTION IN BELGIUM, METRIC TONS

Year	Hainaut	Namur	Liege	Other Provinces	Total
1913	1,864,200	171,010	453,350	120,000	2,608,640
1914	1,371,480	128,730	299,490	?	1,799,700
1915	968,470	135,220	386,410	?	1,409,100
1916	1,300,850	166,710	468,260	?	1,935,820
1917	707,690	70,130	204,110	?	981,930

shown in Table II, which gives the production, 1913-18, by provinces and totals.

The Belgian railways use briquetted fuel exclusively, which accounts for the fact that the briquetting plants were in most cases unharmed. Table III gives the production for 1913 to 1917 by provinces and totals.—*Chemical and Metallurgical Engineering.*

[1] La situation des Industries en Belgique, en février 1919, après les dévastations allemandes. *Annales des Mines de Belgique*, 2ème livraison, Tome XX, 1919, pp. 695-711.

Dangers of the Postal Zone Law

By Senator Arthur Capper
Kansas

THERE is no function of government that reaches every citizen and every home to the extent of our United States postal service. For over seventy years the history of our postal legislation shows that our country has not legislated for postal service on the basis of cost, because the postal service is of such universal benefit, is such an instrument of information and education and unification, that to restrict it in any way is to hurt the country that we as thinking citizens wish to serve. So clearly and firmly has this American postal principle been held—that postage cost must not determine the postage rate—that our post-office has delivered letters and publications to Yankee whaling ships at Point Barrow in the Arctic Circle for two cents that cost over $5.60 to deliver. I would ask any thinking citizen if it is not just as important that a Yankee skipper home from a whaling cruise shall be able to understand and vote intelligently upon the great public questions of the day as it is for the citizen who has stayed at home? This principle is sound. Shall not California, Kansas and Maine, as integral parts of this great country of ours, have equal postage on all information as an American right?

American magazines—technical and popular—bind together the people of the United States, making this country truly "one and indivisible"

Our rural free delivery system—the most expensive and least revenue-producing branch of the post-office—costs 1½ cents per piece of mail matter, and this 1½ cents is over and above the cost of collecting, sorting, handling, transporting and rehandling until it gets into the rural free delivery carrier's wagon. This has all been done upon the American postal theory that the post-office function was a service to the American people and that the cheapness of postage was a benefit to the American home.

IT has been alleged—and maybe some have fallen victim to its un-American and illogical absurdity—that cheap postage on magazines and newspapers is a subsidy to the publishers. It is not a subsidy to the publishers. It is, if you want to use the term "subsidy," a subsidy to American readers. You can determine this for yourself. Who receives the benefit or subsidy when the Yankee skipper of a whaling ship off Point Barrow, in the Arctic Circle, receives news from home which costs $5.60 to deliver? Is that a subsidy to his home newspaper, his periodical or magazine, or is the benefit of that to the ship captain himself and his citizenship and our united and national standards of intelligence?

You will instantly recognize that it is this ship captain receiver of costly postal service who is benefited, and your common sense will instantly prove to you that in every case of cheap postage the primary and entire benefit is to the receiver.

Cheap postage on periodicals and newspapers has made the American nation a nation of readers beyond any nation in the world. If there is any thought in your mind that *this* is *not* a national benefit, I ask you to compare in your mind this great country with its splendid and homogeneous American idealism, its singleness of purpose and the universality of its achievements with those nations in the world in which there is but little magazine reading.

NOW as a practical proposition. You know the economic law that all costs must ultimately be paid by the final consumer, i. e., in this case the reader. To raise the postage on publications means that the publishers, as business men, must add this charge to the price of their periodicals—and thus lessen reading. Is this a good thing? And again I ask every reader to consider those nations in the world which have never encouraged widespread reading nor the widespread distribution of periodicals and newspapers, and to answer that question. For it is one which I and other legislators in Congress have to face and with which we must deal.

This country had a postal zone system at one time, applying to letters and newspapers and periodicals. The abolition of the zone system was made complete by President Lincoln in 1863 and the zone system was abolished not only on periodicals and newspapers, but also on letters, because it was regarded as an unsound postal policy and un-American that a citizen or home should have to pay more postage simply by an accidentally greater distance from the point of mailing. The postal service is an American service from all Americans to all Americans on a basis of equal postage and equal service. I ask every reader to consider for himself if this is not sound Americanism.

NOW on the practical side I wish to point out that the country newspapers have circulation in their county of publication without any postage charge whatsoever, and this can only be justified and continued on our American theory that the postal function is an equal service to all American homes.

It would be obviously unfair for those supporting the postal theory that the cost must determine the rate of postage to ask that a letter costing 1½ cents for delivery alone on rural routes should be sent for one cent. I do not have to be convinced that we should have one cent letter postage. I am for cheap postage as a great American social service. I believe that every right-thinking American is for cheap and equal postage. But there is no logical reason for believing that the rate on one class of postal matter must be determined by the rate on another class of postal matter. The figures of postal cost upon which this unsound and un-American postal cost theory is demanded were compiled in 1907 and upon being investigated by the United States Postal Commission headed by Hon. Charles E. Hughes, these figures were discarded as utterly unreliable in determining the cost of handling newspapers and periodicals. Yet it is upon these discarded cost figures that such unsound arguments are based.

IF WE must abolish postal service—or increase postage rates to a prohibitive basis—on the theory that cost of service shall determine the postage rates, we should have to abandon many of the most important of our postal functions, the rural free delivery being the most conspicuous example and one which I believe should be kept up no matter what its cost, as it is the most important postal service in the entire department. It pays too high a return—as does every other postal service—in improved and elevated citizenship.

I earnestly hope that every reader will give this postal zone matter and its revival of unsound postal theories, that have been discredited for over two generations, very serious thought. There should be no tax on intelligence.

Efficiency in Underground Haulage

By C. E. Bowron
Birmingham, Ala.

SYNOPSIS—*The mine operator may learn many valuable lessons concerning tramroad problems from observation of a well-managed steam railroad. The rules governing one apply to the other. One extremely important feature is to make someone responsible for each operation or for each department.*

ENGINEERING has been variously defined. One apt definition calls it the science or art of moving materials from one place to another. Another definition calls it the scientific spending of money to get the largest value out of a dollar. If we coördinate these two definitions, they will well apply to coal-mining engineering and management, where the prime object is to economically load and move coal from the bowels of the earth to daylight, to then move the impurities away from the coal and to finally load the clean coal, to be moved to the points of ultimate consumption.

Incidental to this we move many tons of air through the airways for ventilation. Nor is this any small movement in itself, for 75,000 cu.ft. of air per minute means about 3800 tons of air moved in 24 hours. We may also move many tons of water out of the mine with pumps. The weight of water thus moved often exceeds the coal tonnage; thus with a modest pumping of only 200 gal. per minute, this item amounts to 1200 tons per day. A mine producing, say, 1000 tons of coal per day may also have 5000 tons of air and water to handle "on the side." Add to this the movement of timber and supplies into the mine, and our definition appears quite apt indeed.

The processes rather naturally group themselves into the following: (1) The mining of coal, in which we may include cutting, blasting, timbering and loading; (2) ventilation and drainage as necessary incidental operations, and (3) haulage of the coal to the surface. It is relative to inside transportation that I desire to present some thoughts, nothing new or startling, to be sure, but possibly from a new angle or viewpoint. This viewpoint is that of considering the inside haulage system of a coal mine in the same light as that of one of our modern above-ground railroad systems, with main lines and branches, yards and terminal facilities, repair shops, round-houses, rolling stock, motive power, signals, maintenance of way and dispatching departments, etc. This is exactly what the mine tramroad is, on a diminutive scale of course. What then can we learn from the observation of modern and efficient railroad operations that can be applied to underground operations?

We find that railroad operation is a complex matter, and that it has been deemed necessary to divide it into departments in order to handle the various divisions, such as have just been mentioned. We find a responsible individual at the head of each department with someone to act in his absence. We also find all of the operations carried on in accordance with a well-defined system and a definite schedule. We can at once appropriate both of these items to underground application. We will therefore outline the duties of each and every man connected with the haulage system, clearly defining his responsibility relative to operating, maintenance and repairs. Unless these duties are thoroughly understood there will always be a multitude of things which are everybody's business and which eventually become nobody's business. In other familiar words, a lack of definiteness fosters the gentle art of "passing the buck."

Proceeding with our observations upon the outside railroad system, we find main lines of the heaviest construction, well graded and aligned, with maximum permissible gradients. Large trains and heavy locomotives are the rule on main lines. Plenty of sidings are provided for passing, for way freight unloading and at terminals. Round-houses are built for the locomotives where they are carefully gone over at the end of each run and groomed for the next one. Cars with a flat wheel or broken sill or door are put off at the first repair shop. And so on, with details to any extent we might care to enumerate.

What Some Operations Look Like

Now, if it were possible to ascend above some mine of which we all know (not ours, of course, but the other fellow's) in one of our military balloons to a convenient height where we could get a bird's-eye view of the entire operation and its transportation system, and then have the lid taken off the mine, exposing it to our critical view, we might see something like the following: Crooked track, crooked rails, curves laid by main strength and awkwardness, light rail on locomotive hauls, rail joints just hanging together, sharp swags and knuckles, mules sweating up grades that could be eased off or avoided, ties too small and without ballast, miners waiting for cars and cussing the management, and numerous other things with which all practical readers of *Coal Age* are only too familiar. And all this arises from a lack of system, schedule and good management, to say nothing of cars, sidings and the like.

What can we do to bring our haulage to a point of reasonable efficiency and in a general way comparable with an outside system where defects are more apparent? I will briefly enumerate only a few things, and naturally they cannot all be done at once, especially if the mine fits the foregoing description. Assuming a well-developed operation, the haulage will naturally divide into one or more main haulage systems, carrying large trips by rope or locomotives. These main haulages will be equipped with terminal yards. The secondary or gathering haulages will take empties from the in-bye terminal yard and distribute them to the working faces or headings, by mule or motors or both. It is essential for smooth operation that there be sufficient length of sidings to care for both empty and loaded cars. If the main line trip be 10 cars long, the sidings at each terminal should have a capacity for 20, 30 or even 40 cars, so as to avoid the general stoppage of haulage if the shaft or slope hoist be out of commission or (at the in-bye end) to avoid holding up the secondary

haulage. The main-line track should be laid with 40-lb. rail or heavier, with angle bars, on well-ballasted ties. Sharp changes in grade either way, responsible for broken couplings and wrecks, should be smoothed out. A heavy rail, well laid, will prove a good investment where a mine has many years of life, from any point of view. It will require less work to keep the track up and in line; it will not wear out the car wheels quickly; spilling of coal and consequent cleaning up will be at a minimum; higher speed can be maintained, requiring fewer cars, and there will be fewer wrecks.

I have in mind a 5 per cent. grade about 500 ft. long, laid with 20-lb. rails, over which two 7½-ton locomotives operated for several years—and the tires lasted just two months. The cost of tires alone would have paid for heavier rails, releasing the lighter ones for room work.

Standard curves, switches and frogs should be adopted and curves should be carefully laid out with transit or string. The capacity of locomotives being limited to their starting effort, it is advantageous to locate sidings and terminals on the level or with a slight grade in favor of the loads. If the main haul requires several locomotives with passing tracks, a good signal system is imperative, and any up-to-date mine should have a telephone system with stations at terminals, passing points, etc. This should also be connected with the outside of the mine.

In the matter of secondary haulage, the balancing of the work between the several units, whether mules or motors, should be carefully done, with the purpose of keeping them busy and the even more important object of keeping an "even turn." One mule serving ten men on a 2000-ft. entry will naturally not give the men as many cars as on a 1000-ft. entry. Grades must also be taken into consideration. A few days' observation with a watch and notebook, following up the various units and the actual work done by each, will form a basis for the planning of this part of the work to the best advantage and the making of any desirable changes by either altering the haulage or shifting men.

I believe that I am within the facts in stating that the number of mines where all the cars are given the men, promptly, that they could and would load are few and far between. How often have you gone in a mine and asked a miner how many cars he can load and get the reply that he has only had one or two today, but could load five or six; and that some days he gets all he wants and other days he does not. This man may average up all right, but what kind of outside railroading would this be with one or two trains one day and five or six the next? Furthermore, how long would the road's patrons stand for such operation? Nor is this always the fault of the haulage system in itself. It not infrequently arises from a lack of a sufficient number of mine cars. The average mine is, I might say, constitutionally short of cars. Many managers do not seem to assimilate the fact that as the mine workings advance more cars are required for the same output, because the cars are longer in transit or are on the additional sidings, etc.

The importance of well-built, easy-running cars is being increasingly appreciated. All unnecessary expenditure of the miner's energy in pushing hard-running cars is a tax on the company, for if he loads less coal on this account it is necessary to keep more rooms open and more track in operation in order to maintain a given output. Roller bearings are now common and relatively cheap for the better service they give; periodical lubrication is of importance. Large axles are of advantage, and these should be held firmly in alignment. Large wheels run more easily than small ones and last longer, of course. In this connection we often have to adopt a compromise in order to keep the car from being too high. Car irons should be made to templet and the best time to repair a car is as soon as it needs a single bolt, iron or plank and not after it is brought into the shop on a stretcher.

A daily report of delays arising from haulage, showing their cause and location and actual time lost, will assist in locating the weak spots. Thus if it is found that wrecks occur continually at one particular place the track at that point should be repaired so that the next one will occur somewhere else; if couplings are breaking they should be gradually discarded in favor of a stronger design. And so on, all along the line.

Even with ample equipment troubles may arise solely from lack of system and schedule, organization and coöperation. When organization is mentioned, I often think of my old friend Joe, a carpenter and all-round handy man. After Joe would get his instructions relative to a piece of new work, he would say, "All right, I'll get organized." He would then proceed to take a fresh chew of tobacco, fill his pockets with nails, chalk, string, tape-line and prints, sharpen his saw and hatchet, and then "go to it." Is it too much to say that the successful underground haulage system is composed of 50 per cent. cars, wire rope, motors, rails, ties, ballast, etc., and the other 50 per cent. brains?

Legal Department

INJURY TO COAL CUTTER'S ASSISTANT—Under the rule prevailing in Alabama, that an employer is not liable for injury to one employee due to negligence of a fellow servant, a coal-mining company is not liable for injury to a coal-cutting machine operator's assistant resulting from negligence of the operator in prematurely starting the machine while the assistant was acting under his orders. (Alabama Supreme Court, Vandiver vs. De Bardeleben Coal Co., 81 Southern Reporter, 569.)

CONTRACT UNENFORCEABLE AS BEING ONE-SIDED—A contract provided that a coal-mining company would sell, for delivery within certain territory, all coal which plaintiff might order up to 25,000 tons per annum, but imposed no obligation on plaintiff to order any quantity. Held, that although the contract is binding as to orders accepted by the mining company under it, it is not enforceable as to unaccepted orders; the agreement lacking mutuality of obligation—one of the vital elements of a valid contract. (United States District Court, Southern District of New York, Leach vs. Kentucky Block Cannel Coal Co., 256 Federal Reporter, 686.)

WHEN EMPLOYER'S NEGLIGENCE IS NOT PRESUMED—Suit for injury to a coal miner, resulting from fall of a boulder, is governed by the general rule of law that the mere occurrence of an accident does not warrant an inference that the employer has been guilty of actionable negligence. "The master is not an insurer of the safety of the employee; neither does the happening of an accident by which the employee is injured in the course of his employment, standing alone, furnish the basis for an inference of culpable negligence on the part of the master. An exception to this general statement of the rule is where the dangerous instrumentality which causes the injury is exclusively under the control of the master.' (Montana Supreme Court, Barry vs. Badger, 169 Pacific Reporter, 34.)

Lignite Deposits in Ireland

The term "lignite" or "brown coal" is usually applied to all coals which occur in formations more recent than the true Carboniferous period, although brown coal of the better sort sometimes so closely resembles good bituminous coals as to be indistinguishable by any marked difference of composition or appearance. As a rule brown coal has a widely variable calorific value on account of its fluctuating content of water and ash; 4000 to 6000 calories are the ordinary limits.

Austria and Germany were hitherto the only two countries where lignite was commercially exploited on a large scale. Immense stores, however, exist within the British Empire, and their development is only a matter of time. The coal deposits of Canada are estimated to be one-seventh of the world's known supplies; a very large amount of this total is, however, lignitic, and this is especially so in Alberta, where the total supply of all classes of coal is estimated to run to 1,000,000 tons. Among the Australian States Victoria possesses immense deposits of brown coal.

In England the lignite obtained from the Bovey-Tracey field in Devonshire is utilized for various processes of manufacture, especially at the neighboring potteries. Large resources are also known to exist in the Weald of the southeast of England, and, although the mining operations which were carried on at one time at Heathfield, Bexhill, and other places were failures so far as the actual discovery of true coal was concerned, there seems to be no reasonable doubt that the value of these lignitic deposits will appreciate to an important extent in the future. It is also stated that there are evidences of an extensive deposit of Tertiary lignite near Brighton.

Beds Near Lough Neagh Were Discovered After Period of Investigation

The presence of lignite in Ireland is noted in a number of places, but many of them are unimportant. Near Moneymeaney, County Londonderry, it exists associated with limonite and white limestone, and at Island Magee the seams of lignite assume considerable thickness. In County Down beds also occur which have not, however, in the past been accounted of much value. It is possible that more detailed investigation might reveal the presence of new lignite deposits and give more data concerning the old.

In this connection it may be stated that up to a very recent period it was assumed that no lignite beds of any value existed in the vicinity of Lough Neagh, and it was left to later investigation to disprove that theory. At the present moment there are several companies actively engaged in prospecting and boring operations in that neighborhood, and the possible future manner of the utilization of the lignite, if discovered in workable quantities, is looked at from different points of view by the various parties concerned. For example, one of the companies has in mind the practicability of making lignite briquets. The lignite around Lough Neagh occurs in the interbasaltic formation and in the pliocene clays. The most important deposits are said to be found on the eastern and the northwestern sides of the lake. Toward the center of the lake basin the mineral is fairly deep, but outcrops at the margins. It is probable that in working the clays the same difficulties will be experienced as on the Bovey-Tracey field in Devonshire, although it seems to be fairly conclusively established that the lignite in the Irish area is not interspersed among them.

No useful estimate can naturally be given of the quantity or extent of the lignite formation, as the experimental operations will not be completed for some time. Furthermore, while a coal seam may retain its original width and thickness for a considerable distance, it is not wise to make any assumption of this nature in connection with lignite, as the seam is variable. It is interesting to note that borings for bituminous coals are also being carried on in this neighborhood and present indications, at all events, would seem to point to a successful outcome.

Pulverized Lignite a Successful Fuel

As a domestic fuel most lignites are unsatisfactory on account of their comparatively high sulphur content, and in Canada they have proved an unsuitable substitute for anthracite, for which many household stoves are properly designed. In the same country the use of lignite for firing locomotives has been forbidden by the railway commission on account of its propensity of emitting dangerous sparks. Experiments so far made with the object of modifying the lignite by special treatment and then converting it into briquets have not met with any pronounced success.

At present the fuel research board is making experimental inquiries into the preparation and use of fuels from brown coals and peat, and the results of these experiments will naturally be of the highest importance to Ireland. So far it seems to have been demonstrated that lignite and peat, when pulverized, are thoroughly satisfactory for use as fuels. Lignites, for example, of which 20 per cent. may, in spite of all precautions, be left in the mine as smalls, can be dried quite satisfactorily for working in the pulverized form, and their use with locomotives has met with a remarkable degree of success. The application of peat in the same form is all the more remarkable considering its high water content. This pulverized fuel may also be used in other directions, and, provided the experiments are successful from the commercial point of view, sources of power in Ireland which have hitherto been neglected to a great extent may prove of the greatest utility in the future.

Use of Lignite for Power Purposes—Distillates

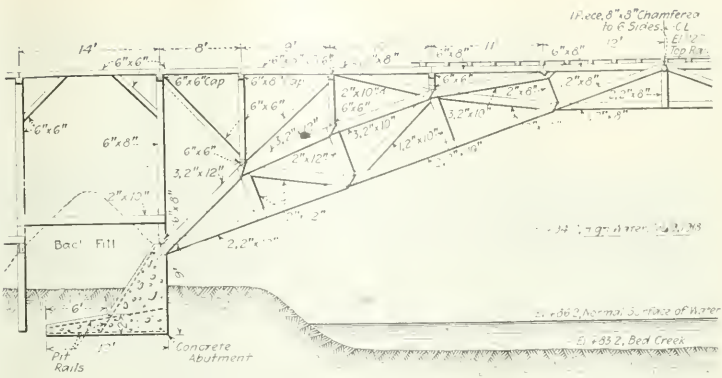
It is now generally admitted that peat can be employed not only for generating steam but also as a power and fuel gas; the gas generated from low-grade coal is used for industrial purposes, and, no doubt, lignite would give equally satisfactory results. To determine the value of some western Canadian lignites as fuel for producing power gas in a non-byproduct recovery gas producer tests were made a few years ago with commercial samples from five producing mines, and the result showed that lignite could be profitably used for this purpose, especially where cheap hydroelectric energy was not available. At Edmonton, in the Province of Alberta, the municipal power plant consists of several steam units and one producer-gas unit, and uses lignite coals almost exclusively obtained from mines in the vicinity. The producer-gas plant has answered most expectations, although in this case the producer installed was not entirely suitable for burning lignite. Better results would, in all likelihood, be recorded with a properly designed gas plant.

Some experts are of opinion that the Lough Neagh deposits could best be employed for the production of distillates. The nature of these products varies according to the age of the geological formation in which the coal occurs. In the older coals the original grouping of the elements in the parent vegetable matter which gives rise to acid products of distillation are alkaline from the presence of ammonia and other nitrogenous bases; but lignite coals, belonging to a later period, have been less completely altered from the original composition of the woody matter from which they have been derived, and, like wood and bituminous shales, yield products of the paraffin series. Some lignitic coals have, however, a high nitrogen content, and this could be recovered as ammonium sulphate, which would naturally find a ready sale in an agricultural country like Ireland, whose imports of that fertilizer amounted in value to nearly $300,000 in 1915. With the commercial exploitation of the Lough Neagh beds, a profitable chemical industry should spring up in the neighborhood of Belfast—the lake being only 20 miles from that city, with which it is connected by railway and canal.—London *Statist.*

One Hundred Foot Timber-Arch Span

By D. R. Walkinshaw
Greensburg, Penn.

A timber arch span 100 ft. long was built recently over the Big Sewickley Creek at Hunker, Westmoreland County, Pennsylvania, for the purpose of getting out coal during the shortage. The bridge was designed by the writer for the Fulton Coal Co. and was erected by the forces of the company under the direction of the carpenter.



DESIGNED IN ACCORDANCE WITH LUTEN FORMULA FOR CONCRETE ARCH

The increased demand for coal has caused the development of a large area of "Freeport" coal in the district around Hunker, which coal in this field has hitherto been considered of little value. In a distance of five miles along the above-named creek some forty mines have been opened in the "Freeport" seam.

In order to provide the shipping facilities that were needed it has frequently been necessary to extend trestles or tipples across this creek so as to load the coal at the railroad sidings, and the accompanying sketch shows the design of one of these bridges with the various dimensions.

Big Sewickley Creek has considerable width at places, and the bridge shown was designed with a clear span of 100 ft. and a height of about 18 ft. The arched members were designed in accordance with the Luten formula for a concrete arch ring. The curve is therefore a mean between the semicircle and the ellipse. The bottom chords and trusses are merely used to stiffen the short panels. The bridge is symmetrical throughout and consists of two ribs spaced 4½ ft. c. to c. and completely X-braced. In order to prevent swaying at the center two ½-in. wire-rope guys were anchored to large trees along the bank. The photograph shows the completed bridge, in which is seen the old suspension footbridge heretofore used.

The writer was the designing engineer and Joseph Kettering was the carpenter who had charge of the construction for the coal company.—*Engineering News-Record.*

TIMBER ARCH CONNECTS COAL MINE WITH RAILROAD SIDING

The U. S. Shipping Board has announced new trade routes that will enable cargo liners to carry American goods on scheduled sailings to every part of entry in the world.

SNAPSHOTS IN COAL MINING

BIRD'S-EYE VIEW OF THE SURFACE PLANT OF THE HAZEL KIRK MINE NO. 2, UNION COAL AND COKE CO.
The mine is situated on the Pigeon Creek Branch of the Pennsylvania R.R., near Monongahela City, Washington County Pennsylvania. The Union Coal and Coke Co. is a subsidiary of the Midvale Steel and Ordnance Co., of Philadelphia.

VIEW OF THE TIPPLE OF THE PATTERSON MINE, OWNED BY J. H. HILLMAN & SONS CO., OF PITTSBURGH, PENN.
The mine is located near McKeesport, Penn., on the Monongahela River. In the cars is shown the day's loading of ¾-in. and slack coal. The operation is in the Pittsburgh seam.

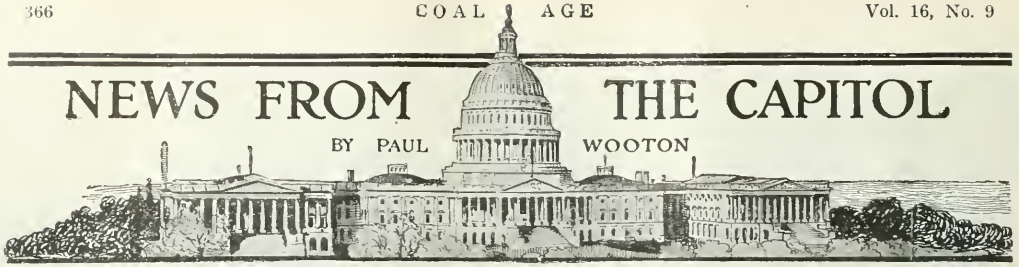
Courtesy of C. F. & I. Bulletin

The Evolution of the Colorado Fuel and Iron Co.'s Workmen's Homes From Pioneer Days to the Present Time

1—Type of "squatter" shacks erected by foreign-born coal miners in the early days of the industry. All buildings of this kind have been removed from the properties. 2 and 4—Types of comfortable frame houses occupied by many employees and their families. 3—Double dwellings recently erected at Calcite. 5 and 11—Homes in the Minnequa Heights district, Pueblo. 6—A modern cement-block cottage in a coal-mining town. 7—Part of Calcite, "upper camp," showing a newly erected modern double house. 8—Cement-block cottage of the type now constructed at most of the mining towns. 9—New double houses at the Lime camp. 10—Five-room brick cottages, with modern conveniences, recently erected at Sunrise, Wyo. 12—Street in a coal-mining town, showing type of dwelling.

NEWS FROM THE CAPITOL

BY PAUL WOOTON



Denies Existence of Combination to Boost Prices of Soft Coal

A combination among bituminous coal operators to maintain or fix prices does not exist, and would not be possible if attempted, J. D. A. Morrow, vice president of the National Coal Association, on Aug. 26 told the Senate subcommittee that is conducting an inquiry into the coal situation. Prices at the mine, Mr. Morrow added, have declined under the competition which prevails and are lower than they were a year ago.

There are about 5000 separate commercial producers operating approximately 7000 mines from which bituminous coal is regularly shipped, Mr. Morrow said. In addition there are some 2000 operators with about 3000 mines who begin producing and selling coal whenever the price goes up a little and offers a profit to them. Thus, in 1917, coal production was reported to the U. S. Geological Survey from 10,634 mines. Moreover, there are hundreds of thousands of acres of coal lands along railroads on which new mines can be readily and quickly opened by any one so disposed. Such a condition obviously does not lend itself to restrictive combinations among producers. In addition, the operators of certain mining fields are subject to competition from the producers of other fields, so that buyers have many different sources of supply available to them. Anyone who alleges that there is a nation-wide combination among bituminous coal producers, when these are the conditions of bituminous coal production and distribution, merely advertises his own ignorance or convicts himself of deliberate and vicious misstatements.

Of the 5000 separate bituminous coal producers in the United States, 2294, approximately 45 per cent., held membership in the National Coal Association. They produce about 60 per cent. of the total output of bituminous coal in the country. Charges that the National Coal Association is a combination to maintain prices are without foundation in fact; they doubtless proceed simply from ignorance of its purposes and activities.

The National Coal Association represents these operators and looks after their interests in matters of general concern, such as transportation and traffic questions, standardization of cost accounting, coöperation with Governmental agencies and similar activities. There is nothing secret about its business. Its files and records are open to the committee or any other duly authorized agency of the Government at any time.

The National Coal Association neither buys nor sells coal; neither does it have anything whatever to do with the prices which its members ask or sell at, nor with the territory into which they ship their coal, nor the quantity which they produce.

Mr. Morrow stated that bituminous coal prices have declined since the armistice, and in general are lower than the prices fixed by the United States Fuel Administration. He pointed out to the committee that until Feb. 1 last, the price of bituminous coal was controlled by the maximum prices fixed by the Fuel Administration in the various producing districts.

These Fuel Administration prices were intended to prevent the charging of undue prices for bituminous coal and to limit the profits which the mine operators might make, he said. At the same time they included fair profits in order that the production of sufficient coal should be stipulated during the war, but they did not permit exorbitant profits. The Fuel Administration prices were based on careful studies of the cost of producing bituminous coal in each of the districts. The Fuel Administration prices, however, did not take quality of coal into consideration. That is, the Fuel Administration did not give higher prices to the coal producers of any district merely because the coal was of better quality than the coal produced in some adjacent mining field. Poor coal and good coal, if the cost of production were the same, were treated alike, we understand, in fixing the Fuel Administration prices.

Mr. Morrow submitted charts to the committee graphically showing the prices at which bituminous coal sold at the mines in different districts of the United States from Apr. 1 to Aug. 1, 1919. In connection with these charts, Mr. Morrow explained that when the price restrictions of the Fuel Administration were removed on Feb. 1, 1919, the better, more desirable coals went to a premium in the open competitive market and the less desirable coals declined in price. He stated that this was the action to be expected in a market where a buyer exercises his choice and can obtain the kind he prefers. As a result, instead of the uniform prices in different districts, which were fixed by the United States Fuel Administration, prices promptly spread out, some coals going higher and some lower than they had been. The charts submitted to the committee showed that in districts producing high quality coals, such as Pittsburgh, southern Illinois, the Harlan field at Kentucky, etc., prices had remained at about the level set by the Fuel Administration or had advanced a few cents above that level. In most districts, however, such as central Pennsylvania, northwest Pennsylvania, eastern Ohio, central Illinois, the Hazard field at Kentucky, northwestern Virginia, etc., Mr. Morrow said coals of lower grade are produced. In such districts, prices declined anywhere from 10c. to 40c. per ton below the prices which prevailed under the United States Fuel Administration.

Meantime, Mr. Morrow said, the cost of producing bituminous coal is higher now than it was a year ago, due to the fact that the mines then were operating six days a week and in many cases are now operating only four days per week, and in some cases only three days a week. The overhead expense of maintaining mines goes on just the same, whether coal is produced or not. These idle-day expenses have resulted in increased costs per ton, as compared with last year. When these increased costs are considered in connection with the general decrease in prices, it is clear that profits of bituminous coal operators are materially less than a year ago.

Referring to statements by Representative Huddleston of Alabama, Director General Hines of the Railroad Administration and others, to the effect that bituminous coals prices in the mines are unduly high, Mr. Morrow said:

I wish to deny publicly and emphatically these allegations that bituminous coal prices are being maintained in some improper manner and are unduly high. I am convinced that these statements proceed simply from a lack of understanding of the fact.

Commenting on the suggestion by Director General Hines in his letter to Vice President Marshall, under date of Aug. 14, 1919, that in the event of any Congressional inquiry it would be expedient to ascertain the extent to which the absence of demand has been due to the maintenance of high prices, which discouraged the demand, Mr. Morrow said:

The committee will please notice that demand from consumers, as shown by the United States Geological Survey reports, has been the poorest in precisely those districts where the prices have declined the most from the Fuel Administration level; on the other hand, the Geological Survey reports show the steadiest demand for coal in precisely the districts where prices have gone down the least.

If Mr. Hines' insinuations had been well founded, it would be reasonable to expect that the absence demand would chiefly characterize the high-price districts and that the low-price districts would be filled up with business and running full time. The contrary condition is shown by the official reports of the Survey and answers the Director General.

Mr. Morrow drew comparisons between the prices of bituminous coals at the mines in the United States and foreign countries.

Prices at the mines in Great Britain, he said, are about three times the mine prices prevalent in the United States; in France the mine prices are more than three and a half times those of the United States. English mine prices range from $6.94 to $7.14 per ton, while bituminous coal in France is costing about $8.76 per ton at the mines. The average mine price of bituminous coal sold in the United States is in the neighborhood of $2.40 per ton.

Mr. Morrow closed his testimony by stating that the real problem is one of getting sufficient bituminous coal produced and shipped.

Take Issue with Railroad Director's Car Supply Report

Publication of the coal-car statement of the Director General of Railroads has brought a flood of protests to members of Congress, to the National Coal Association and to the American Mining Congress. Operators generally take the position that the Director General's statement does not reflect true conditions as to car supply. The matter was the subject of comment on both the floor of the House and that of the Senate. Senator Pomerene of Ohio has printed in the *Congressional Record* a long list of telegrams he has received. In connection with the presentation of the telegrams, he said:

I think it is only fair to say that perhaps in the early part of this year the coal difficulty was not due so much to car shortage as it was, possibly, to the high price of coal, which made many consumers hesitate about buying, or at least delaying to buy, hoping for better prices. I think that situation has somewhat changed; but the public is little concerned as to whether it is due to the high price of coal or to shortage of cars. It is interested in the coal supply; and while these cars are being manufactured and distributed by the Government through the medium of the Director General of Railroads, I hope there will not be cause for further complaint in this behalf. The report of Friday, made by the Director General of Railroads, indicates that a great number of cars are being supplied, I believe at the rate of about 300 per day. It is unfortunate that these cars were not distributed many moons ago.

West Virginian Defends Coal Industry on Floor of House of Representatives

What is regarded as a very able defense of the coal operators and of the coal industry was made on the floor of the House of Representatives, Aug. 19, by Wells Goodykoontz, of the fifth West Virginia district. His address, which was frequently punctuated by applause, was prompted by the attack made on the coal industry by Representative Huddleston of Alabama. Extracts follow from Mr. Goodykoontz's remarks:

It is usual for coal mines to be idle in summertime for lack of orders. It was for the purpose of keeping the mines at work and giving employment to the men and saving the population from suffering during the approaching winter weather, and in order to keep our mills and factories and furnaces going, that the National Coal Association appropriated the sum of $50,000 to warn the people. This patriotic action upon the part of the coal operators has been held up to public view as only the indication of lack of "common humanity and honesty on the part of the coal operators of this country." A more unfair statement and unjust allegation was never made, and the man who assumes to advise a domestic consumer in this country not to lay in a supply of coal for the coming winter assumes a terrible responsibility.

There is no industry that is subject to more trials and misfortunes, disappointments and vicissitudes than is the coal-mining industry. There is no business that requires higher technical skill and greater business enterprise than that of producing coal.

There is no business enterprise that is as harrowing and exasperating as that of conducting a coal-mining operation. The establishing of an efficient coal-mining plant calls for a very considerable investment. There is a very large financial risk coupled with the development of a coal mine, and the man who enters upon it engages in a business venture that may cause the entire loss of his investment.

The ancients found good in everything, and believed that even a toad had a jewel in his head. And so, from the war and the taxing laws the operators have been held to a system of uniform accounting, with the result that they have discovered what they never before seemed to have realized, that they, under the old system of prices, had been losing mony every day they operated the mine. Expert accounting showed them that every ton of coal taken from the mine reduced their capital expenditure just that much, and that when exhaustion was complete the entire investment was extinguished, so that coal must be sold at a price sufficient to cover the original cost of the coal and the plant, with interest, taxes, and other fixed charges, but also to cover the cost of mining.

To Cooperate on Heating and Ventilating

Important coöperative work is to be undertaken by the Bureau of Mines and the American Society of Heating and Ventilating Engineers. The engineers are to furnish a director of research at a salary of $5000, an assistant director at a salary of $2400 and a stenographer at $1040. The Bureau of Mines is to furnish a fuel engineer at a salary of $3000, an assistant fuel engineer to draw $1800, and a helper to be paid $1200. The research work is to be done at the Pittsburgh station of the Bureau of Mines, where all the facilities of the Bureau are to be available for use in the investigation of fuel, heating and ventilating problems.

Development of the Government's coal mines in Alaska is proceeding. Reports of operation for June, which have just been received, show that 3300 tons were brought to the surface at the Eska mine and 120 tons at the Chickaloon mine. The former mine employs 80 persons and the latter 32 persons.

COAL AGE

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The Better the Coal, the More Mobile the Labor

MOBILE labor, the kind of labor that is at home where it hangs up its hat, has certain advantages after all. It congregates where labor is needed, it wanders away readily when the need is at an end. Turnover is not all loss, when the books are balanced. It was mobile labor that developed the West, is creating Alaska, that made the Appalachians a hive of industry.

In the Middle West the mobile labor of a generation or two ago settled down and sunk its roots into the ground. It built houses and formed a community life. Many of the older coal fields of the Middle West are of that type. Now that better fields have been found, and the best coal of the old fields has been worked out, the problem is what shall be done with this mobile labor now become immobile, for which no employment can be continuously found.

The newer mining regions of the Middle West, those which have the better coal, have company houses and accordingly are manned with a readily moving population. The coal fields in the mountainous districts of the Appalachian Province, where the coal is always most in demand, are full of company-owned villages with a mobile population. Thus for the most part, in the sections with the poorest coal, the employees own their homes, while in the fields with the best coal the companies own the houses. Thus mobility which should go with poor coal is most marked with the best. Georges Creek and the Moshannon Valley are sections, however, with good coal and an immobile population.

The "United Mine Workers' Journal" shows poreine "Profiteers" feeding in a field of "War-Time Prices," labeling the cartoon: "The Pigs are in the Clover." In what else can any one feed but war-time prices with wages higher, if anything, than before the armistice? Try again, cartoonist Kettner; the pigs must break into a yet more luscious field, namely one growing "post-war prices," if they are not to starve to death with the "post-war" wages that the mine workers and others are demanding.

Pumps on Hand Are An Insurance Policy Against Water Troubles

BETWEEN successful and unsuccessful superintendence lie only the practices of prevision and provision. The inadequately experienced fail entirely to look ahead and others, well knowing the difficulties and having clearly visualized them, take no precautions to head them off. In nothing is this ignorance and indifference more general than in light pumping. The average mine superintendent fails to order his small pumps till he is badly beset for the need of them, and he is constantly at loggerheads with the purchasing agent because that functionary tries to put the urgent order through according to the tried and methodical methods of his profession.

As a matter of fact, at most mines, the pumps should arrive as soon as the timbers, whether the opening be a slope, a shaft or a drift. In any event water will probably be encountered in a few days, and is certainly to be expected eventually, and the presence of the pumping outfit insures reasonably economical removal of the water and the steady progress of the work. Many a man has lost five or six times the cost of a pump in trying to do without one or to make badly broken equipment do the work. And then, after all his wasted effort, he has had to purchase the pump into the bargain.

The loss of time is often worse than any other loss. The completion of every part of a mine plant is schemed to synchronize with the completion of every other part. If, therefore, the plant is built and the mine is not ready to utilize it to the degree intended, an unnecessary loss results.

Many a mine works at half or two-thirds tonnage waiting for the water to be pumped out of some vital roadway that has been drowned out. In newly opened mines many a railroad is left without opportunity for service, many a boiler and engine plant lies idle or runs at a tenth or a fiftieth part of capacity, because a certain essential part of the development is flooded with water.

Nowadays, with portable electric and pneumatic pumping outfits, there is no necessity for the delays which formerly unduly protracted and needlessly harassed operation. No longer need a mine with thin coal wait so distressingly on the extension of headings through water-soaked dips. A degree of certainty and assurance is imparted to operation. Where, before, the management declared that the place would be driven in so many days, "if we don't strike a dip," with portable pumps there need no longer be any such proviso if only the pumps are on hand ready to be wheeled into place and put in operation.

In those early days of the baled powder keg and of the wood and pitcher pumps, in those years when water was taken out in a car or shoveled on the top of every pit wagon of extracted coal in the hope that sufficient would stay in the leaky vessel during the short passage from the bottom of the dip to the outwardly sloping roadway beyond, with what worries and discomforts was mining fraught! With what industry did the heading man send shovelfuls of water after the retreating car in the hope that put in at the last moment it would not be drained off till the summit of the hill was reached!

And with what patience those early heading men drove their main headings down into the dips, put out their crosscuts and then drove the return airway (far from being an airway till completed) up the grade, so as to avoid the difficulty of driving two headings downward into the water-soaked strata! With what weariness did working places stand till other places were up and water courses were constructed! Our tonnage today rests where it does largely because the pump is there to do the work as soon as pumping is needed.

Mining history revolves around the pump. All the early mines in England and all the native coal work-

ings in China (and not a few of our own early mines) stopped as soon as such water was reached as needed lifting. It was the discovery of the steam pump that made extensive mining possible and brought a new era in British mining. So important was this phase mechanically that it may well be wondered if the steam engine would ever have been perfected if it had not been for the persistent needs of the mining engineer, for other mechanical uses of the steam engine were adaptations and, for some while, not any too successful adaptations, of the mine steam pump.

And even now progress still waits on the pumps. Not that the pump is laggard, but because our use is laggard. We wait to requisition for the pump we want till some few days after it is needed, and then wait long for its delivery. As a result haulageways and ventilation places lag and the tonnage is curtailed; sags fill with water and cars run hard from loss of oil in the bearings; locomotives cannot run through the water and the tracks are spoiled. The poorly equipped mine is always waiting for something, and the superintendent sees his tonnage decline, though he puts in double time at his work nevertheless. If he would start right and stay right with the possible needs all provided, he would not have to be so skillful in meeting trouble or so meticulously painstaking, nights and Sundays; and the trouble he so much dreads would never come.

Instead of the five-day week we need the 290-day year. Who will contrive to regulate our buying so that such a steady outflow of work will be attainable? If it could be done, it would perhaps increase the world's real earnings 30 to 50 per cent.

Failures in Profit Sharing

EVERY once in a while some one revives, as something new, the cry of profit sharing. The plea sounds so logical and so excellent that it readily carries conviction with it. When profits are large and stable or even increasing, there are no great objections to profit sharing. True, the defect of profit sharing is that the revenue does not come to the working man once a month or once every two weeks. Coming in bulk, profit sharing does not help him pay the rent or fill his market basket. It is an exceptional income which, coming in at widely separated periods, is soon spent and cannot help in the payment of the weekly expenses.

If the profit is certain, and never gets less, the workman receiving it is not disposed to complain, but if it should get smaller, if it ceases or if it is replaced by a deficit, what happens then? The workingman is not disposed to accept a gamble for his wages. That is a recognized principle of socialism which is worthy of study, if only as the creed of covetousness. It decrees that there shall be no uncertainty of return. Whether a man chooses a line of work which no one wants or one for which he is in no way fitted, he must, nevertheless, be fully protected.

If he cannot put the balls in the pocket, someone else must do it for him. He may gamble with his money when he has it, but not for him are decreasing returns for his labor. The capitalist may be like the ship of the desert, the camel, and go without for an inordinate period of time, but the workman will not do so. If he were so constituted he would be of the genus, "capitalist." It has well been noted that a fish with gills and fins takes naturally to water.

When diminishing returns occur the workingman is apt to be suspicious. He believes that such charges as insurance, depletion, amortization and obsolescence should be ignored and that nothing should be put aside for a rainy day. Why charge heavily, for instance, for insurance when no accidents have been met. However, there are men whom diminishing returns might not shake in their loyalty. They are not many. Faced by a year of profitless operation most workmen will want an increase in wages that will equal the last divided profit, so that they will be safely assured of last year's income.

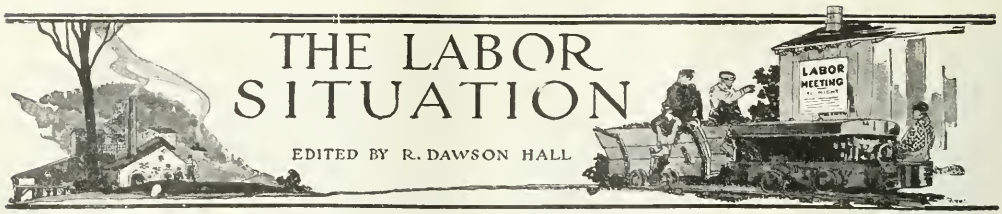
When there is a loss, their profit-sharing is for the nonce at an end. Then the only effect of the profit-sharing scheme is to give the employer discontented men. The plan will work fairly well so long as profits grow, but the coal business is hardly one in which that condition can be secured. If it were a profit-sharing that would pay the profit as an extra wage throughout the year after its earning to those who stayed with the company it would have many arguments in its favor.

Great Britain, in its long and varied and economic history, has tried profit-sharing extensively. In 1912 the Government of the United Kingdom published an analysis of all the many attempts to share profits with the employee in the past 125 years. From that report it appears that 299 such experiments were made, 133 of which failed. Thus there remained 166 other ventures, but they only involved 106,000 employees out of a possible 15 million. Three-fourths of these were public utilities where a profit was, up to that time, practically always made. Since 1912 there must have been many years with nothing but a deficit, and the death rate in the 166 concerns must have been large.

Unions are usually dead set against profit sharing. They argue that it makes men satisfied with a lower wage and that a concern with a lower wage can always cut the price and so underbid other concerns. That, however, could not be the case with coal mining where the scale is fixed by union agreement, and the profit-sharing capitalist, like his old line competitor, would have to pay the union scale.

Again it is argued that the profit sharer must stay to get his profit, and so is not given his full liberty to quit at his pleasure. Also, in part, the union objects to the contentment it may foster if profits steadily increase. Contentment does not exactly spell union success, and perhaps a union man would be superhuman if he could overcome his objections to any scheme which caused men to regard the union as unnecessary. And again profit sharing tends to increase efficiency and by that fact enables the profit-sharing capitalist to underbid his rivals, thus making the lot of the discontented employees of the concern which does not divide profits harder than it would otherwise be. The workmen in the non-participating company in consequence make a call on the union for the suppression of the concern that is dividing profits.

The increased cost of transportation, foreshadowed in the losses sustained in the operation of the railroads and in the increased pay demanded by the railroad men, will add immensely to the price of coal delivered to the consumer and will add to his woes. Larger wages for mine workers and larger transportation charges are fit causes for the discomfiture of the masses.



Changes in the Cost of Living July, 1914—July, 1919

The cost of living for American wage-earners was 71 per cent. higher in July, 1919, than at the outbreak of the world war in July, 1914, according to a preliminary statement issued recently by the National Industrial Conference Board based on a careful survey of conditions the country over. This represents an advance of 6 per cent. since March, 1919, and of 12 per cent. since June, 1918. The increase of 71 per cent. to July, 1919, makes the highest point yet reached and compares with an increase of 61.3 per cent. to March, 1919; of 65.9 per cent. to November, 1918, and of 52.3 per cent. to June, 1918.

The total increase for the five-year period since the beginning of the war in the average cost of each of the principal items entering into the family budget was:

	Per Cent.
All items	70.8
Food	85
Shelter	28
Clothing	100
Fuel, heat, and light	57
Sundries	63

	Per Cent.
All items	5 9
Food	5 7
Shelter	4 9
Clothing	10 5
Fuel, heat, and light	No change
Sundries	5

In combining these separate items to obtain the increase in the budget as a whole, account has been taken of the fact that approximately 43 per cent. of the income of the average wage-earner's family is spent for food; 18 per cent. for shelter; 13 per cent. for clothing; 6 per cent. for fuel, heat and light, and 20 per cent. for sundries. This distribution is based on studies of the expenditures of a large number of families made by the United States Bureau of Labor Statistics and other authoritative government and private agencies. The method of computing the change in the cost of living on the basis of the increases found for the separate items by the National Industrial Conference Board is shown below:

Budget Items	Relative Importance in Family Budget, per Cent.	Increase in Cost Between July, 1914, and July, 1919, per Cent.	Increase as Related to Total Budget, per Cent.
All items	100.0	....	70.8
Food	43.1	85a	36.6
Shelter	17.7	28	5.0
Clothing	13.2	100	13.2
Fuel, heat, and light	5.6	57	3.2
Sundries	20.4	63	12.8

a Based on an increase of 84% up to June 15, 1919, as reported by the United States Bureau of Labor Statistics

The allocation of expenditures for the different budget items usually varies so little among the families of wage-earners that with any reasonable distribution there would be but slight deviation from the average increase of 71 per cent. since 1914. This figure is, therefore, broadly representative of conditions the country over. But it should be emphasized that special local, racial or other circumstances may at times make necessary some revision to adapt this estimate to meet specific conditions. This is especially true of rents, since changes in this item have at times differed considerably in separate communities. With the data given, however, such necessary adjustments may readily be computed.

Estimates of changes in the cost of living made by the Board on the basis of retail prices and expenditures for the separate budget items by average families must not be confused with changes in wholesale price index numbers such as Bradstreet's, Dun's or those of the New York Times *Annalist*. Wholesale commodity prices do not necessarily change concurrently with retail prices and, as already pointed out by the Board, they often tend to advance faster than retail quotations.

Although valuable as an index of market conditions, commodity prices do not take account of the relative importance of the different items in the family budget. Likewise changes in retail prices of food should not be used as representing changes in the cost of living, since they measure but one item in the budget. The only accurate measure of changes in the cost of living is that based on retail prices weighted according to the proportion of the total budget spent for each item by average families.

More detailed information regarding changes in the cost of the separate budget items is given briefly below. Average retail prices of food as collected by the United States Bureau of Labor Statistics have been accepted by the Board as the best available measure of changes in the cost of this item. For all others, original data were secured by the Board through replies to detailed questionnaires distributed to a large number of retail merchants, real-estate brokers and others in close touch with local conditions in all parts of the country.

Food

Average retail prices of food were slightly more than 5 per cent. higher on June 15, 1919, than on March 15, 1919, and 84 per cent. higher than before the war, on the basis of average prices for the year 1913. The increase within the year ending June 15, 1919, was 14 per cent. These figures cover price changes of 22 articles of food as reported by over 2000 dealers. Since the Bureau's estimate of 84 per cent. increase is for June 15, a slight addition was made by the Board to allow for a possible rise in the last half of the month.

Some of the articles showing the most significant price changes since June, 1918, were onions, the price of which increased 133 per cent.; prunes, 53 per cent.; coffee, 41 per cent.; potatoes, 31 per cent.; cheese, 28 per cent.; eggs, 26 per cent.; butter, 24 per cent.; lard, 23 per cent.; sugar, 16 per cent.; milk, 15 per cent.; and flour, 12 per cent. The prices of chuck roast and plate beef decreased 5 per cent.; of corn meal, 6 per cent., and of navy beans, 31 per cent. Compared with June, 1913, the average prices of the following articles in June, 1919, were 100 per cent, or more higher: Sugar, pork chops, ham, bacon, potatoes, corn meal, flour and lard.

Shelter

Reports regarding rent conditions were received from practically all of the cities in the United States having a population of 50,000 or over, and from a number of smaller places. Of more than 300 statements from persons closely in touch with rents as paid by wage-earners in these separate cities, only one recorded a decrease in this item since March, 1919. In many places rents were still rising, although few pronounced increases were found. Frequently the larger increases reported in July were in those localities where former advances had been least, indicating that the tendency to a leveling of the total increase in rents the country over, which had been evident in March, was still in progress in July.

The estimate of 28 per cent. as the average rise in rents since 1914 is, therefore, of more general application than that of 22 per cent. up to March, 1919; of 20 per cent. up to November, 1918; or of 15 per cent. up to June, 1918, as given in previous reports by the Board. Between March, 1919, and July, 1919, the average increase in rents for the country as a whole was about 5 per cent. These are averages for all sections of the country and reflect a considerable variety of rent conditions.

The opinion was general that rents would continue to rise, since, on account of the abnormally high cost of construction and maintenance, the number of houses being built is inadequate to meet the demand for accommodations. In some places the housing shortage had stimulated popular "own your own home" campaigns and various schemes to assist people to build.

Clothing

The advance of 100 per cent. in the cost of clothing is larger than that of any other of the major budget items. The average outlay for a family's clothing needs in July, 1919, was 10.5 per cent. more than in March, and 3.6 per cent. more than in November, 1918, when the previous high peak of clothing prices was reached. Since the summer of 1918, the average cost of clothing had advanced 13 per cent. These increases were obtained by combining the percentages of change in the cost of the separate articles according to their relative importance in the total clothing budget.

Quotations for 29 types of most commonly used yard goods and wearing apparel were secured from 146 dealers in 43 cities. For every article the average price was higher in July, 1919, than in March. As compared with November, 1918, changes varied, but the most important were upward. Cotton and woolen yard goods, overalls, knit and muslin underwear, and the cheaper grades of work shirts, although higher in price than in March, were slightly lower than in November.

THE HEAVENLY TWINS—THEY GO SKYWARD TOGETHER

Prices of yard goods increased more than did prices of made-up garments in the five-year period since 1914, but the cost of women's shoes advanced 131 per cent.; women's gloves, 125 per cent.; women's knit underwear, 120 per cent.; women's coats, 116 per cent., and women's hosiery, 104 per cent. between July, 1914, and July, 1919. In every case these marked the highest points reached since 1914. Several articles of men's clothing also cost 100 per cent. more than before the war. Dealers very generally expressed the opinion that clothing prices were likely to go still higher.

Fuel, Heat and Light

No important change in the combined cost of fuel, heat and light between March and July, 1919, was indicated. While there was a small increase in the cost of anthracite, there was a corresponding decrease in the price of bituminous coal. Prices of other items in this group were practically unchanged. The average increase in the total cost of fuel, heat and light combined, therefore, is again placed at 57 per cent., as in the March study.

Retail price quotations on anthracite and bituminous coal for household use, secured in July, 1919, from 97 dealers in 43 cities, were analyzed. These showed changes since last March for anthracite varying from a 9 per cent. increase in Boston, to a 9 per cent. decrease in Charleston, S. C., and an average increase for the country as a whole of 1 per cent. to 2 per cent. The total increase since the beginning of the war in 1914 was between 54 per cent. and 57 per cent. The increase for bituminous coal within the five-year period was 55 per cent.

Coal dealers were generally of the opinion that the price of anthracite would advance further within the next few months, but there were suggestions that the price of bituminous coal might drop. Average retail prices of coke and wood fell in a number of cities, but in others they advanced; for the entire country no significant difference was indicated. Few important changes in the cost of gas and electricity to small consumers between March and July, 1919, were reported, although the tendency of rates was upward.

Sundries

Reports regarding carfare, one of the principal items in the sundries group, were received from 143 cities. In 121 of these there had been no change between March and July, 1919, and in 3 there was a decrease. Such increases as occurred were small. Changes in carfare the country over were, therefore, unimportant. The retail price of tobacco was somewhat higher in July than it had been in March, partly because of increased taxes. The tax on candy, soda water and ice cream as well as on toilet preparations and drugs also contributed to raise the cost of these items. Household furnishings and supplies were in many instances higher in July than they had been in March. On the other hand, the prices of admission to amusement places, of reading materials, and of doctors' services remained about the same. Postage decreased.

From these separate estimates it appears that there was a small increase in the cost of all sundries combined between March, 1919, and July, 1919. This has been placed at 5 per cent. It must be understood, however, that families vary more in their expenditures for sundries than for any other of the budget items and that no estimated change can be said to be typical. The estimate of 5 per cent. increase is based on a wide variety of combinations and is as representative of the change that has occurred as any that can be reached. This brings the total increase in the cost of sundries since 1914 to 63 per cent. as contrasted with 55 per cent. in March, 1919, and November, 1918, and 50 per cent. in June, 1918.

The Complete Budget

A summary of changes in the cost of living as determined in the four surveys made by the National Industrial Conference Board is given in the table below:

INCREASE IN THE COST OF LIVING FOR WAGE-EARNERS IN AVERAGE AMERICAN COMMUNITIES, BETWEEN JULY, 1914, AND JULY, 1919, BY SEPARATE BUDGET ITEMS

Budget Items	July, 1914, to June, 1918, per Cent.	July, 1914, to November, 1918, per Cent.	July, 1914, to March, 1919, per Cent	July, 1914, to July, 1919, per Cent.
All items	52.3	65.9	61.3	70.8
Food	62	83	75	85a
Shelter	15	20	22	28
Clothing	77	93	81	100
Fuel, heat, and light	45	55	57	57
Sundries	50	55	55	63

a Based on an increase of 84 per cent. up to June 15, 1919, as reported by the United States Bureau of Labor Statistics.

A complete report containing the evidence from which these conclusions were drawn—the fourth of a series on this subject—will be issued by the Board within a few weeks.

[The following notes may be made on the foregoing to fit the figures to the mine worker's conditions. Prior to the war the average mine worker—contract man and day man—might have been figured roughly as earning $100 per month. The rent varied greatly. In the West it was more than in the East; in the villages, towns and cities it was usually more than in the company mining town. Probably it averaged about $10 per month. This is about 10 per cent. instead of 17.7 as in the table given in the foregoing article shows. Fuel, heat and light probably amounted to barely 2 per cent. Therefore the following seems a fair adaptation of the table to the conditions of the mine worker:

Budget Items	Relative Importance in Family Budget, per Cent.	Increase in Cost Between July, 1914, and July, 1917, per Cent.	Increase as Related to Total Budget, per Cent.
All items	100	...	73.0
Food	49.5	85	42.0
Shelter	10.0	0	0.0
Clothing	15.1	100	15.1
Fuel, heat and light	2.0	57	1.2
Sundries	23.4	63	14.7

The mine worker has therefore sustained a greater increase in cost of living than the ordinary workman because a larger percentage of his earnings has, for many years, been devoted to the items clothing, food, sundries, and these have had relatively the larger increases in price. The difference is, however, small—73.0 as against 70.8 per cent. The calculation just made is quite empirical. It may be rightly objected that it takes no account of the cost of supplies which if figured would reduce the amount spent on clothing, food and sundries and bring the miners' increase in cost of living to a lower figure. Powder being the principal item in the cost of supplies has not increased in price to the miner, so perhaps after all the figure given by the National Industrial Conference, 70.8 per cent., would fit the miner well and 73.1 would fit the day worker more closely, though again it must be admitted we do the day worker more than justice when we put his rent charge at only 10 per cent.—before the war he must have paid more and, as we have seen, reducing the percentage of rent charge raises, instead of lowers, the rate of increase of the whole budget, for a man who pays little or no rent expends more on food, clothing and sundries which have made the largest advances. The increase in the cost of the mine workers' living lies somewhere between 70 and 75 per cent. The disposition is to place it higher than that figure, basing the increases not on the whole budget but on the cost of certain articles of clothing and not on the same article but on some other article of greater intrinsic value that the well being of the mine worker has caused him to substitute for the less valuable article.—*Editor.*]

General Labor Review

Rarely has the labor situation been more full of event than today. At Wilkes-Barre the representatives of the anthracite members of the union as a whole have proved even more radical than the union men of Indiana. Where Indiana wanted a minimum of 40 per cent. for all employees and 61 per cent. for surface workmen, the Tridistrict convention in the anthracite field seeks 60 per cent. for everyone. The anthracite region, it was hoped with reason, would not approve the demand for the 6-hour day and 5-day week. However, it did, when the time came. There is plenty of room for a second and soberer thought before Apr. 1, 1920, when a new anthracite scale is to be written.

In West Virginia, the mine workers of the New River field have accepted the tentative agreement by which wages remain at the same level (with some trifling reductions, it is true), hours remain unchanged, discipline is more definitely provided and the price of domestic coal is increased, the contract to remain in force until the Central Competitive region makes a new contract when the New River mine workers will receive a second document, the provisions of which will accord with those of the agreement made by the Central Competitive region. The Williamson or Thacker nonunion fields on Aug. 14 decided to advance wages and shorten hours to eight per day.

In Illinois and British Columbia, the United Mine Workers of America are resuming control over the unorganized insurgents in one case and the "One Big Union" in the other. The old union men of British Columbia are using kidnapping methods to overcome the members of the O. B. U. while the insurgents of Illinois are using violence to prevent the regular union men from working.

In Kansas the United Mine Workers are led by the extremely radical Alex. Howat, the district president. No one could well be more radical than he. There is no fear that while Howat is in the saddle any more socialistic man will be found to lead in opposition to his dictates. The conservatives are few in number, so Howat has just been promised support "to the last ditch."

The tridistrict convention (districts Nos. 1, 7 and 9), at which all members of the United Mine Workers of America in the anthracite region are represented, met at Wilkes-Barre, Penn., on Aug. 19. The presiding officer at the opening session was Thomas L. Kennedy of the Hazelton region. It seems to have been feared that none of the district presidents in the anthracite region could hold the meeting in line seeing that the insurgents in District No. 1—the northern field—were present in numbers and might be expectd to "insurge" at any moment.

On Aug. 3, seven local unions had met in the convention city and had voted that they would pay no more dues to the organization until some determination had been made of the electoral dispute. As has been already stated, the insurgents claim that ballots have been changed. Because of the presence of the insurgents, pressure was brought to bear on the acting international president, John L. Lewis, to come to Wilkes-Barre and preside over the convention, and eventually he came.

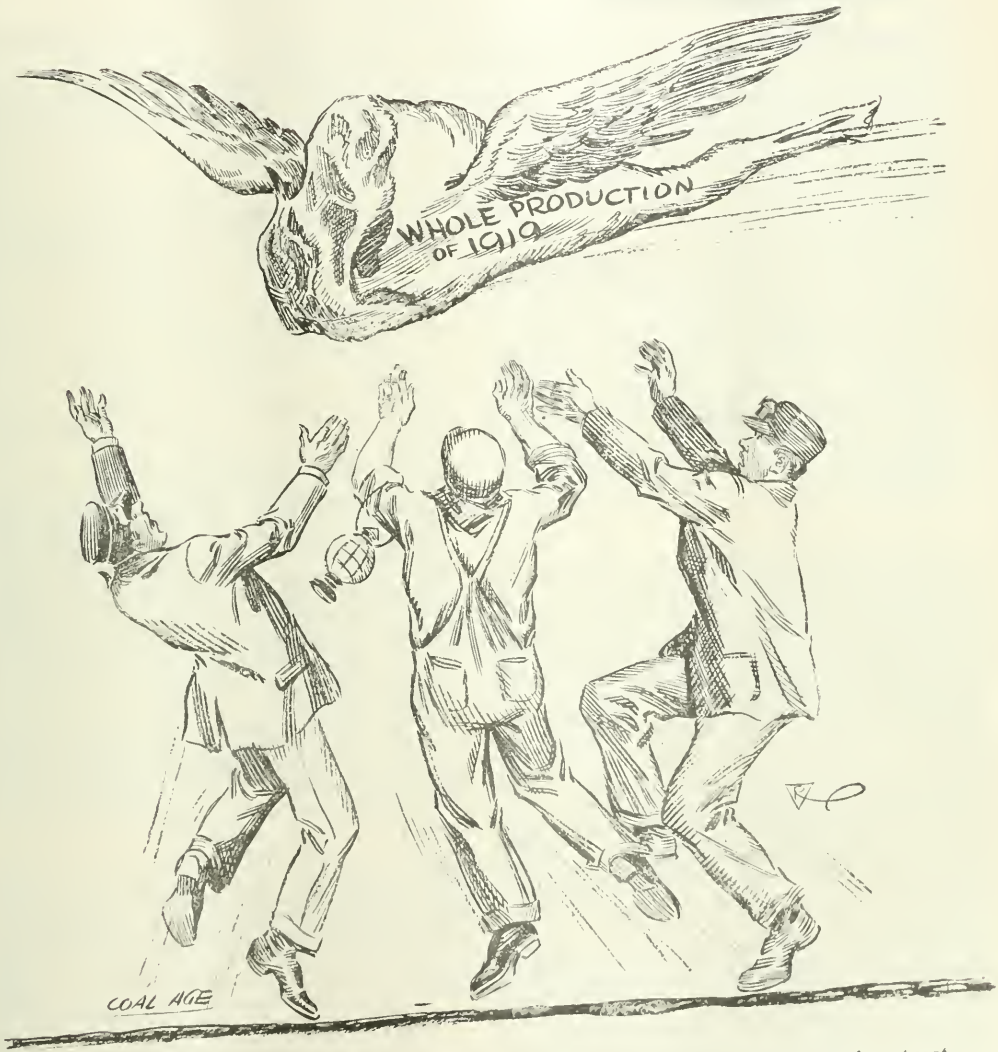
The mine workers' representatives declared for a 60 per cent increase, not over the old contract rates but over the present war-bonus rates now in operation. There is a general belief that the demand for shorter hours and a shorter week will not be persisted in when final action is taken at Cleveland, Ohio. The anthracite region is suffering acutely from a shortage of men, the mines work every day in the week, and still the market is not quite comfortably assured that there will not be found a shortage when winter comes. The mine workers of the anthracite region, therefore, will show themselves quite indifferent to public need if they shorten their working time.

They do not view the matter as do the men of the Central Province where shorter time would assure an overwhelming coal shortage such as would make the mining industry as steady as in Great Britain—until, of course, West Virginia, Virginia and eastern Kentucky contrived to increase their tonnages to handle the demand that would be made on those sections.

But what could the district do with the demands of the policy committee for a short day and a short week before them and in view of the unpleasantness which recently occurred when certain companies, finding the miners had all gone home and there was no coal to haul or prepare, closed down at about 6 hours? This trouble, however, could be cured if the miners and laborers would consent to work the contracted length of time, namely an 8-hour day. William Green, the secretary of the union, on Aug. 20 declared for the shorter day, asserting that just as much coal could be obtained with the less lengthy days as with one of 8 hours.

It is rumored that meetings of foreigners have been held at which it was shown that the miners who were planning to return to Galicia, Italy, Russia and Poland were being deterred by the high price of everything in those countries. Foreigners quite generally, deploring the high cost of living in America, have overlooked the fact that in Europe the cost of living has risen much more. Whereas a competency here was formerly a small fortune in Europe, a competency in Europe is now a small fortune here, so much lower are our rates of living.

They Can't All Have All of It, So Why Not Divide It Fairly?



The cartoonist shows the production of 1919 as a leg of mutton, with the street-car conductor, the railroad man and the miner all striving to reach up and get it. They can't all have all of it, so why not divide it fairly? There is only so much of it, so raising wages all around won't make any one get any more of it than they would with the present wages. If some get more wages than others by striking or violence, they will get more than their share and some will do without. The only way for us all to get more mutton is by raising a bigger sheep.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Unpractical Examination Questions

Letter No. 2—In the issue of *Coal Age*, July 24, p. 165, the editor requests a practical solution of a question asking for the size of two airways whose perimeters are equal and the sectional area of one of them half again as large as that of the other. He states, in reference to this and other questions given on the same page, that one or two of them are hardly capable of a practical solution.

To my mind, there would never be an airway having dimensions that would fulfill these conditions and which would be of use in mining practice. We can assume, for example, a hexagon whose sides are each 6 ft. as being the cross-section of an airway. Its perimeter is 36 ft. and its area 93.53 square feet.

Then, taking two-thirds of this area as the sectional area of a rectangle, we must find a rectangle having a perimeter of 36 ft. and a sectional area of $\frac{2}{3}(93.53) = 62.35$ sq.ft. By trial, I find this rectangle to be 4.68 x 13.32 ft., which is therefore the cross-section of the required airway. ANDREW O. BAIN.

McKeesport, Penn.

Letter No. 3—Referring to the examination questions answered in *Coal Age*, July 24, p. 165, I notice that the reply to the second question on that page states, "We should be glad to receive a practical solution to this question." The question asks for the size of two airways, whose perimeters are equal, while the area of one is half again as large as that of the other.

Such a question as this is only interesting as a mathematical problem, and I heartily agree with the editor that there is no justification for asking the question in a mining examination. The only excuse for asking such a question is the fact that it may serve to emphasize the practical advantage of a circular airway over a rectangular one, in respect to ventilation, it being well known that the circle has a greater area, for the same perimeter, than either a square or a rectangle, and likewise, the square a greater area than a rectangle.

The advantage gained in ventilation by reason of these facts is the lesser amount of rubbing surface per square foot of area, first, in the circular airway and, second, in the square airway. However, practical considerations regarding the driving, timbering, etc., of mine entries, debar the general use of airways of the circular form, and it is necessary to forego the advantage in respect to ventilation and adopt the rectangular form of cross-section for all mine roads and airways.

In the solution of this problem, let us first compare the circle with a rectangle having an equal perimeter, assuming the area of the rectangle is two-thirds that of the circle, since it is plainly evident that the circle must have a greater area than a rectangle, for the same perimeter. Calling the diameter of the circle d and the two sides, the height and width, of the rectangle, a and b, respectively, we have, from the conditions of the problem, the following:

Perimeter, $3.1416\,d = 2(a + b)$ (1)

Area, $\frac{2}{3}(0.7854\,d^2) = ab$ (2)

Now, for the sake of simplicity, let us assume the diameter of the circle as $d = 10$. Substituting this value for d in equations 1 and 2, we have,

$$a + b = 15.708 \quad (3)$$

and

$$ab = 52.36 \quad (4)$$

Again, substituting, in equation 3, for b, its value taken from equation 4, we have

$$a + \frac{52.36}{a} = 15.708 \quad (5)$$

Multiplying throughout by a and transposing gives the equation

$$a^2 - 15.708\,a + 52.36 = 0 \quad (6)$$

Finally, solving this quadratic equation gives, for the value of one side of the required rectangle, either $a = 10.908$, or $a = 4.8$; and substituting these values for a, in equation 3, gives for the corresponding values of the other side of the rectangle, $b = 4.8$; or $b = 10.908$, making the required rectangle 4.8 x 10.908 ft.

Proof—The perimeter of this rectangle is $2(4.8 + 10.908) = 31.416$; and its area is $4.8 \times 10.908 = 52.36$, which is $\frac{2}{3}$ of the area of the circle whose diameter is 10 and perimeter $3.1416 \times 10 = 31.416$. The area of the circle is $0.7854 \times 10^2 = 78.54$, and $\frac{2}{3}(78.54) = 52.36$.

Let us now compare a square and a rectangle having equal perimeters and assume the sectional area of the rectangle is two-thirds that of the square. Denoting a side of the square by s and the two respective sides of the rectangle by a and b, we have the following:

Perimeter, $4s = 2(a + b)$

$$2s = a + b \quad (7)$$

Area, $\frac{2}{3}s^2 = ab$ (8)

For the sake of simplicity, assume for a side of the square $s = 9$, and substitute this value for s in equations 7 and 8, which gives

$$a + b = 18 \quad (9)$$

and

$$ab = 54 \quad (10)$$

Now, combining equations 9 and 10 and solving for a, we have

$$a + \frac{54}{a} = 18 \quad (11)$$

Multiplying throughout by a, as before, gives the quadratic equation,

$$a^2 - 18\,a + 54 = 0 \quad (12)$$

Finally, solving equation 12 gives for one side of the required rectangle $a = 14.196$; or $a = 3.804$, and substituting these values in equation 9, we find for the other side of the rectangle, $b = 3.804$; or $b = 14.196$, making the required rectangle 3.804 x 14.196 ft.

Proof—The perimeter of the square is $4 \times 9 = 36$ and its area $9^2 = 81$. The perimeter of the rectangle just found is $2(3.804 + 14.196) = 36$ and its area $3.804 \times 14.196 = 54$, which is two-thirds that of the square, $\frac{2}{3}(81) = 54$.

A. C. CALLEN,
Prof. Mining Engineering,
Morgantown, W. Va. West Virginia University.

[Practically the same solution has been received from John H. Turner, North American Colliery, Ltd., Coalhurst, Alta., Can., who finds that "a circular airway 8 ft. in diameter has an equal perimeter and an area one and one-half times larger than a rectangular airway 3.84 x 8.73 ft. in section. The above is a practical solution of the question, but the question itself is not a practical one."

Another solution by August Carmazi, mine foreman, Avella, Penn., finds, by a hit-and-miss method that he does not explain, that the two following airways have equal perimeters, while the second airway has an area only two-thirds that of the first. The first airway is 9 x 10 ft. in section; perimeter, $2(9 + 10) = 38$ ft.; area, $9 \times 10 = 90$ sq.ft. The second airway is 4 x 15 ft. in section; perimeter, $2(4 + 15) = 38$ ft.; area, $4 \times 15 = 60$ sq.ft., which is two-thirds the area of the first airway.

The two following letters give solutions by somewhat different methods.—EDITOR.]

Letter No. 6—Kindly let me submit the following answer to the question given in *Coal Age*, July 24, p. 165, asking for the dimensions of two airways having equal perimeters, the sectional area of the second airway being two-thirds that of the first. My solution is as follows:

Indicate the side of a square airway by x. Now, increase and decrease this side, in turn, by an amount indicated by a, which will give a rectangle $(x + a) \times (x - a)$. Evidently, the perimeter of this rectangle is equal to that of the square whose side is x.

Now, by the condition of the problem, the sectional area of the rectangle is two-thirds that of the square, which gives the equation

$$\frac{2}{3}x^2 = (x + a)(x - a)$$
$$2x^2 = 3(x^2 - a^2)$$
$$x^2 = 3a^2$$
$$a = \frac{x}{\sqrt{3}} = \frac{x}{1.732} = 0.577x$$

Finally, assuming the square airway is 9 x 9 ft., in section, the required increase and decrease, a, in these dimensions, in order to form a rectangle having an equal perimeter and an area two-thirds that of the original airway, is $a = 0.577 \times 9 = 5.193$ ft. The longer side of the required rectangle is, therefore, $9 + 5.193 = 14.193$ ft.; and the shorter side, $9 - 5.193 = 3.807$ ft. Therefore, the required rectangle, in this case, is 3.807 x 14.193 ft.

Proof—The perimeter of the square airway is $4 \times 9 = 36$ ft. and its area $9 \times 9 = 81$ sq.ft. The perimeter of the rectangle found is $2(3.807 + 14.193) = 36$ ft.; and its area $3.807 \times 14.193 = 54$ sq.ft., which is two-thirds that of the square, $\frac{2}{3}(81) = 54$.

J. Q. MCNALT, Div. Engineer,
Canon City, Colo. Colorado Fuel and Iron Co.

Letter No. 7—To find two rectangular airways having equal perimeters, the sectional area of the second airway to be two-thirds that of the first airway, I prefer to use a method of ratios.

The first step in this method is to find two simple numbers whose sum shall be equal to that of two other numbers, while the product of the first two is two-thirds that of the second two numbers. For example, $1 + 4 = 5$; and $2 + 3 = 5$. Again, $1 \times 4 = \frac{2}{3}(2 \times 3)$.

MULTIPLYING BY ANY DESIRED MULTIPLE

Now, taking these numbers to represent the relative heights and widths of two rectangular airways having equal perimeters and the sectional area of the first being two-thirds that of the second airway, we can adopt any desired multiple of these numbers to represent the required rectangles. For example, using a multiple of 4, the height of the first airway is $4 \times 1 = 4$ ft., while its width is $4 \times 4 = 16$ ft. The size of this airway is, therefore, 4 x 16 ft. in section; its perimeter is $2(4 + 16) = 40$ ft. and area, $4 \times 16 = 64$ sq.ft.

Again, using the same multiple 4, the height of the second airway is $4 \times 2 = 8$ ft. and its width $4 \times 3 = 12$ ft., making the size of this second airway 4 x 12 ft., in section; its perimeter, $2(8 + 12) = 40$ ft. and area, $8 \times 12 = 96$ sq.ft. The sectional area of the first airway is, therefore, two-thirds that of the second airway, since $\frac{2}{3}(96) = 64$ sq.ft.

Using any other multiple desired, it is possible to find any two other rectangular airways that will fulfill the conditions of this problem, by means of the same ratios as given previously. This appears to be a practical solution and one that will always give the desired results.

DAVE HUNTER.
Washoe, Mont.

Promotion of Ambitious Workers

Letter No. 1—Recent references to the uneasiness of labor and the reading of two books discussing the labor question have convinced me that one chief cause of what is styled "disloyalty on the part of employees" is the failure of the management of many large corporations to recognize that there are ambitious men who have qualified themselves for positions above that which they now occupy, and who desire promotion when vacancies occur.

Not long ago, a man of my acquaintance, who had such an ambition and had qualified himself and secured a first-class, mine-foreman's certificate, was greatly disappointed when an outside man was chosen to fill a vacancy in that position in his company.

SUPERINTENDENT OVERLOOKS AMBITIOUS WORKER

When approached on the matter, later, the superintendent remarked that he did not know that the man desired promotion, although he had worked for the company for 15 years and given them the best portion of his life, in successful service. This is but one example of many ambitious workers who, by study and application, have qualified themselves to fill higher positions than those they occupy, but whose efforts in that direction have not been recognized by their superiors in office.

It is my belief that, if managers would examine the appointments made by their officials, many times they would find that personal friendship, acquaintance or relationship was the controlling factor in the making of the appointment, rather than efficiency and fitness for

service. To the management, the position in question may seem of little importance, and yet it may be the goal of some employee's desire, and the disappointment that follows his failure to secure promotion almost invariably leads to a spirit of enmity. His work, from that time on, is performed in a matter of fact sort of way. The worker has lost his interest and fails in many ways to coöperate in the same spirit as formerly.

Systematic Plan of Promotion

Some four or five years ago, I read in *Coal Age* a plan that was adopted by one of the great railroad systems in this country, in order to secure and maintain a spirit of loyalty among its employees. Briefly, the plan was one by which a notice of a vacancy was to be posted throughout the division in which such vacancy occurred, so that employees who were eligible for promotion to the position would have an opportunity to ask for and fill out a blank to be submitted to the general manager. The examination of the application so made would show the qualifications and fitness of the candidate for the position. Then, when the appointment was made, the superintendent of the division would be advised of the candidate's fitness for the place.

This plan has now been tried many years and has developed a spirit of coöperation among the employees of that system. The working of the industrial organization has been much improved. Things move smoothly, because each employee, no matter how low his station, feels that he has the assurance that the future has something tangible in store for him who strives to do his part, and promotion will be his ultimate reward.

Altoona, Ala. FAIRPLAY.

Installing High-Tension Lines

Letter No. 1—Referring to the inquiry of "Operator," *Coal Age*, July 10, p. 73, regarding the best means of transmitting electric power a distance of nearly two miles underground with the greatest degree of safety and at the least expense, permit me to say that high-tension power lines when properly installed in a mine, should be as safe as when the lines are conducted over the surface to a borehole, as suggested in the reply to this inquiry.

In my own experience, where power lines are properly laid in a box or tile conduit, in a ditch at the side of the road, there is far less chance of accidents resulting than when the wires are hung on poles on the surface. I believe, also, that the work of laying the lines in a conduit, including the expense of ditching, will generally prove less expensive than to provide the necessary poles for carrying the wires over the surface and to bore the holes required to conduct them into the mines. Of course, much will depend on the nature of the mine bottom and the width and condition of the roadways in the mine. It is not stated in the inquiry whether this mine is dry or wet.

Advantage in Use of Alternating Current

In the long-distance transmission of power, alternating current should be used between the power house and the point of distribution in the mine. By the use of alternating current, the first cost for copper will be greatly reduced. At points where the power is to be distributed to different sections of the mine, a small room should be excavated in the solid strata. This room should be lined with cement or brick and a wooden floor provided, which will make the place safe for the installation of the transformers required to step down the voltage of the current for use at the working face.

From this central station, the three-wire system should be employed to conduct the current to the machines. These wires must be hung on the side of the roadway opposite to that where the men travel. Many state mining laws prohibit the carrying of electric wires in a return airway. In that case, the wires must be carried through openings made in the crosscuts so as to enable them to reach the places where the power is to be used.

Precautions Taken in Gaseous and Wet Mines

Gas-tight, explosion-proof switch boxes should be provided at all points where the trailing cables are attached, and the switches should be properly grounded. A competent electrician should carefully inspect such installations at least once every 24 hours and report their condition.

In a wet mine instead of carrying the power line in a ditch, as just explained, it should be installed in a box, fixed to the timbers and roof, or properly supported on the rib, at one side of the entry and close to the roof. This box should always be located on the opposite side of the road from where the men travel. The box should either be grooved to receive the cable, or the latter should be packed in the box so that it will fit snugly in its place.

Wherever high-tension power lines are conducted into a mine, either through ditches or conduits or in boxes at the roof, danger signals should be posted at frequent short intervals, warning persons of the presence of the high-tension cables.

Chase River P. O., MATTHEW STAFFORD.
Vancouver Island, B. C.

Bolshevism in America

Letter No. 3—I have read with much pleasure the Foreword in the issue of *Coal Age*, July 3, and the excellent letter on the subject of "Bolshevism in America," on page 31 of the same issue. I wish to endorse the sentiment expressed in the Foreword that Bolshevism is a passion.

None of the Bolsheviki who have been prominent in affairs have shown their ability to make clean public records for themselves. On the other hand, their methods are clearly destructive both of life and property. Thousands of human lives have been sacrificed through their reckless passion and thirst for blood, and millions of dollars worth of damage has been done to crops, dwellings and warehouses stored with supplies for our soldiers and the allies.

Contrary to all human morals, Bolshevism has never furnished protection to the people under its sway, but the most fiendish methods have been devised to destroy, maim and kill innocent people. Its devotees ever indulge in wild and prolonged debauch, which must eventually prove their downfall and that of the government they represent. To such an extent has this become recognized that even those who know nothing of political economy, as well as the saner class of socialists, are gradually coming to understand the utter hopelessness of the cause of Bolshevism.

To put confidence in a Bolshevik government, expecting and looking for the protection of home and property, would be like going into a gaseous mine with a naked light. It goes without saying that if the governments of the world were of this order, chaos would reign. Men would tear and rend each other to pieces, and the few survivors would die under the tottering ruins of civilization. Let those whose thoughts roam toward Bolshevism think seriously of these things.

Clinton, Ind. PATRIOT.

Living Conditions at Mines

Letter No. 7—It is interesting, indeed, to read the many letters that appear in *Coal Age*, from time to time, regarding the safety and welfare of mine workers. In no industry are the workers more entitled to consideration than in that of mining coal, because of the dangers they must face continually in the performance of labor on which all other industries depend.

In reading letter No. 6, by Joseph R. Thomas, *Coal Age*, July 17, p. 115, I was more than pleased. Mr. Thomas sounds the keynote of action when he says, "Success mean coöperation in establishing a community of interests, to the end that employers and workers in every industry shall strive for the common good." True it is that when employer and employed strive for the common good they create a "community of interests." Nowhere has this been more clearly demonstrated than in the efforts of the Colorado Fuel & Iron Co., during the past four years, in which they have operated their mines under the Industrial Representation Plan. While many people believe that the plan has proved more than could have been expected, there are a few grumblers, of course, who would be glad to see the scheme abolished.

Success of Industrial Representation Plan

Under the Industrial Representation Plan, there is a joint committee of six members appointed, three of whom represent the company and three the employees. The committee is known as the Health, Sanitation and Housing Committee and the name outlines their duties. At their own option, this committee can bring up for discussion, at the joint conferences of the company and its employees, any matters relating to health, hospitals, physicians, nurses, occupational diseases, garbage disposal, street cleaning, wash-houses, locker-rooms, housing, rents, homes, gardens, fencing, etc.

As chairman of the committee and a representative of the employees, I am pleased to state that the report of our last inspection shows that the superintendents of the different camps are carrying out the company's program, in every detail. A few years ago, in these same camps, this and other coal companies sold or rented lots to their employees who built their own homes largely out of old railroad ties, with black-powder cans for shingles on the roof. Generally, a bad smelling pig pen occupied the rear of the lot. The odor from these pig pens could be detected a distance of a mile or more during the summer months. One would be surprised to observe the difference that the company's industrial plan has made in a few years, in its operation in these camps.

For a number of years, the Miners' Union was very active in Colorado and, at one time, was in control. After observing the activities of the union, for a long period, the Colorado Fuel & Iron Co. decided that the only solution of the problem of securing proper health, sanitation and housing for the men was by the adoption of what has since been known as the "Industrial Representation Plan," previously mentioned. The improvements accomplished under this plan are a credit to the company, who have made extraordinary efforts to beautify the camps and eradicate whatever creates filth, flies and disease.

Certainly, no person in his right mind could advocate the abandonment of a plan that produced such results in so short a time, and it is safe to say that whatever may occur in the future to hinder the progress of this company, no other plan will be adopted and, should striking miners desire to return to the mines, they will be welcomed and given work under the same plan, as the company believes that no other agency is capable of caring for the health, sanitation and housing, in their camps, and guaranteeing to their employees good living conditions. ROBERT A. MARSHALL.

Farr, Colo.

Preservation of Mine Timber

Letter No. 1—Kindly permit me to refer to the inquiry of "T. L.," *Coal Age*, July 24, p. 164, regarding the best means of preserving mine timber, and to express some surprise that the reply by the editor does not mention the method of creosoting timber to eliminate the primary cause of its destruction

Timber that is partly decayed becomes an increased fire hazard, and a breeding place for insects. Decay also weakens the timber, reducing its mechanical strength to where it cannot stand the strain of the roof pressure. Thus, decay causes, first, the weakening of the timber and mechanical failure; and, second, increases the inflammability of the wood and promotes its destruction by insects.

Advantages in Creosoting Mine Timber

Timber if creosoted before being taken into the mine retains its natural condition and mechanical strength, assuring the full period of its mechanical service. Creosoted timber when dry, being no more inflammable than untreated sound wood, the treatment acts as a fire retardant, as compared with aged, untreated and partly decayed timber. The injection of the creosote poisons the wood, thus preventing the development of decay; likewise, it also prevents attack by wood-destroying insects. Hence, the three chief conditions complained of are overcome by proper treatment with coal-tar, creosote oil.

In order to obtain satisfactory results, it is necessary to properly prepare timber for this treatment, by stripping off the bark immediately after the wood is cut and then seasoning until the moisture content has been reduced 25 per cent. of the oven-dry weight. Treatment by the open-tank process is more practical, under the average conditions prevailing at mines. It consists of immersion in hot and cold baths of refined coal-tar, creosote oil, and should be recommended for treatment of mine timber.

I note with interest, the reference to gunite. Undoubtedly, it is a protection against fire and also, perhaps, against certain insects; but it is by no means a preservative treatment to retard decay.

One of the duties of my position is to make surveys of coal-mine properties for the purpose of ascertaining

what class of timber can be economically creosoted, and the method of treatment most practical for the operation. Although this service is performed in the interest of creosoting, it is not recommended unless fully justified.

K. C. BARTH,
Chicago, Ill. The Barrett Co.

Safety in Mine Timbering

Letter No. 4—I fully agree with the suggestions that have been offered in regard to making the work of timbering in mines safer. It has been stated that illustrations should be made of the right and wrong methods of framing and setting timber, and that these should be posted in places where men will see and study them. This would impress on many the way in which accidents often occur from improper timbering.

As we all know, it is at the working face where most of the accidents occur, which makes it of the utmost importance that the proper posting of rooms should be explained. In his letter, *Coal Age*, May 15, p. 919, Jesse Hamliton gives some good illustrations of the best methods of framing double timbers so as to develop their full strength. However, in all my mining experience, a derailed car striking a post at the side of the road has never failed to knock out one or more timbers, unless the legs are set in a groove cut in the rib.

To avoid such an occurrence, it has been my habit, in crossbar timbering, to cut a long slip in the rib at the roof, on each side of the road. And, after the crossbar had been placed in each slip and wedged tightly, I would cut the two legs of the right length and set them in place under the bar, driving them as tight as possible. Then, should a derailed car knock out either leg, the crossbar would still support the roof.

Timbering with Steel and Old Iron Rails

Referring to the use of discarded iron rails in place of wooden crossbars, as suggested by "Inspector," June 26, p. 1175, it is my experience that the iron rails are all right as long as no squeeze occurs. But when a squeeze takes place an iron rail bends down under the weight of the roof and is very difficult to remove, whereas a wooden crossbar can be cut out and a new timber put in its place. For that reason, the use of iron rails as crossbars cannot be recommended.

At a certain mine in this state, the fan drift is timbered with steel crossbars and legs, bolted together and braced each set against the one next adjoining The bars and legs are of rail-road iron used on surface roads and, I believe weigh 90 lb. to the yard.

It is remarked by W. H. Noone, in his letter, July 24, p. 163, that "too much publicity cannot be given the safety-in-timbering idea." That has been my thought on many previous occasions when I have drawn attention to points in our own state mining law that would stand revision. One of those points (Sec. 143) has reference to the safe timbering of mines. The law simply provides that such a method of timbering the roof and spragging the coal shall be adopted, in each mine, as will securely hold the roof, sides and face and meet with the approval of the chief inspector of coal mines.

The practical working of this provision of the mine law makes the timbering, in each mine, conform to an agreement made between the mine inspector and the mine foreman or superintendent. Such an agreement will specify the maximum distance apart and the maximum distance the posts are to be set from the coal. Too often it happens that the mine foreman merely sees that the timbers are set in each place according to this agreement, depending on the miner's ability to take care of himself when this is done.

On the other hand, should a mine foreman find that the roof over a miner is not safe, it is extremely difficult to convince the man that other timbers must be set to make the place secure. The miner does not know the meaning of "maximum," and he thinks that the distances made in the agreement are the proper distances at which the timbers must be set, under any conditions.

The agreement generally provides a distance of seven feet between the coal face and the first row of timbers, so as to allow a 6½-ft. coal-cutting machine to cross the face after being sumped in under the coal. But, even if the foreman does succeed in getting the miner to set a few posts nearer to the face to protect himself, the probability is that the machine runner will knock these out and not reset them after cutting the coal. The chances are 100 to 1 that the machinerunner or the miner will be killed, and the utmost vigilance is required on the part of the foreman to prevent the occurrence of a fatal accident under these conditions.

Fixed Timber Agreement Unfair to Foreman

Allow me to cite one instance where the coal in a certain mine is overlaid with 35 ft. of sandrock that enables the partings on the road to be driven from 16 to 18 ft. in width, without setting a timber the entire length of the parting, about 350 ft. Under the agreement with the mine inspector, posts are set five feet apart in the rooms, and there is not a break in the roof until the rooms have finished and the pillars have been drawn back about 50 yd. Usually, six pillars are started back at once, and when a cave occurs it covers an area of practically 45,000 sq. ft. Only recently, the force of one of these caves blew a miner 60 ft., cutting and bruising him in a terrible manner.

My claim is that the fixing of a timber agreement between the mine inspector and the superintendent is unfair to the foreman, who finds it difficult to modify the particular conditions. It is well known that too many props, in pillar work, is as dangerous as too small a number, as it means a large territory exposed when the cave does take place.

Before the final adoption of the timber agreement embodied in the law, there was considerable argument between the men representing the state, the miners and the operators; but the objection to the agreement clause, on the part of the operators, was overruled and they were compelled to accept this provision in the law, although they saw the results that would follow

In closing, permit me to urge that every miner should be carefully instructed in safe methods of cutting timbers and taught the nature of the roof under which he must work. In my opinion, judgment should be used in setting mine timbers, according to the conditions existing in the mine, regardless of any fixed agreement. Most men will allow that it is the painstaking and watchful care of the mine foreman that has been the chief cause in the reduction of the accident list, in coal mining. Having full charge of the mine, the foreman's authority should not be limited by an agreement in respect to the method of timbering.

————————, Colo. MINE FOREMAN.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Markers on Mine Trips

Some time ago, at a mine foremen's meeting, a discussion arose about the best kind of marker to be used on the rear of trips and some favored light and others alarm bells or gongs, in the mine. In my opinion, the use of any of these devices has not proved to be entirely satisfactory and safe.

In the mine in which I work, a steam locomotive is used on the main haulage road, which is often so filled with smoke that one can scarcely see the rails when walking on the road. Under such conditions, it is clear that even a strong light on the rear of the trip could not be seen at a safe distance. Moreover, should the air be clear on the entry, a bend or sharp curve might hide the light and cause an accident.

There are bells and gongs that are operated automatically by the movement of the car; but it often happens that these are not heard a great distance from the moving trip. For that reason bells and gongs are not wholly satisfactory, at the best. In our mine the cars make more noise than a dozen of such bells and gongs. I believe that if a good gong could be operated like an alarm clock, it would give out a shriller sound than when its operation depends on the jar or movement of the car.

Where men are obliged to travel a haulage road, it is important that a suitable alarm should be used at the head of the trip to warn them of its approach. The sound should be heard at a distance of, say 300 ft. to permit the men to reach a place of safety before the trip overtakes them. If a horn, such as is used on automobiles, could be employed, it would be a good thing, as the sound of a horn would probably be heard at a safe distance.

I would like to see a good discussion on this matter, in the columns of *Coal Age*, and learn the opinion of its many readers, who will probably have some good suggestions to make. J. J. S.

Fern Glen, Penn.

The conditions described by this correspondent as existing in his mine are extremely dangerous and should not be tolerated. First, a steam locomotive should not be used on a main haulage road in a mine, unless under exceptional conditions that would provide good ventilation throughout the length of the road, and render harmless and sweep away the smoke and gases generated by the locomotive.

Second, men should not be permitted to travel on a haulage road where mechanical haulage is in operation. Even in mule haulage the practice is dangerous. In any case, there should be an ample clearance at the side of the road that would enable men and animals to pass the moving cars in safety whenever it is necessary for them to travel the haulage road. Safety holes cut in the rib are good, but often cannot be found or reached in time to avoid an accident.

Automatic gongs and bells are the only devices used at present, to our knowledge, and we shall be glad to hear from our practical readers any suggestions that they are pleased to give.

Work and Strength of a Mine Mule

We have always employed mules in our mine, and conditions are such that we shall probably continue their use for some time to come, in preference to installing mechanical haulage. Our mules will average, say, 12 or 13 hands in height and perhaps 1200 lb. in weight. I am anxious to secure a few data giving an idea of the average work that may be expected of a good mine mule and its strength to pull a loaded car out of a dip in a heading or chamber. I want to ask what should be considered as the limiting grade on a haulage road, in mule haulage. Also, can you give me the approximate relative cost of mule and motor haulage, under ordinary conditions, in coal mining?

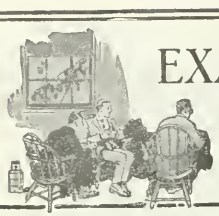
———, Iowa. SUPERINTENDENT.

For the purpose of estimate, it is customary to assume that the average work performed by a good mine mule, under ordinary conditions, will equal 6 ton-mile-hours. That is to say, a mule that is kept in good condition in a mine may be expected to haul $(8 \times 6) \div \frac{1}{4} = 192$ tons, a distance of $\frac{1}{4}$ mi. over a good road, in an 8-hr. working day.

The strength of a good mule when exerted to start a loaded car from a dip heading can be estimated as being at least equal to the weight of the mule, provided the grade is not too steep. For example, a 1200-lb. mule may be expected to exert a pull of 1200 lb., in starting a load from a dip not exceeding, say 3 per cent. But the pull exerted by the mule will decrease rapidly on steeper inclinations. Assuming the track and grade resistance, in starting, as 120 lb. per ton of gross weight, on a 3 per cent. grade, a good mule should be able to start a load of $1200 \div 120 = 10$ tons, more or less. However, a mule cannot be expected to maintain this pull longer than to start the load. Traveling at a speed of, say, 4 mi. an hour, it is estimated a mule can exert a pull equal to one-fifth, or even one-fourth its weight on short hauls, without overtaxing its strength.

The limiting grade in mule haulage should not exceed 3 per cent. For short distances, however, a steeper grade is permissible, particularly if the mule has the advantage of a run for the grade.

The relative cost of mule and motor haulage has been estimated to be $3\frac{1}{2}$c., per ton-mile for mules, as compared with $1\frac{3}{4}$c., per ton-mile for motor haulage, making no allowance for upkeep of cars and track.



EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Alabama First Class Examination, Birmingham, July 21-24, 1919

(*Selected Questions*)

Ques.—In mines having extremely tender roof, state what precautions you would adopt when introducing the various types of mining machines, to insure the safety of employees and economy of operation.

Ans.—Machine mining, under tender roof, requires the adoption of a systematic method of timbering the working faces. The system used must be adapted to the conditions in the mine and the type of machines employed. Only competent machinerunners should be engaged in the work of cutting the coal. The posts should be set staggered, in rows parallel to the face of the coal and at distances apart not exceeding 3 or 4 ft. The first row of timber should be stood as close as practicable to the coal face. The posts in this row should be removed and reset as the cutting machine advances along the face. It may be necessary or advisable to use projecting crossbars over the timbers for the better protection of the men and the machines.

Ques.—State how the several mine gases may be detected. In what proportion in the air are they fatal to life? In what proportion do they extinguish light?

Ans.—Methane or marsh gas (CH_4) is detected by the flame cap produced in a safety lamp burning in an atmosphere charged with that gas, the height of the cap and the action of the flame indicating the proportion of gas present in the air. The gas is not extinctive of a lamp flame, until about 6 per cent. of gas is present in the air. The gas is practically without toxic effect and is fatal to life only when the proportion of gas has reached about 66.5 per cent., the oxygen content of the air being then decreased to 7 per cent.

Carbon monoxide (CO) is detected by observing its effect on small caged animals, as birds or mice, these being far more sensitive to the effects of the gas than men, as shown by their collapse when a small percentage of gas is present. From 0.1 to 0.5 per cent. of carbon monoxide present in the mine air will prove fatal to human life, depending on the length of time the air is breathed and the oxygen content of the air. This gas being inflammable will not extinguish a light when present in the air.

Carbon dioxide (CO_2) is best detected by its effect in dimming or extinguishing a light when present in sufficient proportion in the mine air. The effect of carbon dioxide to extinguish a light or prove fatal to life depends largely on the depletion of the oxygen in the air. With a normal oxygen content, an oil-fed flame is usually extinguished when 14 per cent. of this gas is present in the air, and 18 per cent. of the gas is then fatal to life. On the other hand, a residual atmosphere in which the oxygen content is reduced to, say 17 per cent., but 3 per cent. of carbon dioxide is required to extinguish an oil-fed flame. In like manner, as the depletion of the oxygen content in the air breathed increases, a fatal effect on life is produced with a lesser percentage of carbon dioxide, the percentage depending on the depletion of the oxygen.

Ques.—If you were the foreman of a mine generating gas and an accumulation of firedamp collected on the falls, what method would you adopt to remove it?

Ans.—Before attempting to remove the gas, notify and withdraw the men on the return of the current and in the adjoining places. Then erect a brattice so as to deflect the current of air over the falls, using only a good safety lamp and employing competent men when performing the work. It may be necessary to increase the circulation in that section of the mine.

Ques.—State fully your opinion of the principal causes of explosions in mines, and give in detail any method you would recommend for their prevention.

Ans.—The presence of gas and dust in mines, use of open lights or electricity when improperly installed, use of black powder and careless methods in blasting and the careless handling of combustible material are the chief causes of explosions in mines generating gas.

To prevent these occurrences enforce a strict compliance with the state mining laws and mine rules and regulations. Maintain a strict discipline when the laws are violated or the rules and regulations disobeyed. Maintain an ample and efficient system of ventilation and employ competent mine examiners and safety inspectors in sufficient number to perform their respective work thoroughly. Remove all dangers promptly when found.

Ques.—Will coal dust extend a mine explosion throughout the entire mine in the absence of explosive gas?

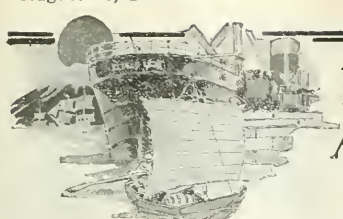
Ans.—Yes.

Ques.—Give your opinion of the best method of rendering coal dust harmless.

Ans.—The best method of accomplishing this purpose is to remove the dust from the mine workings and the haulage roads where it is accumulated and load it out of the mine. Sprinkling the dust, as it lies on the floor of the workings and in the roads and on the timbers and ribs, is a precaution taken to prevent its being blown into the air. Dust suspended in the air current is particularly dangerous. Though beneficial, this method of treatment does not eliminate the danger of explosion.

Ques.—Give your opinion of the best method of humidifying the air in a mine.

Ans.—Some practical and effectual means of preheating the mine air current should be devised, using for that purpose the exhaust steam of the hoisting, haulage and ventilating equipment. What appears to be the most effective means yet devised for this purpose is a combined heating and humidifying apparatus such as was described in *Coal Age*, Vol. 15, pp. 28, 29, in connection with the prevention of the freezing of shafts in winter.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Great Britain Facing Huge Coal Problem

Announcements of Price Increase Bring Protests from All—Will Hinder Development of Britain's Foreign Trade and Make American Competition

Industrial circles in Great Britain were thrown into a state of excitement when Sir Auckland Geddes, president of the Board of Trade, announced that after July 16 the price of coal to all consumers would be increased by 6s. ($1.46) per ton. He announced that this increase had been made necessary by the seven-hour working day and the increase of 2s. ($0.49) a day in pay which was granted the miners some months ago by the Coal Commission appointed to investigate demands of miners. Shortly after the commission had made its report it was announced that the price of coal would have to be increased by 4s. 6d. ($1.10). However, according to Sir Auckland Geddes, in making up this price the Government had not taken into consideration three vital factors: (1) Coal used in working the pits; (2) coal issued free to miners; and (3) coal for export at a price exceeding the minimum. In a White Paper issued by the Government it is estimated that the deficiency in the working of the coal mines from July 16, 1919, to July 16, 1920, will be £46,000,000 ($223,850,000).

This announcement of an increase in price brought forth protests from householders, industrial interests and the miners themselves. Since the award of shorter working hours and increased wages the Coal Commission has held another session, and upon the findings advocated the nationalization of mines, which has been sought by the Miners Federation for some years past. Leaving out of consideration the question of nationalization, the country as a whole views with alarm this increase, as it will raise the price of all the manufactured products of Great Britain entering into international trade. As stated in Parliament, Great Britain lives by its international trade, and anything that handicaps the foreign trade will have a detrimental influence upon the progress of the country.

Prices in Various Countries—Effect on Industrial Products

Before the Government's case was opened in Parliament, Mr. Bridgeman, Parliamentary Secretary of the Board of Trade, said that the costs of coal at the pit head, according to latest statistics, were as follows: Scotland, 28s. 11d. ($7.04); the rest of Great Britain, 29s. 4d. ($7.14); Transvaal, 1916, 5s. 6d. ($1.34); Natal, 1918, 10s. 7d. ($2.58); India, 1918, 5s. 10d. ($1.42); United States, June, 1919, 11s. 2d. ($2.72); France, June, 1919, 36s. ($8.76); Belgium, 1917, 18s. ($4.38); Spain, 1917, 39s. ($9.49). He further stated that the average pit price of coal in the United Kingdom in 1913 was 10s. 11½d. ($2.46).

Sir Auckland Geddes, referring to the effect that the increased cost of coal would have on international trade, said that it would mean that rails which were now selling at £16 ($77.86) per ton in Great Britain would have to be sold for £17 10s. ($85.16) after the increase, as compared with £10 ($48.67) for the same product in the United States; ship plates in Great Britain were now selling at £17 15s. ($86.38), but with the increased cost of coal would have to be sold for £19 ($92.46), while the United States product could be sold for £14 ($68.13); crown bars, which were now selling at £21 ($102.20) would have to be increased to £22 10s. ($109.49), as compared with £11 15s. ($57.18) in the United States; pig iron, which was now quoted at £8 ($38.93) in Great Britain would sell for about £9 ($43.80), while the same quality of iron in the United States would sell for £6 ($29.20). The rise in the price of coal, he said, would cause an increase in steel and finished iron of 25s. to 30s. ($6.08 to $7.30); coke, about 10s. ($2.43); spelter, £2 ($9.73); gas, 6d. to 9d. ($0.12 to $0.18) per thousand feet, electric power, 1d. to 5d. ($0.02 to $0.10) per unit; paper, 10s. ($2.43) per ton; glass, 5 to 10 per cent.; textiles, about 4 per cent.; bricks, about 5 per cent.; machinery, about 12 per cent.; and chemicals generally, about 10 per cent.

Analysis of Increased Cost of Production

In explaining the cost he said that in 1913 the average pit price of coal was 10s. 11½d. ($2.46); today the price was 26s. 3d. ($6.34). Thus coal sold stood at 11s. ($2.68) in 1913 while today the price was 29s. 3½d. ($7.13). In 1913 the costs were made up as follows: Labor, 6s. 1d. ($1.54); timber and stores, 1s. ($0.24); other costs, 11d. ($0.22); royalties, 5½d. ($0.11); owners' profits, 1s. 5d. ($0.35). The corresponding costs today are: Labor, 19s. 5½d. ($4.74); timber and stores, 3s. 2½d. ($0.78); other costs, 1s. 2½d. ($0.29); royalties, 6¾d. ($0.135); owners' profits, 1s. 2d. ($0.28); compensation to owners for workings which would otherwise be abandoned, 3½d. ($0.065); another 1d. (0.02) for administrative purposes and required in connection with coal control; and also 1½o. ($0.025), which was surplus per ton. After July 16 the following would be the figures: Labor per ton, 21s. 10½d. ($5.32); timber and stores, 3s. 7d. ($0.87); other costs, 1s. 4½d. ($0.33); royalties, 7¾d. ($0.15); owners' profits, 1s. 3½d. ($0.31). As a result of the increase of wages and the reduction of output labor cost had increased 13s. 12½d. ($3.19) per ton raised, or 15s. ($3.65) per ton sold, out of a total increase of 15s. 11d. ($3.87) per ton raised, or 18s. 3d. ($4.44) per ton sold.

In justifying the increase Sir Auckland Geddes gave estimates as to the cost price of coal delivered in the coal bins of the householder in London. The miners declared that they were certain these figures were not correct, and asked that the Government postpone the increase to give them time to investigate. This Bonar Law, on the part of the Government, agreed to do.

It was stated in Parliament that American coal, f.o.b. Atlantic ports; was about 20s. ($4.87) a ton and that America was much nearer some of the places to which Great Britain formerly exported coal than were the coal ports of the British Isles.

Coal Regulations in Australia

Further regulations relating to the Australian Government's control of the coal industry were issued recently. Formerly the Prime Minister was empowered to fix rates of wages and conditions of employees working at coal mines whose output had been acquired by the Commonwealth under the regulations. The Prime Minister may now fix rates of wages and conditions of employees at any other coal mine in the Commonwealth, whether or not an acquisition order has been issued. Where this has been done he may vary contracts for the supply of coal from such mine, the *Melbourne Age* announces.

In accordance with this new regulation, an order has been issued fixing the rates of wages of persons employed in the production of coal at all coal mines in the State of Victoria (save Hudson's Austral Colliery, Korumburra, and mines producing brown coal) as follows: The rates are to be those prevailing on May 29, plus 15 per cent., provided the minimum rate for adult workers, other than stablemen, shall be $3.10 per day, and the minimum rate for stablemen shall be $2.98 per day.

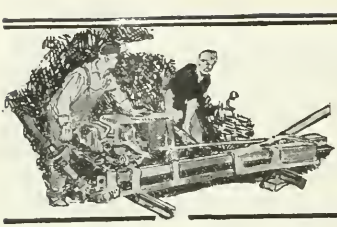
Exports of Coal and Coke During June, 1919

(Compiled by Bureau of Foreign and Domestic Commerce)

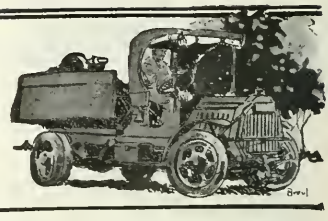
Countries	Coal — Anthracite, Tons	Coal — Bituminous, Tons	Coke, Tons
Denmark		37,856	
France		19,196	2,406
Greece		4,997	
Italy		126,881	
Netherlands		43,479	
Norway		27,052	
Sweden		55,270	
Switzerland		101,601	
Bermuda	130	1,522	
British Honduras	1	216	1
Canada	471,825	1,430,741	28,642
Guatemala		100	
Honduras		749	3
Nicaragua		356	
Mexico	341	14,312	17,356
Miquelon, Langley, etc.	293		
Newfoundland and Lab.	1,407	998	
Barbados		9,060	
Jamaica	5	605	
Trinidad and Tobago		5,892	
Other Brit West Indies		5,583	
Cuba		84,198	25
Danish West Indies			2
Dutch West Indies		1,097	
French West Indies		7,430	15
Dominican Republic	3	464	15
Argentina	25	54,796	248
Brazil	50	100,778	54
Chile		8,397	
Colombia	6	903	
Falkland Islands		6,423	
British Guiana	25		
Peru		5,243	7,758
Uruguay		22,758	
Venezuela		240	8
Philippine Islands	204		
Total	474,315	2,179,201	56,533
Districts.			
Maine and New Hampshire	146		21
Vermont	2,443	4,532	94
Massachusetts	470		
St Lawrence	174,224	143,357	3,954
Rochester	74,562	81,946	
Buffalo	705,679	207,932	15,225
New York	10,482	25	2,614
Philadelphia	5,331	73,185	
Maryland		214,656	7,733
Virginia		427,102	173
South Carolina		10,057	
Georgia		3,300	
Florida		4,402	
Mobile		89	
New Orleans	1	1,784	4
Sabine			6
San Antonio	238	931	2,362
El Paso	41	7,345	5,363
Arizona		5,519	9,617
Southern California	62	63	
San Francisco		2	8
Washington		124	168
Dakota	206	2,295	140
Duluth and Superior	229	1,877	127
Michigan	45	88,969	7,628
Ohio	156	899,709	1,185
Porto Rico			11
Total	474,315	2,179,201	56,533

BUNKER COAL

Districts	Tons
Maryland	44,176
New York	294,354
Philadelphia	34,750
Virginia	141,944



COAL AND COKE NEWS



Harrisburg, Penn.

Increase of cost of compensation insurance not as large as predicted by opponents of bill. Accident and fatality statistics noted. Conference planned to discuss advisability of maintaining state insurance fund ten per cent. differential. Attitude of stock and mutual insurance companies.

While compensation insurance costs were increased by the last legislature, the figures compiled by the actuaries do not indicate that the increases are nearly so large as the opponents of the bill alleged they would be when the bill was pending in the House and Senate. According to E. H. Downey, state insurance rate expert, the average increase in the cost of all benefits under the new compensation bill will be 30 per cent. The increase in death benefits will be only ten per cent. Permanent disability charges will jump approximately 40 per cent. Medical costs have been increased 50 per cent., while temporary disability costs will average an increase of 40 per cent. It is estimated that the increased costs to the mining industry will be 20 per cent.; in the manufacturing industry, 30 per cent.; in construction work, 25 per cent.

The accident and fatality experience of 1918, while it will necessarily figure in rates for the coming year, is not an experience that is likely to be permanent. In the mining industry the years 1917 and 1918 show an increase in the number of fatal accidents as compared with 1916. This was due to the fact that mines were operated under pressure, and that in many instances it was impossible to keep mines in good physical condition. Timbering deteriorated and could not be readily replaced in many instances. Moreover, there was an increase in the number of unskilled men around the mines.

From 1911 the production of coal per fatal accident was always under 300,000 tons. In 1911 the present bituminous mine law was enacted with the result that in 1913 there were 350,000 tons of coal mined for every man killed. In 1916 a new high figure was set; that year 425,000 tons of coal were mined for every fatal accident. Then came the slump, the 1917 and 1918 figures being 360,000 tons of coal for every fatal accident.

It is expected that with the return of normal conditions in the mining industry that the accident and fatality totals will fall. This fall will not immediately be reflected in a drop in compensation costs by reason of the fact that there is now an unusually large percentage of married men among the workers in the mines. Many single miners have gone back to Europe, and many single miners who entered the service have not returned. The possibility of reducing accident and fatality totals, however, is shown by the fact that if present costs were compared with the 1903 death and accident list, then the compensation charge would actually show a decrease.

Commissioner Donaldson is preparing for a conference with all interests and will hear arguments on the question whether the state insurance fund ten per cent. differential should be maintained. At present the state fund is permitted to write compensation insurance ten per cent. cheaper than the mutual or stock companies. The fund now has a premium income of $2,500,000 a year. The surplus is approximately $2,000,000. Two years ago, the associated companies had three times the amount of coal mine insurance as that written by the insurance fund. Now, however, the fund has as much of that sort of business as the associated companies.

The stock companies contend that it will not make any difference, in the long run, whether the ten per cent. differential is maintained or not. They say that if the state fund is not permitted to write insurance at lower rates than the stock companies and the mutuals, then the state fund will be able to increase its dividends. It is evident, however, that the companies are of the opinion that the ten per cent. differential gives the state fund an advantage that is more psychological than financial. A lower rate sounds better than a larger dividend. It is generally taken for granted that the companies are not interested in boosting the state fund and would not be advocating the abolition of the differential if by so doing, they would increase state fund business.

The prime contention of the companies is that at present the state fund bids fair to become the dominant factor in the compensation insurance situation, whereas the intention was simply to make it a regulator act, with which to keep the stock companies and mutuals on their good behavior. Insurance Commissioner Donaldson has expressed himself as favoring the abolition of the state fund differential. He also has been quoted as expressing the belief that the compensation business should all be in the hands of the mutual companies, there being no proper place for it in either the stock companies or the state funds. Commissioner Donaldson has the final word as to whether the ten per cent. differential stands or falls.

Charleston, W. Va.

Little coal mined on C. & O. during second week of August. Loss close to 1,000,000 tons. Next to impossible to secure New River smokeless. Cannot recover lost ground during August. Should have been banner month of the year.

Virtually no coal at all was mined in the high volatile fields of West Virginia during the week ended Aug. 16 except such as may have been produced at a few scattered mines on the Chesapeake & Ohio Ry.; for although the strike of C. & O. shopmen had been settled by the end of the week with the railroad, even by Saturday, Aug. 16, was in no position to handle coal trains to any extent and consequently empties were few and far between. The backbone of the strike on the C. & O. was broken when the men at Richmond returned to work followed by the men at Clifton Forge, Hinton and other points on Aug. 15. Few mines were able to operate to any extent until Aug. 18 on the C. & O., and it was estimated that there was a total loss of production of between 750,000 and 1,000,000 tons of coal; the operations on the line of the Kanawha & Michigan Ry., on the north side of the Kanawha River, alone receiving any cars.

As might be expected, with so large a supply of coal shut off, there was a most urgent demand felt in southern West Virginia for smokeless steam fuel and prepared sizes, neither of which it was possible to meet; it appears to be next to impossible to secure any smokeless coal.

Between Aug. 7 and 15 the loss in production for both the New River and Winding Gulf districts was in excess of 200,000 tons. Producers are of the opinion, that, as a result of run-down equipment and general demoralization caused by the strike, it will not be possible to recover any lost ground during August. Under favorable transportation conditions August should have been the banner month of the year especially in view of the insistent and extensive demand for New River coal. This demand cannot be met especially as production has fallen so far behind the requirements of both foreign and domestic trade.

Except among the mines reached by the Kanawha & Michigan Ry. and the Kanawha & West Virginia Ry., no coal was mined in the Kanawha district during the week ended Aug. 16, the striking shopmen not returning to work until Aug. 15. Consequently few mines received any cars before Aug. 18 and then there was an extremely short supply. In fact it will take 30 days to recover from the effect of the shopmen's strike, in the opinion of producers. It was estimated that there was a loss in production as a result of the strike, in the Kanawha region of between 300,000 and 400,000 tons, and the financial loss to operators, miners and business in general was extremely heavy. As no shipments could be made, it was out of the question to take care of the strong call for splint, lump and other prepared coal as well as for mine-run.

Tonnage from the Kanawha district handled by roads other than the Chesapeake & Ohio during the month of July was as follows: Kanawha & Michigan: 272,928; Kanawha & West Virginia: 15,220; Campbell's Creek R.R.: 45,134.

Fairmont, W. Va.

Director General Hines' statement about transportation subject of lively comment on part of operators. Northern West Virginia fields have been hard hit. Railroad tonnage declining. Movement to Lakes small. Embargo lifted on tidewater shipments.

In view of the car shortage which has been so pronounced in the Fairmont and other northern West Virginia fields for the last month, the comment on Director General Hines' statement (in reply to a Senate resolution), in which he said that the car shortage in the bituminous fields has been insignificant and should not warrant any increase in prices, has been a subject of rather lively comment on the part of northern West Virginia operators. Inasmuch as the Fairmont and other regions have been suffering from a car shortage which has been materially retarding the production and transportation of coal, and inasmuch as the railroad figures have shown a shortage of cars and railroad officials have admitted such a shortage, producers are wondering from what sources the director general secures his information and just how much reliance is to be placed on it. The various regions in northern West Virginia were still handicapped by an inadequate supply of cars during the week ended Aug. 16, though the supply did show an improvement over the previous week. It requires about 1250 cars a day to supply the mines in the Fairmont region, and during the first two weeks of August there have been only two days during which the supply of cars was equal to the ratings and days were Monday and Monday 11, following a Sunday accumulation. As an inevitable result of the car shortage there was an average of 20 mines a day shut down in the Fairmont region alone. Because of a somewhat better supply of cars, however, shipments were in excess of the first 9 days of August, and the tidewater tonnage was heavier in volume throughout almost the entire week than it had been during the previous week. Railroad fuel shipments, however, during the same period seem to have declined somewhat and tonnage moved to the Lakes was rather small in volume. Most of the tonnage for Curtis Bay is being exported and since the embargo (in effect early in the week) was lifted there had been a much larger tonnage shipped than was possible under such restrictions.

Huntington, W. Va.

Conditions in Logan field on account of railroad shopmen strike. Loss of 347,000 tons as direct result of strike. Guyan operators appeal for better car supply.

Though empties began to flow into the Logan district by Aug. 18, after a suspension of all coal traffic, it was not found possible to make any headway in getting production back to normal during the week. Consequently the car supply was far short of requirements throughout the week and production was still at quite low ebb though not so low as during the week ended Aug. 16 when only 79,000 tons were produced, none of that however being shipped except at the end of the week. The total loss

for the week just referred to (as a direct result of the strike) was 328,000 tons or 77 per cent. of the capacity of the mines; that constituted the bulk of the entire production loss of 347,000 tons, "no market" losses only running 11,000 tons or three per cent. of capacity. By operating for a day or so at the wind-up of the week the mines of the district were able to produce up to only 18 per cent. During the same period last year production was at the rate of 212,000 tons.

The car shortage has been so serious in West Virginia since early in July that a committee of Guyan operators went to Pittsburgh on Aug. 20 to appeal to Mr. Gerner, manager of the Eastern Car Pool, for a better supply of cars for West Virginia mines and especially for mines of the Logan field. On the committee were: A. R. Beisel, of the Island Creek Coal Co.; J. J. Ross, of the Logan Mining Co., and Walter Thurmond, another well known coal man of the Logan field. While the car supply was rated as fair at the time they left for Pittsburgh they saw little prospects for the future unless further plans for guaranteeing a good supply were worked out.

Hinton, W. Va.

Report of C. & O. Ry. notes equipment allotted to it by Railroad Administration. C. & O. protests its acceptance. Objections overruled by administration. Railway finally accepts and asks assistance to finance cost. Indifferent way in which administration maintained the railroad.

The following extract from the report of the Chesapeake & Ohio Ry. for 1918 shows why the freight cars built for its use were not originally accepted and how indifferently the Railroad Administration is maintaining at least one of the coal carrying roads: During the year 1918 the U. S. Railroad Administration notified the C. & O. company that there had been allotted to it 25 freight and passenger locomotives, 1000 box cars and 2000 55-ton steel coal cars, at an estimated cost of $10,559,500 which the C. & O. company was expected to provide. The directors of the C. & O. were of the opinion that the equipment so allocated was not necessary to the efficient operation of the railroad, that much of it was unsuited for the company's purposes, and that the purchase of such equipment at the current prices, which were abnormally high, was inadvisable.

Protests were accordingly made against the company being required to accept such equipment. Notwithstanding such protests, the administration adhered to its position and notified the C. & O. that unless it agreed to accept the allocated equipment, the entire cost of such equipment would be charged against the compensation due it under the Federal Control Act. Although the C. & O. directors believed the position of the administration to be unreasonable, in order to protect the interests of the company and to prevent the charging so large an amount of capital expenditures against its income, they determined to accept the equipment so allocated, with the proviso that the director general should assist the company in financing its cost which it is believed he is prepared to do.

Statistics in the report show that in the maintenance of way and structures during 1918, the Railroad Administration replaced only 821,153, cross ties, as compared with 1,035,029, put in by the road in the preceding year. Only 19,396 new ties were used in the construction of new tracks and sidings, as compared with 29,818 in 1917. There were 10,645 tons of new rail used in renewals in 1918, as against 25,119 tons in the preceding year.

Bluefield, W. Va.

Result of railroad shopmen's strike in Pocahontas field. Production loss for week ended Aug. 16 was 186,000 tons. Loading done by two prominent plants on Virginian Ry.

The full extent to which production in the Pocahontas region suffered during the week ended Aug. 16, through a shopmen's strike on other roads, is shown by the fact that 26,000 tons more were lopped off production and that a car shortage cut into production to the extent of 177,000 tons—an increase of 37,000 tons over the previous week. More than 300 hours were cut off of the working time in the mines of the district, largely because of the increase in the shortage of cars, and at the same time the labor situation was not quite so favorable, there being an increased loss from that source. The total production loss for the week was 186,000 tons—an increase of 38,000 tons. Owing to poor transportation conditions, therefore, conditions were quite similar to those prevailing last winter when there was a poor market. The lessened supply of smokeless has made itself felt most keenly in all markets especially in view of the growing export demand. Coke production remained at the same figure as for the week ended Aug. 9.

A total of 9,994 cars (449,700 tons) were loaded on the Virginian Ry. during the month of July. The heaviest loading for the month was at the Stotesbury operation of the E. E. White Coal Co. where 416 cars were loaded; good work was also done at the Winding Gulf Colliery Co. where 347 fifty-ton cars were loaded.

Louisville, Ky.

Representative Boyd, of coal operators' associations of the South and adjacent territory, working hard on car shortage problem. Little encouragement. Head of Kentucky association makes statement.

C. D. Boyd, Traffic Manager, representing the Southern Appalachian Coal Operators' Association, the Harlan and Hazard associations, and others, has been working hard for the past month on the car shortage problem. He plainly states that he has secured little encouragement, and practically no improvement of the situation. Mr. Boyd has been in Washington several times, was in Atlanta to see B. J. Winchell, the regional director of the U. S. Railroad Administration, and has been working steadily to secure relief. At the present time the pool mines are getting cars while the others suffer. Cars routed south to the oil and cotton districts are returned over short routes, such as the Seaboard and Norfolk & Western to car pool territory; operators in that section are securing quite a fair run of cars, while Kentucky and east Tennessee mines are working two days a week.

R. A. Hord, of the Hazard Coal Operators' Association, made a statement at Lexington recently in which he stated that eastern Kentucky will shortly face a serious labor shortage as well as car shortage. If cars are not supplied, labor will move to other fields. This statement was also emphasized by H. A. Beard, Kentucky representative of the C. L. Ryley Coal Co.

Birmingham, Ala.

Fight of Alabama coal operators and Governor Kilby over revenue bills on in full force. Kilby makes statements which are challenged by coal men in open letter to governor. Cost of coal production discussed. Deadlock continues in Senate over general revenue bill.

In the July 14, 1919, issue of *Coal Age* was a report on the status of the Alabama general revenue bill which, at that writing, was being considered by the Alabama House of Representatives convening in committee of the whole. Since then this bill has been put through the House, but only at the expense of certain changes. This bill is of considerable direct importance to the operators of that state on account of the coal and iron tonnage tax and the income and excess profits section. These features all remained in, but the coal tax at only two-fifths of the rate fixed by the budget committee, and the excess profit tax was cut in two.

After leaving the House, the bill was referred to the Senate committee on finance and taxation. The strongest fight then made against the bill was that of the business people, who suddenly awoke to the significance of the income and excess profits sections. There was also a growing sentiment against the coal and iron tonnage tax. These were the main points of attack. However, it looked as though these two sections would be retained in the bill, though at a slight change in the rate. Governor Kilby was unyielding in his demands that this tax be retained in the bill.

The Governor gave out a prepared statement in which he claimed that opposition to the mineral taxes is based on selfishness and money greed. He cited a certain Alabama coal operator who told him that coal was being mined at a profit of $1 to $1.50 a ton in the state. Before the war—said the governor—the price of coal ranged from $1 to $3 or $4 at the mines; today these prices are doubled and the cost of digging coal has only increased about 30c. a ton. It was also stated that the reason why Kentucky and Tennessee competition could not be met was because the operators did not want to break down the war prices. Congressman George Huddleston was also quoted in an effort to strengthen the case of the Alabama administration and damage the testimony of the operators. However, the public utterances of Mr. Huddleston are too well known on coal matters in general, to make it necessary to quote him in particular.

The statement of Governor Kilby was answered by an open card from the operators, who challenged the administration to either prove or retract the assertion that coal operators in Alabama are making a profit of $1 to $1.50 a ton. The challenge was signed by a number of the largest operators in the state. The coal men of the Birmingham district, in an open hearing before the finance and taxation committee of the state Senate, attacked the pending revenue bill, declaring it to be unfair, unjust and virtually a penalizing of industry. H. T. De Bardeleben stated that a member of the House charged that his statement as to the cost of mining coal was padded and could not be accepted. "This statement is true," said Mr. De Bardeleben. "It is sworn to, and if false I am subject to a fine of $15,000 and three years in the penitentiary. My books are open for your inspection."

The operators further stated that the total cost of mining coal has greatly increased since 1914; coal which cost $1.10 per ton at that time, now costs up to $2.50, and that which then cost $1.35 now costs up to $3.60.

Other prominent operators and men of the state contributed similar testimony, which was met by another statement from the governor, who made a technical denial of some of the charges the operators had brought up against him and certain features of the revenue bill. The latest available information in the matter notes that efforts to get the general revenue bill out of the finance and taxation committee have failed; it is apparently hopelessly tied up over the taxing machinery, the income, excess profit and coal and iron tonnage sections.

Terre Haute, Ind.

Increase of 300,000 tons during July over June tonnage in Indiana. Mines work half time in July. Railroad shopmen's strike cut down tonnage for first half of August.

Production of coal by Indiana mines showed an increase of almost 300,000 tons in July over the June production, according to reports, which were announced at the headquarters of the Indiana Bituminous Coal Operators' Association. In July there were hoisted in the Indiana field 1,615,495 tons, as against 1,355,551 tons in June. These figures indicate that the 197 mines, on whose reports the total tonnage is based, worked approximately half time last month. With full time production they could have produced close to 3,500,000 tons. Whether August will show a material gain over July cannot yet be forecast. The week ended Aug. 2 showed a production of 377,394 tons, which was slightly under the preceding week, while the following week showed a further decrease on account of the railroad shopmen's strike, many mines having closed down because of the inability of the railroads to serve them. Of the orders being received, the greater part are for railroad and domestic fuel. Users of steam coal are still hanging back and apparently are placing orders only for coal as they need it from day to day. The most uncertain element at the present time is rail facilities and car supply. A tremendous demand, it is believed, is bound to develop in a short time. Meantime, the operators are bending every energy to induce domestic users to lay in their fuel supply at once.

St. Louis, Mo.

Railroad Administration orders Western coal cars to be sent east. Strong protest by coal men. Emphatic message of Missouri association to the Railroad Administration against order.

Strong protests are being sent to N. C. Kendall, Director of the Car Service Section of the United States Railroad Administration, at Washington, against the order recently issued by the Railroad Administration to Illinois coal-carrying lines to turn over a large number of their own coal cars at designated junction points to be taken east for the use of the Eastern lines. E. J. Wallace, Acting Secretary of the Missouri Retail Coal Merchants' Association has sent the following telegram: "Please be good enough to advise us why the people in the eastern part of the country are to get the coal equipment that the Middle West must have right now or freeze this winter. Are you not serving the country as a whole? We emphatically protest against this order which calls for Western equipment to be shipped east. We are citizens the same as the people of New England and it is not our intention to be discriminated against in the matter of coal equipment. We have patriotically responded to every call and if the railroads have

been mismanaged, surely we should not be penalized. We must insist that we be given our share of the empty coal car equipment for the mines to load in the Middle West. Methods of unfair distribution are what is causing civil unrest in this country. The coal dealer and the mine operator are not to blame when the public shows its resentment over being punished for other people's mismanagement."

Trinidad, Colo.

Earnings of miners of Colorado Fuel and Iron Co. for June noted. Marked increase in wages under per ton payment plan. Data about Colorado's principal coal fields. Details of earnings at typical plants given.

Coal miners working for the Colorado Fuel and Iron Co., more than 20 days in June, averaged $158.52 each for the month, or an average of $6.72 a day for each man, according to an announcement made by the Colorado company recently. The miners are paid by the ton. The statement is interesting inasmuch as it shows the earning capacity of coal miners in Colorado. There has been a marked increase in the earnings of miners under the per ton payment plan. In Colorado, June is known to be a big month as regards coal mined, for during that month few mines work full time, hence the earning capacity of the men is reduced. In the mines of the Colorado Fuel and Iron Co., 1192 miners worked more than 20 days each; furthermore the statement shows that 49 miners made more than $250 each for the month of June.

The Colorado company's statement gives statistics regarding wages of miners at its typical plants. Of the seven mines noted, four (Cameron, Walsen, Rouse and Pictou) are in Huerfano County; two (Morley and Sopris) are in Las Animas County and the Coal Creek plant is in Fremont County. The total yearly production of the state is approximately ten million tons and one-half of this tonnage comes from Huerfano and Las Animas counties. Of the one million tons of coke made annually in Colorado, about all comes from Las Animas County. Six of the seven mines noted are in the Trinidad field in the southern central part of the state; the other mine the Coal Creek, is in the Cañon City field midway between the Trinidad field and the Denver region. The former field contains mostly high-grade and the Cañon City field low-grade bituminous coal.

With this general information in mind and some details to be given subsequently, coal men can the more readily appreciate the value of the data relative to the earnings at the mines in question. Details relative to the earnings of the miners at one mine in each county considered will suffice by way of illustration. In Huerfano County, at the Walsen plant out of 144 miners working more than 20 days, two earned over $250; ten, between $175 and $200; 11, between $150 and $175. In Las Animas County, at the Sopris plant, out of 161 miners working more than 20 days, six earned over $250; 11, between $225 and $250; 13 between $200 and $225; 18 between $175 and $200; 31, between $150 and $175. In Fremont County, at the Coal Creek plant out of 109 miners working more than 20 days, two earned over $250; four, between $225 and $250; five between $200 and $225; 11, between $175 and $200; 30, between $150 and $175.

The coal mined at the Walsen plant averages five feet in thickness and is developed by a slope. The Sopris plant is a drift mine and the coal averages five feet in thickness. The coal at the Coal Creek mine is reached by a shaft and it is four feet thick.

In this connection an interesting article appeared in the May 22, 1919, issue of *Coal Age* under the title, "Some Items That Enter Into the Cost of Producing Coal." The figures in this article are those pertaining to the Victor-American Fuel Co.'s production costs; this company being one of the leading coal producers of Colorado.

Vancouver, B. C.

Problems of the Northwest—Fuel shortage and rapidly advancing prices. American naval squadron at Bremerton, Wash., takes on considerable coal. Coal now at $10.75 a ton.

Two problems are receiving attention at the hands of consumers of coal in the Northwest at the present time. One of these is the likelihood of there being a shortage next winter and the other the rapidly advancing prices. Coal merchants of Victoria and Vancouver, British Columbia, state that they do not expect a condition that will prevent their meeting all demands both from domestic and commercial sources. However, the arrival of the American naval squadron at Bremerton, Washington, taxed the production of coal in the Northwest to the utmost. In the meantime an advertising campaign is in progress having in view the inducement of the public to purchase their winter supply of fuel as far as possible without delay.

As to prices, there is a considerable section asking for an investigation. Coal now is bringing about $10.75 a ton as compared to $7.50 when the war broke out. Many cannot see the justification for this substantial increase and would like the matter thoroughly probed by a properly constituted government board.

Ottawa, Ont.

Smokey River coal leases cancelled. Canadian Geological Survey states this coal is richest in Canada. Recommended that Government develop the area of 18,000 acres.

As a result of the investigations held by the select committee of the Senate of Canada, appointed recently to inquire into the question of certain valuable coal leases in the Smokey River district of the Alberta Peace River, (about two hundred miles north of Edmonton) the leases have been cancelled by order of Hon. Arthur Meighen, Minister of the Interior. As a consequence the application for the right to build a railway, to be known as the Athabasca Grand Prairie & Vermillion Ry. will go no farther in its present stage. In the investigations that took place, officials of the Geological Survey, Ottawa, testified that the coal area in question probably is the richest in Canada; if developed and connected with the main line to the south, it would be able to supply the whole of the West with a coal, said to be almost equal in quality to the Pennsylvania anthracite. That this may come about, it is recommended that the Government develop the area either on a national or royalty basis and that a line of railway sixty miles in length be erected at once from the Grand Trunk Pacific or Canadian National Railways' main line to the area in question. The leases comprise some eighteen thousand acres, and the coal available is estimated at from 200,000,000 to 400,000,000 tons. A German-American, Dr. Botts, first filed on the leases in 1912, and paid into the treasury the sum of $100,000 in six years for his leases. In 1918 he failed to make payment and the rights were cancelled.

PENNSYLVANIA

Anthracite

Llewllyn—The old Silverton colliery near this place has been reopened by out-of-the-state parties and is in position to ship coal. George Moore, of Minersville, is in charge of the mine.

Mahanoy City—It is announced that the Philadelphia & Reading Coal and Iron Co. will develop a mammoth stripping near this place; the company has started to uncover coal on its property between Mahanoy City and Lost Creek.

Hazleton—The Anthracite Forest Fire Protective Association has been formed. Dr. Drinker, President of Lehigh University, is the president and Chief Forester Neumiller, of the Lehigh Coal and Navigation Co., of Lansford, is secretary. An extensive area is included in the territory looked after by this protective association which is now conducting an advertising campaign in the anthracite region of Pennsylvania to get every landowner within the area on the membership roll. The association, which numbers coal companies, water companies, rod and gun clubs and individual citizens among its membership, hopes ultimately to reduce forest fires throughout the entire region to a minimum and to encourage the re-forestation of what are now waste lands.

The inside team of Beaver Brook and the outside team of Locust Mountain collieries won the trip to Pittsburgh and the right to compete in the first-aid and mine-rescue event to be held by the Bureau of Mines on Oct. 1. These teams participated in the Weston Dodson Company, Inc., meet at Hazle Park on Aug. 15.

Shenandoah—The rush of anthracite miners to their former homes in Europe has been halted by the high prices prevailing overseas, it developed at a meeting held by foreigners of this section recently. So high are the prices in Galicia, Italy and Russia that miners who planned to return home, each with several thousand dollars, found that this sum would be inadequate to establish themselves in business at present rates.

It was stated at the meeting that sugar is selling at $2 a pound in Galicia and shoes at $30 for an ordinary pair. "Those who have been preparing to leave America partly on account of the high cost of living here, found they would only be jumping out of the frying pan into the fire," said one of the prominent Polanders, who attended the meeting.

Bituminous

Uniontown — Connellsville interests headed by Joseph J. Butler and George S. Connell, have purchased the Beechwood mines of the Consolidated Coal Co. at Beechwood, Monongalia County, W. Va. The company also owns other valuable holdings in the same district.

The Cumberland Coal Co. has added to its holdings in Greene County by the purchase of a three-fourths interest in 247.29 acres from Levi Keener, of Morgantown; F. H. Keener, of Carmichaels and T. F. Keener, of Willow Tree. The consideration was $115,919.15.

WEST VIRGINIA

Glen White—The total production of the mines of the E. E. White Coal Co., at Glen White and Stotesbury, in the Raleigh County field during the fiscal year ended June 30, 1919, was 676,000 tons; the production of the two mines was almost even, 340,000 tons being shipped from the Glen White plant and 336,000 tons from the Stotesbury operation.

Charleston.—Announcement has been made by W. J. Heatherman, Chief of the West Virginia Department of Mines, that the following are the places where the new mine-rescue stations in West Virginia (just established) will be located: At Wheeling—quarters and truck provided by the coal operators' association; Welch—in a building furnished by the Houston Coal & Coke Co.; Elkins—quarters provided by the West Virginia Coal and Coke Co.; Macdonald—quarters furnished by the New River Co.; Logan—quarters to be furnished by the operators' association; Fairmont—where the Consolidation Coal Co. is lending its equipment for the use of the Mine Department.

Fairmont—That the transportation committee of the Northern West Virginia Coal Operators' Association intend, if it is within the realm of possibility, to secure relief from the present car shortage was demonstrated recently when the following telegram was sent not only to the Director General of Railroads but to Senators Sutherland and Elkins, and Congressman Neely: "Transportation committee of undersigned association belives there is too much advantage taken of rules which result in inefficiency in reference to utilization of equipment and in loss to the coal companies. Observation also leads the committee to think there is much indifference to get full utilization of equipment. Delay to equipment should be reported to proper officers with view of getting it released promptly. Committee believes twenty-five per cent of car-shortage is caused by too many officers trying to rid themselves of responsibility and to lack of co-operation. This committee is ready to co-operate in any way to help this condition. For example it is absolutely foolish to place cars on rating basis when car distributor knows the mine cannot load the rating while other mines are standing idle on account of low rating. Good judgement should be used which will bring more satisfactory results."

A rumor was in circulation here last week that the law creating the Fuel Administration was to be re-enacted and the powers of the administration widened; coupled with such a rumor was one to the effect that C. W. Calloway, Director of Distribution under the Fuel Administration, would be asked to act in the same capacity again. Little credence was given the rumors about friends of Mr. Calloway (president of the Davis Coal and Coke Co.) stating that under no circumstances would Mr. Calloway agree to act in the same capacity again.

KENTUCKY

Louisville—Due to the advancing price of mine-run coal, which is now quoted at prices ranging from $2.40 to $2.85 a ton, some of the wagon mines with short hauls are again starting operations; but cars are so scarce that competition from such mines does not promise to become heavy for the present, it is said.

Louisville—A delegation of coal men is now in Washington in an effort to secure relief from the inequitable distribution of coal cars, which has resulted in mining companies in some districts getting good supplies, through the car pool, and other sections being left high and dry. The Harlan, Hazard, Southern Appalachian, West Kentucky, Virginia and Alabama associations are represented by the delegation. The work was started on Aug. 1, at a meeting in Louisville, but to date no relief has been secured.

OHIO

Columbus—While the tabulation of tonnage figures regarding available freight for shipment over the proposed barge canal connecting the Ohio River with Lake Erie is not completed, partial figures show that 33,750,000 tons will originate in a portion of the district to be served by the proposed canal. These figures are being tabulated under the auspices of the Central River Route of the Great Lakes and Ohio River Waterways Association. A large proportion of this tonnage is coal, originating in West Virginia, Kentucky and southern Ohio. Iron ore will also contribute a considerable proportion of the tonnage.

INDIANA

Indianapolis—The Indianapolis Public Welfare Loan Association, of which J. K. Stephens is manager, is assisting many persons who are finding it necessary to borrow money with which to buy next winter's coal. Recently the rate of interest charged by the association was lowered from 3 per cent to 2½ per cent., which is 1 per cent. less than the legal rate. During the seven years the association has been in existence not more than 25 or 30 foreclosures have been made. The amounts loaned range from $50 to $100, for which chattel mortgages on furniture are usually taken as security. In event of illness or other unavoidable reason for not paying back a loan when due, the association takes every means to aid the borrower. Although lending money at a low rate of interest and only to the most deserving persons, the association has always paid a fair dividend on its $50,000 capital stock.

ALABAMA

Birmingham—The Tennessee Coal, Iron and Railroad Co. is said to have established a ten-hour day, with pay for eleven hours, for employees of the company working at ore and coal mines at Mulga, Muscoda and Ishkooda. More than 3,000 men are affected by this raise. The men had been working on an eight-hour basis until this increase in wages was granted. It is also said that the night shift will be restored shortly at all mines of the company in the Birmingham district.

MISSOURI

Jefferson City—Petitions purporting to be signed by 20,402 persons in 12 of the Congressional districts of Missouri, for a referendum on the workmen's compensation law, have been filed with the secretary of state by the Building Trades councils of St. Louis and Kansas City. This is 11,000 more than the required number of signers. Representatives of the Missouri State Federation of Labor and the Associated Industries of Missouri have filed a protest with the secretary of state against the submission of the law to a vote of the people at the election in Nov., 1920. They allege fraud in obtaining many of the signatures. About 200 requests have been received from persons for withdrawal of their names on the ground that they were induced to sign by misrepresentation. It is also charged that the petitions contain many fictitious, duplicated and fraudulent names.

COLORADO

Walsenburg—An explosion occurred in the Oakview mine of the Oakdale Coal Co. on Aug. 18 which killed 18 men. At first it was thought that 40 miners had been entombed but all but the 18 victims escaped. The bodies of those killed by the explosion have been recovered. The accident, said to have been caused by gas, occurred about 1½ miles inside the workings. The place is a drift opening located near La Veta in Huerfano County, near the southern part of the state. The Oakdale seam mined here runs from 6 to 14 ft. thick. Compressed air and electric machines and hand mining are employed in getting out the coal. Some 225 men are employed at the plant. The general offices of the company are at Denver.

MONTANA

Roundup—Some 446,243 tons of coal were hoisted out of the No. 3 mine of The Roundup Coal Mining Co., of this place, during the year ended March 1, 1919, according to figures furnished by H. S. Hopka, superintendent of the company. Much improvement and development work was done at the Carpenter Creek or No. 5 mine of this company last year. Electrical mining machines are used to undercut the coal and electric motors are used for haulage. Some 500 men are employed at the two plants; 300 at Roundup and 200 at Carpenter Creek. The general offices of the company are at Omaha, Neb.; the mines are in Musselshell County, near the center of the state. The coal is mined by slope at No. 3 and by a shaft at No. 5; it is a subbituminous seam about 72 in. thick.

Personals

Fred W. Price, of Duquoin, Ill., has accepted the superintendency of a mine near Colorado Springs, Colo., owned and operated by the W. D. Corley Coal Co.

C. E. Warner has been appointed traffic manager of the Southwestern Interstate Coal Operators' Association, with offices in the Keith & Perry Bldg., Kansas City, Mo. F. W. Lukins is president of this association.

Henry Miard, of Fernie, B. C., and **James Dixon,** of Nanaimo, B. C., have been appointed acting inspectors. Mr. Dixon was formerly manager of the Reserve mine and was also recently appointed to the British Columbia Board of Examiners.

O. B. Wescott is in charge of the new branch office of the Jeffrey Manufacturing Co., of Columbus, Ohio, at Detroit, Mich. Mr. Wescott has had a long experience in the sales and engineering-construction departments of this company.

S. G. Little has been appointed manager of the Mine Car Department of the Hyatt Roller Bearing Co., in the Pittsburgh district with offices in the Frick Annex, Pittsburgh; he is assisted by **Joseph S. Larkin,** sales engineer.

W. N. Rigg, of Latrobe, Penn., has accepted the position of superintendent of the large new operation of the New England Fuel and Transportation Co. at Grant Town, in the Fairmont region. He succeeds C. F. Bashore who resigned to enter the service of the Osage Coal Co., a Brady operation. Mr. Rigg has also been connected with The Latrobe & Connellsville Coal Co. He was at one time connected with the Liverpool Coal Company.

W. S. Walker, formerly southwestern sales agent for the Northern Coal Co., of Chicago, is now associated with the Peabody interests as special representative. The Peabody Coal Co. also announces that the two mines in the Gallatin County field, formerly handled by the Northern Coal Co., will be operated by the Peabody Coal Co., who will have the exclusive sale of this coal in the St. Louis market.

Charles W. McKay has taken charge of the Appraisal Division of J. V. Estes, Inc., industrial engineers. This company specializes in the appraisement of industrial property for Federal income tax purposes and articles for Federal income tax purposes and in the appraisement of public utility properties in connection with rate cases. Mr. McKay is the author of the book entitled "Valuing Industrial Properties" and of "Telephone Rates and Values," the latter book to appear shortly.

Col. G. A. Burrell, formerly in charge of mine gas investigations for the Bureau of Mines, has received the Distinguished Service Medal for his work during the war, as chief of the Research Division, Chemical Warfare Service, U. S. A. He worked out gas masks, poison gases, incendiary bombs, smoke screens, signal lights, etc., and looked the supply of helium for balloons, starting and organizing this work.

At the present time Col. Burrell is located at 62 Cedar St., New York City. He is president of the Island Refining Corporation and the Equitable Gas Products Corporation; vice president and general manager of the Raritan Refining Corporation, and a member of the firm of Richmond, Levering & Co. He is also consulting chemist for the Mine Safety Appliances Co., of Pittsburgh, Penn., having started this company in the manufacture of gas masks.

Coming Meetings

The United Mine Workers will hold a convention at Cleveland, Ohio, beginning Sept. 9.

The Bureau of Mines on Sept. 30 and Oct. 1 will hold a national first-aid and mine-rescue contest at Pittsburgh, Penn.

The National Safety Council will hold its annual meeting Oct. 1 to 4 at Cleveland, Ohio. Secretary, S. J. Williams, Chicago, Ill.

New York Coal Merchants' Association will hold its annual meeting Sept. 11-13 at Alexandria Bay, N. Y. Executive secretary, G. W. F. Woodside, Albany, N. Y.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

Indiana Retail Coal Merchants Association will hold its annual convention Sept. 17 to 18 at the Hotel Severin, Indianapolis, Indiana. Secretary, R. R. Yeagley, Fidelity Trust Building, Indianapolis, Indiana.

National Exposition of Chemical Industries will hold its first annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles E. Roth, 417 South Dearborn St., Chicago, Ill.

Industrial News

Logan, W. Va.—The Island Creek Mining Co. is planning for extensive development work on about 3000 acres of coal properties in this district. Frederick Haislip is general manager.

Pottsville, Penn.—The Raven Run Coal Co. is planning to take over the colliery now being run by the Girard Mammoth Coal Co., in West Mahanoy Township. The change will be made about the first of the year.

Scranton, Pa.—Staple & Bell, Inc., Mears Building, this city has arranged for the immediate construction of a new coal breaker and development of a stripping at its properties at West Nanticoke, Penn., to cost about $100,000.

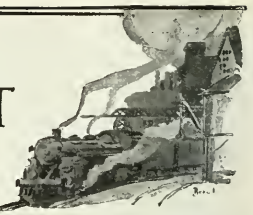
Cleveland, Ohio—The McKinney Steel Co. has acquired additional coal properties in the vicinity of its mines along the Big Sandy River, in Pike County, Ky., and plans to open up the tract for increased output. It is proposed to provide for a production of about twice the present capacity. New electric transmission lines will be extended to the properties.

Cincinnati, Ohio—The Lunkenheimer Co., of this place, manufacturers of valves and engineering appliances, has announced its intention to build a complete new plant. The site selected for the works comprises about 70 acres in a manufacturing suburb of Cincinnati. It is expected that work on this plant will be started within the next few months. The buildings will be of steel and concrete construction and provided with all modern devices for the manufacture of materials into the finished product. The work will represent an outlay of about $2,000,000. The welfare of the employees has been given special consideration. An 8-acre piece of land opposite the plant site will be made into a recreation center, upon which will be erected an assembly hall, clubrooms, athletic grounds and a dining room capable of accommodating 1000 persons at one time.

Pittston, Penn.—The Exeter Machine Works, Inc., has been purchased by New York men who will begin at once to develop the plant into one of the large industries of the Wyoming Valley. The company will continue the manufacture of locomotive cranes and coal-handling machinery, gray iron and bronze castings, steam and electric hoists, etc. It is said that the plant will be materially enlarged and that an addition of some 600 skilled and unskilled workers will be made. Ground has already been purchased for the addition of new buildings to the present plant, which will be erected later on. Work has been started on the relocating of certain machinery to increase efficiency and output. There will be no changes in the personnel of the office and shop forces. The executive and general sales offices of the company will now be located at 30 Church St., New York City, with branch offices in Chicago, Cleveland, St. Louis and other large cities.

MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Market in Bituminous Coal Tightening—Car Shortage Limits Production—Export Business Seeking Bottoms—Lake Coal Moving Actively—Anthracite Industry Holding Its Own

MARKET conditions in soft coal are tightening perceptibly. Car shortages in all the principal producing districts have taken their toll in output, and prices on spot coal change almost overnight. The tendency is constantly upward. Railroads here and there have begun to stock considerable extra coal, and signs are not wanting that industry in general expects boom business in the future, as all seem eager for fuel. Buyers who were foresighted enough to protect themselves by contracts are now reaping the benefits of their wisdom, for the present prices of the better grades of fuel are well in advance of those which were in effect some months ago.

Strange to relate, however, in spite of indications that coal will be scarce and higher in price later in the year, many large consumers are apparently indifferent about their future supplies and seem content to await developments before arranging for their winter reserves.

There is a lively demand for coal for export, but the numerous inquiries bring to light that there is a scarcity of fuel suitable for foreign use, and also that there are not sufficient vessels in which to make shipment. To alleviate this condition somewhat, the Shipping Board recently allocated fourteen more American ships to the port of Baltimore.

The movement of coal to the Great Lakes, for transshipment to the Northwest, is rather active, although the car shortage has reduced shipments to a certain extent. Reports show that there is some congestion at the upper lake docks due to slow interior movement.

During the week ended August 16 the production of soft coal dropped to 9,166,000 net tons, as against 9,369,000 net tons for the week preceding.

So far as anthracite is concerned, buyers are eager for the egg and stove sizes, which have been scarce all summer. It is believed that most dealers have filled the greater proportion of the orders they had on their books for domestic coal, and no real difficulties are expected unless labor troubles and poor transportation conditions should considerably hamper production. No change is to be detected in the call for the steam sizes of anthracite, which in the main continue to move slowly.

As with bituminous coal, the output of anthracite declined in the week ended August 16 to 1,642,000 net tons. Production for the week preceding amounted to 1,870,000 net tons. The total output for the coal year to date is now 33,976,000 net tons compared with 39,761,000 tons last year.

WEEKLY COAL PRODUCTION

The production of bituminous coal slumped again in the week of Aug. 16, bringing the rate of production down to near the level in the latter part of June. The recent strikes on the railroads and in the coal fields, to which causes the sharp decrease in production the first half of August are largely attributed, have been awakening consumers of bituminous coal generally to the danger of delayed purchases of coal. The lack of market has ceased to be the principal factor limiting production in most districts, and car shortage, or more broadly speaking, transportation disability, is of greatest importance. Mine-operating time reported lost in the week of Aug. 9, because of car shortage, was the highest recorded in any week since March, 1918. Production of bituminous coal in the calendar year to date is now nearly 92,000,000 tons, or 25 per cent. behind last year for the same period.

The production of anthracite declined in the week of Aug. 16 to 1,642,000 net tons from 1,870,000 in the preceding week. The output in the second week of August, 1918, was 1,925,000 net tons. The total output in the coal year to date (from Apr. 1) is now estimated at 33,976,000 net tons, compared with 39,761,000 net tons in the same period of 1918. As has been pointed out before, a large part of the decrease this year has been in the fine sizes that are not used for household fuel.

The drop in production in the week of Aug. 9, recorded last week, is shown by the reports from mine operators, since received, to have been largely due to transportation disability, the general average of time lost because of car shortage having risen from 15 per cent. to 22.5 per cent. Labor troubles, particularly in Illinois and the Southwest, also contributed to the losses of operation. The railroads' troubles appear to have been most serious in southern West Virginia, part of eastern Kentucky and in the Middle West.

Coincidently with the increase in car and labor shortage the per cent. of time lost because of no market decreased. To what extent the market has actually stiffened, particularly in the Middle West where it has been sluggish, remains to be seen, for when few or no cars are available or when the miners are on a strike, time lost will be charged to those causes because it is impossible under such conditions to ascertain time that might have been lost because of either mine disability or no market had cars and men been available. The principal cause for the shutdown of a mine, no matter what it be, is never given the benefit of the doubt, for it is only the immediate cause that can be determined without question.

The rate of production of beehive coke continues to gain, the output in the week of Aug. 16 being estimated at 412,500 net tons, a gain over the previous week of 23,700 tons, or 6 per cent. Substantial gains in all the eastern districts were partially offset by decreases in the far west. The output for the week of Aug. 16 was equivalent to 72 per cent. of the production in the corresponding week of last year, whereas the total for the calendar year to date is but 63 per cent. of the total for the same period of last year.

Bituminous coal dumped at lower Lake Erie ports in the week of Aug. 9 was 973,000 net tons, a large increase over the previous week and the largest weekly record since the decline began the first week of July. Total dumpings to date this year are 14,375,000 net tons, compared with 13,190,000 last year.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods was well ahead of the same week a year ago. Compared with the same period of 1918 the number of customers in the house was much larger. Orders from road salesmen for at once delivery were largely in excess of the same week last year. Such lines as are being offered for future delivery are being freely taken. Collections are most satisfactory.

Dry Goods Economist—Business in dry goods and department stores all over the country continues in excess of expectations. Money is plentiful and is being spent freely. Everywhere the demand for commodities of all kinds is unprecedented and is reflected in the orders placed by the stores. Preparations for the usual fall trips of road men carrying staple lines are nearly completed and the first of the month will see most of them on the way to their territories. Collections are excellent.

American Wool and Cotton Reporter—The Boston wool market has been rather quiet for the week under review, but with a little more activity, and sales of 3,000,000 lb. Both fine and medium wools have been bought, but the demand for fleeces has been rather prominent. It is reported that there is no limit to the amount of business that mills would take, because of the continued consumption. The needs of cotton manufacturers have declined on the basis of the smaller number of orders placed. Many producers feel that it is desirable to wait until the new crop becomes available before accepting many new orders.

Atlantic Seaboard

BOSTON

Prices firm, but a dull market. Buyers marking time. Few developments except for somewhat higher quotations. Large tonnages at New York and Philadelphia piers. Export and bunker demand strong. No sales for New England. Reading fleet still tied up. Some retailers have better stocks, but September demand expected to renew the pressure.

Bituminous—While prices are firm it is not because of any strong demand in this particular territory. The market here is slow to respond, and aside from an undertone of anxiety among certain consumers

there is so little interest in current quotations that we are reminded of the "midsummer dullness" that used to be a byword in August. What apprehension there is has regard for contracts made early in the season, and it remains to be seen whether monthly quotas will continue to come forward. August shipments all-rail have been considerably upset by embargoes resulting from the shopmen's walk-out, and from Hampton Roads there has been at least an equal slowing up since the seamen's strike in July.

There is less spot buying than was the case three weeks ago. Buyers here have arranged for three and four months' supply. They see the coal again coming forward in fair volume, and they are much inclined to await developments before making further purchases. There is enough good coal offering so that steam users are still in position to discriminate, and there is a disposition to pay an extra price for grades of known quality.

For fairly high grades from South Fork and special coals from the Moshannon districts there has been a slight advance in current quotations. What were quoted at $3.25 a fortnight ago are now offered at first hand on the basis of $3.40, but only small tonnages are being absorbed on any such basis. Such coals find their best current market at New York and other tidewater loading piers, and it is against prices there that buyers here are forced to bid.

The week has shown the extent to which shippers were obliged to reconsign coal when the embargoes were clamped on early this month. There were not many moves open to them, and in most cases the coal was sent to tidewater to take its chance on the open market. Tonnages at the piers have been larger than for some months, and although there were occasional instances of weak prices on the coals less desirable for bunker use the average of sales was on a level with current quotations at the mines. A number of factors engaged in export and bunker trade have themselves made heavy purchases to clear ships, their own mines having suffered from shortage of labor and to a certain extent the shortage of cars. This has been particularly true of Philadelphia, where $3.25 has been more or less freely paid the past few days for only fair grade low volatiles.

The offshore trade is reported strong in all directions, and especially so for Hampton Roads loading. The agencies see no end to the demand through the fall and winter, and while prices remain on their present basis of $6@6.50 there will be little interest on their part in any demand from New England. The few inquiries that develop are promptly turned down and the great volume of the smokeless coals is being sent overseas. The demand for prepared coal is also strong in the West, and this is another element that will tend to make the market even firmer as the season advances. Despatch is slow at the Virginia terminals and the movement of coal from the mines more or less irregular, but delays so far have not been serious and there seems no special apprehension on this score.

At this end, distributors are still having difficulty getting forward Pocahontas and New River for distribution inland. None of the storage plants has on hand any surplus, and should there be any protracted interruption to through traffic all-rail it is tolerably certain that emergency supplies would be hard to secure. Experience has shown that once shipments from Hampton Roads begin falling off at this season the tonnage is seldom made up, and very often receipts here diminish steadily as winter draws near. The difference this year, so far as this territory is concerned lies in the fact that never was New England so little dependent upon water deliveries generally, of bituminous, and on Hampton Roads in particular.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F. o. b. mines, net tons	$2 60@3 10	$3 00@3 60
F. o. b. Philadelphia, gross tons	4 70@5 35	5 20@5 80
F. o. b. New York, gross tons	5 10@5 70	5 50@6 20
Alongside Boston (water coal), gross tons	6 85@7 35	7 10@7 85

Georges Creek is quoted at $3.70 per net ton, f. o. b. mines.

Pocahontas and New River are quoted at $6.25@6.60 per gross ton f. o. b. Norfolk and Newport News, Va., in response to export demand. There continue practically no sales for coast wise shipment.

Anthracite—There are no new developments in anthracite. Receipts here are still affected by the continued tie-up of the Reading fleet of tugs and barges. It appears that the operating officials in charge made a recommendation two weeks ago, but thus far the Government reviewing authority has not seen fit to act.

From New York there have been shipments lately in fair volume, and now that the embargoes have been lifted there is again a reasonably good movement all-rail. Certain of the retail dealers report somewhat better stocks on hand, but it is almost certain that the end of the vacation season will cause a renewed demand for deliveries. In September we look to hear more said about the shortage here of domestic sizes.

NEW YORK

Local receipts of anthracite increase, but demand continues to exceed supply. Egg and stove lead the list, but dealers accept others sizes. Buckwheats moving easily at steady prices. Demand for bituminous easy; stocks increase. Increased demand for Pennsylvania coals in Canada due to shortage of Nova Scotia coals. Miners are restless.

Anthracite—Receipts of anthracite at this market, according to reports, show a steady increase. This goes a long way to allay the fears of a serious fuel shortage here next winter. At the same time there is a strong feeling that retail dealers have delivered many orders during July and August that ordinarily would not have been delivered until September or October. In view of these facts it is not likely that conditions here next winter will be anything like what was pictured in the spring or early summer, when nearly everyone in the trade was preaching "early buying" as a protection against a near-fuel famine.

Production is strong and considerable coal continues to be sent into the West and into Canada. Reports from the coal fields indicate some uneasiness among labor, probably due in a large degree to the increases in pay secured by many other industries. Not much comment was heard regarding the demands the mine workers propose making upon the operators.

Locally the greatest shortage exists in egg and stove sizes. The demands remain heavy, but dealers are inclined to relieve the situation by accepting chestnut and pea in lieu of the larger sizes, although there is a slow market here for either of these. Most dealers have a heavy tonnage of these coals in their yards, some of which they took in order to obtain the larger coals.

The steam coals are moving freely, considering the season. Dealers are willing to take a proportionate share of these coals if assured deliveries of egg and stove. The large producers are holding quotations at nearly full circular, and these are being obtained for the better grades.

Dumpings of anthracite at the local railroad piers for the week ended Aug. 22 were 6242 cars, as compared with 6158 cars the week previous and 5866 cars during the week ended Aug. 8.

Quotations for company white ash coals, per gross ton at the mines and f.o.b. New York tidewater lower ports, during August, follow:

	Mine	Tidewater
Broken	$5 95	$7 80
Egg	6 25	8 10
Stove	6 50	8 35
Chestnut	6 60	8 45
Pea	5 20	6 95
Buckwheat	3 40	5 15
Rice	2 75	4 50
Barley	2 25	4 00

Bituminous—The labor unrest which is prevalent in nearly all industries is also to be noticed in the coal industry to a certain extent, and as a result production is not keeping up to the mark set for it by the producers. A goodly portion of the decrease is attributed to the various railroad strikes, which result in poor car supply.

There has been a let-up in demand, and various grades which a week ago were short are more plentiful. While the market shows a general change for the better, the increased demand has been for the better grades of coal which are hard to get unless there is a contract.

There has been a heavy cut in production in the West Virginia coal field as a result of the strike of shopmen on the Chesapeake & Ohio RR., and many miners are reported to have left for other regions.

New inquiries are being received concerning coal for export, but when the prospective buyer is asked about vessels a new situation arises. Shipping has not improved sufficiently to take care of all shippers, and those conversant with the situation say they can see no great change for some time to come.

There has been an increased demand for Pennsylvania coals from the territory in and about Montreal because of the delay in securing shipments from Nova Scotia. It is pointed out that this is due in part to the scarcity of ships to carry the coal from Cape Breton to Montreal, and that the rail shipment rates from Pennsylvania have not risen nearly as much as water shipment rates. Another factor is the rise in the cost of mining, due to the lack of labor, the mines having lost a heavy percentage of coal cutters.

The local situation is uninteresting. While stocks show an increase over the previous week, there has been a steadiness in quotations, which remain on substantially the same basis as a week back.

Contract coals move on a heavy basis and the spot buyer finds it difficult to get any free lots. Free coals are not so plentiful as to cause any alarm.

There were 5427 cars of bituminous dumped at the local railroad piers during the week of Aug. 22, as compared with 5733 cars the previous week and 6463 cars the week ended Aug. 8.

There were not many changes in the current quotations for the various grades of coal at the mines. The range is as follows:

	Spot
South Fork (best)	$3.25@$3.50
Cambria (best)	3.00@ 3.25
Cambria (ordinary)	2.65@ 2.90
Clearfield (best)	3.00@ 3.25
Clearfield (ordinary)	2.70@ 3.00
Reynoldsville	2.70@ 2.90
Quemahoning	3.10@ 3.25
Somerset (best)	3.00@ 3.25
Somerset (poor)	2.65@ 2.75
Western Maryland	2.50@ 2.75
Fairmont	2.10@ 2.35
Latrobe	2.60@ 2.65
Greensburg	2.50@ 2.60
Westmoreland, ½ in.	2.75@ 2.90
Westmoreland run-of-mine	2.50@ 2.60

PHILADELPHIA

Anthracite demand still strong for egg and nut. Good shipments last week, but falling off in evidence again. Good stocks of chestnut. Pea also heavily stored. September price talk current. Can individuals maintain their schedules? Some prediction of lull in trade. Retailers have orders well filled. Moderate new business offering. Irregular shipments at minimum. Steam coal quiet, with fair stocking of buckwheat. Bituminous in demand. Fairmont price jumps. Good storing.

Anthracite—The local market is still anxious for coal, principally egg and stove, which have been short all summer. Due to the railroad troubles in New England a goodly supply of all sizes was received here for a short time, but this is changed now, as shipments once more are being directed to other territories, probably even to a greater extent in order to make up the loss due to the embargoes which had been placed. As the railroad strike seems over for the time there is no doubt that this market will again have to get along on meager supplies.

As to chestnut and pea, every one is about satisfied. It is only the occasional dealer that is actually in need of any chestnut, and most dealers have good stocks, better in fact than they have had of this size for several years. As yet there has been little inclination on the part of dealers to hold orders on chestnut, for they realize it will be good stuff to have around next winter. The only real difficulty any of them have is in the matter of tying up so much money in stock, for at the present rate of coal it does not take many cars to use up several thousands of dollars. With pea it is somewhat different, so far as the willingness of the dealers to take in stock is concerned. Lots of them figure they have more than they will be able to dispose of, although these are dealers who have not been in the practice of storing pea. They have taken in this size quite liberally all summer long in order to procure the much needed sizes, and they are now becoming just the least timid and are asking shippers to hold up orders. Still there is the other class of dealer, who simply stores all he can get, as he figures there has never been a time in the past four or five years that his yard was not about bare of this size when the middle of March rolled around.

There is much speculation current as to just what the September prices will be. There can be no denying that there is a falling off in the rush for coal that was evident a few weeks since, and many of the operating companies seem to feel that there will be a general let down in the demand before real retail buying commences. Should this be the case it will be interesting to watch the individual shippers to see what action they will take with their prices, which are now so far in advance of the company figures. It would not be at all surprising to see the independent

dealers allow their present prices to stand and simply ask premiums on the scarce sizes—egg and stove. Even at this they are bound to have some difficulty in disposing of pea coal, as much of their trade is pretty well filled up on this size now.

It is a pleasure to report that there has been a considerable falling off in the sales of carload lots of anthracite to manufacturing plants for distribution to employees. It begins to look as if the meeting held between some of the dealers and the operators in New York some weeks ago is beginning to bear fruit. At that time the operators, producing about 90 per cent. of all the anthracite, promised to give their best efforts toward wiping out the practice. This is a feature of the trade which for years has had a bad effect on the retail trade and has been the cause of much friction between them and the operators.

There has been little appreciable change in the steam situation. Certainly it has not gone backward, but it is a little too early to expect much in the way of improvement. Certain big consumers of buckwheat have lately increased their calls for this size and, if anything, they have in stock more than their usual tonnage, as they seem to fear car shortage or rail disturbances during the winter. Outside of this there is little change. While there has also been some increased buying in price, it has not been very noticeable, and barley is still heavy.

Bituminous—The soft coal trade is in a somewhat feverish condition as to price. Figures have changed almost from day to day, and prices when given were only for a day at the most, as there was a constant tendency upward. This has been particularly true of coals from the Fairmont region, where there have been quite extensive price increases. Most of the trouble has been due to short car supply, being in many cases as low as 40 per cent., while the best reports do not give more than 60 per cent. There is also a greater tendency on the part of bituminous users to take in stock now, especially in the iron trade. Lately there have been some quite noticeable signs of a revival of this industry, and the buying by them has been quite liberal of late. The railroads, too, have at least begun to take in considerable extra coal. All of these factors have had the effect of causing the spot prices to move upward, until they are now well in advance of most of the contract figures which were made some months ago. The rising market has also had its effect on those holding contracts, to the extent that they are asking for their full quotas.

The prices per net ton at the mines are about as follows:

Georges Creek Big Vein	$3.25@3.40
South Fork Miller Vein	3.25@3.40
Clearfield (ordinary)	3.00@3.10
Somerset (ordinary)	2.90@3.05
Fairmont lump	3.25@3.35
Fairmont mine-run	3.10@3.20
Fairmont slack	2.50@2.65
Fairmont lump (ordinary)	2.90@3.00
Fairmont mine-run	2.70@2.80
Fairmont slack	2.50@2.65

BALTIMORE

The fact that local demand is not overbrisk for soft coal more than offset by heavy export calls. Market stiffens during week. Hard coal receipts fair, but premiums are heavy on considerable portion.

Bituminous—From the local viewpoint the market might be stamped as almost dull. There is no rush to get coal for storage here, and buyers are still discriminating. Export coal, however, has tended to stiffen the situation as a whole. There is such a liv ly demand for coal for foreign delivery that it cannot be met promptly either in the matter of coal deliveries at tide or in the supply of vessels to carry it. The week opened a little weaker so far as price was concerned, probably due to a better run of coal over Sunday, but this changed quickly to a stiffer market. At present prices are far above the old government war maximums, and extra strength has been exhibited by gas coals as a result of the export movement. Steam coals for bunker are also in constantly increasing demand. Prices on steam coals range to the trade, mine basis, about as follows; Pools 9 and 71, $3.50@$3.75. Pool 10, $3.25. Pool 11, $2.75@$2.95. Pool 44, $2.65.

On gas coals the prices to the trade are about as follows, although there is frequently quite a range that carries quotations 25c. or more above the average figures: Fairmont low sulphur, three-quarter, running to Pool 37, $3.50. Fairmont run-of-mine, Pool 34, $2.50. Medium sulphur, three-quarter, Pool 33, $2.75@3.00. Youghiogheny and Westmoreland Pool 36, $3.50@3.75.

The export movement continues heavy, a total of 52,488 tons going out on foreign bound ships for the week ending Aug. 11. Fourteen more American ships were announced allocated to Baltimore for immediate coal loading by the Shipping Board.

Anthracite—Receipts of anthracite are fair as a whole and are still too largely of the Independent kind, bearing premiums, to suit many. It is admitted, however, that the run of Company coal is improving here. Premiums asked for the most part are around 75c., although there has been some talk of the asking of premiums of $1.00@$1.25. While it is said that some coal has been taken at those figures, the trading on that basis has certainly not been large. Stove size remains scarce. Dealers here do not seem to be worried over the talk of a famine. There is probaly more coal in cellars thar for some years past, and while there is little or no reserve, the prospect seems bright for receipts enough between now and Oct. 15 to take care of the business that will go on the books with the coming of cool weather.

Lake Markets

PITTSBURGH

Market stiffer and gas coal distinctly higher. Stocks of steam coal, not of gas coal. Labor uncertainty now among coal consumers as well as coal producers.

The coal market has gained farther in strength. Steam coal is distinctly stiffer, while gas coal is higher by at least 25c., and byproduct is higher by an indefinite amount, so much depending on tonnage and delivery. In some cases byproduct ovens have paid very high prices for small lots for immediate shipment, when they needed the coal badly, but they would not pay the same price for large lots and extended delivery. Even on the most conservative comparison byproduct coal is higher than a fortnight ago.

Conservative coal operators suggest that the talk of coming scarcity in coal is exaggerated. They assert that steam-coal users have in many cases laid in very comfortable stocks. A shortage of steam coal, according to their analysis, depends upon labor and transportation conditions—that is, there may be a shortage next winter and there may not be. As to gas coal, this analysis does not apply. The stocks of gas coal are small, not because gas-coal users have been less foresighted than other consumers, but because it has been impossible for them to accumulate stocks, their current consumption having been almost equal to the quantities obtainable for months past.

The coal industry has nothing like a monopoly of labor unrest. There is now so much uncertainty as to labor among coal consumers, including in particular the steel industry, that matters are almost at a stand-off in this respect. It is not without the range of possibilities that manufacturing operations in the iron and steel industry will be at a much lower rate within a few weeks than at present.

Coal production in the Pittsburgh district is at approximately the same rate as for several weeks past, at about two-thirds the full mine ratings, but at 80 or 90 per cent. on the basis of the men on payrolls. Car shortages are more in evidence, and limit production as compared with demand but not as compared with production one month or two months ago.

We quote the market approximately as follows, except for occasional premium prices paid on small prompt lots: Steam slack, $1.90@2.10; gas slack, $2.15@2.40; steam mine-run, $2.25@2.60; gas mine-run, $2.75@3; 3-in. gas, $2.90@3.20, per net ton at mine, Pittsburgh district.

BUFFALO

Jobbers uncertain as to bituminous outlook. They do not like to see prices pushed up. Demand not increasing. Cars more scarce. Anthracite not moving quite so fast.

Bituminous—The trade outlook is not satisfactory to the jobbers. Some of them say that the Pittsburgh market is to blame for their difficulties. They find an asking price in that market that they cannot meet. They feel that it is wrong to urge prices up at this time, for there is nothing to warrant it unless it is on account of the shortage of cars; and that ought to be allowed to take care of itself. Cars are bound to be in small supply from this time on, and that condition ought to be the regulator of prices.

At the same time it is claimed that Pittsburgh shippers are using every opportunity to force higher prices, and the result is that they are quoting more than coal can be sold for here. The best posted of our jobbers admit that they are puzzled over the situation. They are not pleased at the prospect. As a rule they would like to see the trade get together and ask uniform prices, such as have been asked for some time back, and let the trade take its own course.

While it is hard to say just what the Buffalo bituminous prices are, as they are far from uniform or steady, the following quotations are given out as the best representation of the market: $4.55 for Allegheny Valley, all sizes; $4.80 for Pittsburgh, and No. 8 lump; $4.65 for same, three-quarter; $4.20 for mine run and $4.10 for ah s'ack, with $4.60 for smokeless and $5.70 for Pennsylvania smithing, all per net ton, f.o.b. Buffalo.

Anthracite—The situation does not change much. Consumers are asking for more coal than the shippers can provide, as they have been doing for some time. The supply just now is less than for July, as the miners have been off more than usual attending church holidays.

The state of the anthracite trade is such that not much can be obtained from the Independent companies. A pretty stiff premium is asked, which is not easy to obtain here. The jobbers refuse to pay it, and they object to it as likely to make trouble. If the Government is waiting for an opportunity to resume control of the entire coal trade it would be easy to give extra prices as a reason for it.

The Buffa'o prices of anthracite, as quoted by the leading shippers, are as follows:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8.55	$10.20
Egg	8.75	10.60
Stove	8.95	10 80
Chestnut	9 05	10 90
Pea	7.40	9 25
Buckwheat	5.70	7.75

Lake shipments of anthracite are not quite so heavy as they were, but they still maintain a good midsummer average, being for the week 113,600 net tons, of which 41,600 tons cleared for Chicago, 31,900 tons for Milwaukee, 10,000 tons for Green Bay, 9200 tons for Fort William, 9200 tons for Port Arthur, 7600 tons for Sheboygan, 3000 tons for Racine and 1100 tons for Kenosha.

CLEVELAND

The coal market in northern Ohio is tightening. Coal again is moving fairly freely toward Lake Erie ports, and with car shortage still acute northern Ohio supplies are pinched. Prices show a firmer tendency daily.

Bituminous—The supply in this market the past few days has been the smallest of any like period in more than a year. If anything, car supply has been more "spotty," despite the use of the railroad administration's new cars. Mine labor almost daily grows less efficient, grumbling over postponement of the opening of wage negotiations. With the railroad shopmen returning to work, dock workers at the head of the Great Lakes have lost heart, and the lake trade is picking up, thus diverting tonnage that for the past two weeks has been going to the lower lake region.

The net result of all this is that receipts of steam coal in northern Ohio in the past week have fallen about 10 per cent., while demand has increased about 15 per cent., owing to the settlement of several local strikes of fair proportions. It appears that practically every steam-coal user in the district is now needing to stock, and this condition is reflected almost directly in prices. Some operators now are more disposed to contract for fair tonnages, and in several instances have anticipated increases by adding slightly to present market levels.

Domestic bituminous has moved better in the past few days than at any time in months. While householders prefer Pocahontas and anthracite, apartment houses and similar institutions are stocking heavily with bituminous, and business from this source has become quite pronounced lately. Some business also has come from smaller consumers who have been unable to obtain Pocahontas or anthracite and are fear

ful of winter catching them with their bins empty.

So far no coal dealers, wholesale or retail, have been summoned before the local grand jury, which is investigating high prices and alleged profiteering. Neither has any mention been made to date of coal prices held to be excessive.

Pocahontas and Anthracite—The situation in these grades continues unchanged. Receipts are 10 to 15 per cent. of what dealers could dispose of, and demand shows no sign of abatement. Most dealers are entering orders in turn and are giving no promise of delivery. Some dealers have marked forked Pocahontas up 25c. a ton.

Lake Trade—Last week's movement was in the neighborhood of 750,000 tons, many boats having loaded storage cargoes to hold until the docks at the head of the Great Lakes are again working. Consequently, with the strike at the point of being broken, the real dip in bituminous loading will not come until next week. The week following should see shipments up to the 850,000-ton mark, or better. Vessel fuel still is less than 50 per cent. of normal. Car supply in the past week has been sufficient to supply the curtailed demand. Early in September will see vessel tonnage wanted for grain, and bituminous coal will cut much less of a figure in the lake trade from now on than it did earlier in the season.

DETROIT

With transportation conditions working back to normal, following the shopmen's walkout, Detroit coal buyers show diminishing interest in coal.

Bituminous—Jobbers find that the interest of Detroit buyers of bituminous, which was apparently stimulated by the curtailment of transportation facilities due to the strike of railway shopmen, is again giving way to an attitude of indifference. Orders are scattering and for small tonnages, while a large number of the manufacturing establishments and other large users of steam coal seem content to await developments at a later period of the year before proceeding to put in winter reserves.

Jobbers find that many of the city's large consumers of steam coal have not yet reached the bottom of reserves that were built up last fall. This is attributed both to the fact that last year's reserves were unusually large and contained much low-grade coal and to the circumstance that many of the industrial plants were either closed or operating at a low production basis for some time during the earlier part of the year, pending reversion from war work to the normal activities of the plants or because of delays in obtaining working material.

Some complaint is made of car shortage, particularly in the West Virginia districts. Coal on tracks in or around Detroit is not at present a market factor of much importance. Smokeless is practically out of the market except for small consignments of mine-run on which the price holds around the equivalent of $3.60 for net ton, f.o.b. mines.

Four-inch West Virginia lump sells at about $3.50 on the same basis, with two-inch lump quoted at $3.25 to $3.50, mine-run $2.75 and slack $2.25 to $2.60. For Hocking domestic lump the mine price is $2.75 to $3, while nut is quoted $2.50 to $2.75, mine-run at $2.25 and slack $1.60 to $1.75. Jackson Hill is about $1 a ton higher than Hocking.

Anthracite—With anthracite reaching the city only in small amounts, dealers fear there will be an inadequate supply for winter needs of household consumers. There is also complaint of delays in transportations. Several of the retailers are declining to accept orders for future delivery, when they are unable to fill them from stock piles.

Lake Trade—Owing to the strike of dock workers at various Lake Superior ports, lake coal shipments are of much smaller volume than a month ago. A considerable number of carriers are at ports at the head of the lakes awaiting unloading, and some vessel owners are declining cargoes for that district pending adjustment of the labor troubles.

COLUMBUS

Ohio coal trade showing strength in every department. Splurge caused by strike of railroad shopmen is being continued even after strikers return to work. Higher prices prevailing in every section. Growing car shortage complicates situation.

The steam trade, which has been the weakest feature of the market, has suddenly jumped into prominence and is now one of the strongest departments. Screenings especially, which were a drag on the market for months, are becoming scarce and there is active bidding for available stocks. In fact, all sizes have shared in the general improvement, and the boom days are again at hand. Whether it will develop into a runaway market remains to be seen.

The factor of growing car shortage is expected to still further strengthen the market, and higher prices are confidently looked for. Mine-run is quoted between $2.50 and $2.75, while screenings are strong around $2 and $2.10. Lump, which was put up to $3 early in August, is now somewhat higher and prices of $3.50 are freely offered. Domestic lump, Pocahontas and other so-called fancy grades are exceedingly strong. Orders for Pocahontas are not being filled promptly. Retail prices have advanced in conjunction with the higher prices at the mines.

Railroads are taking a large percentage on their fuel contracts as the freight movement is increasing. Steam users are becoming alarmed, and some are trying to accumulate reserves to guard against a stoppage of shipments. Iron and steel plants are better buyers and general manufacturing appears to be improving as far as coal orders are concerned.

The lake trade is rather active, although the car shortage is reducing shipments to a certain extent. This is shown by records of loadings at the principal docks of the lower lake region. Reports show that there is some congestion at the upper lake docks due to slow interior movement. Lake prices are firm at the figures which have prevailed for the past few months.

Production in Ohio fields is being reduced by the car shortage, which is becoming worse on many of the coal-carrying roads. The eastern Ohio field is probably the greatest sufferer, with a car supply approximating about 40 per cent. of needs. In the Pomeroy Bend field the output is estimated at about 50 per cent., and the same figure is reported in the Hocking Valley. Other Ohio fields are inconvenienced by lack of cars and the output is steadily falling off.

CINCINNATI

Predict higher prices. Car shortage to blame. Winter weather will seriously affect situation.

Coal prices have remained firm for the most part, with surplus stocks increasing as the conditions in the mining fields continue to right themselves following the havoc wrought when the mines were closed because of the railroad shopmen's strike several weeks ago. It will take several weeks, however, for conditions to get back to where they were before the strike came on.

Coal prices will go up, about Sept. 1, say the local coal men, and they blame Walker D. Hines, United States Railway Administrator for it. They complain that the car supply is inadequate, despite the fact that the State Utilities Commission inspectors report that all cars demanded are supplied.

There are long strings of new coal cars, it is reported, which have not been allotted to the railroad companies operating under Federal direction. The operators deny the optimistic reports of the situation which are given to Congress by the Railroad Administration. The approach of winter and heavier demands will greatly affect the situation. Figures have been prepared to show that there is a car shortage.

Local domestic consumers have practically all laid in their winter supply, and the big industrial users have placed their orders for the winter. Deliveries are still uncertain, however, and some of those who waited until the last moment in the hopes of reduced prices may find themselves rather pushed for coal when the time for its need arrives.

It seemed to be the contention of the coal users that with the war at an end, transportation facilities would speedily return to a pre-war basis and that there was no need to worry about a shortage of fuel this season. Then, too, they pointed out, there was the gas to fall back on. But right here is another argument in the coal man's favor, for the public long since has been advised by the gas company officials that there is absolute certainty of a shortage in gas this winter.

LOUISVILLE

Situation about the same, with operators suffering from car shortage and miners growing more dissatisfied. Continued good demand for block coal.

Mines in Kentucky for the past three weeks have averaged two days a week, and in some instances have not done that well. The car shortage continues serious, although operators on car pool territory are apparently getting plenty of cars and are selling coal freely in territories that would be covered by the Southern Appalachian trade if cars could be had. Due to the small output and high cost of production, eastern Kentucky is unable to compete in block coal prices with West Virginia, which is selling a good deal of coal on the local market. Western Kentucky block coal is also somewhat stronger in prices and demand. Mine-run and four-inch steam is in fair demand, with screenings still a little draggy. Production is so low that steam prices are being well maintained.

During the past week the Louisville & Nashville announced that it would reemploy all shopmen laid off in the spring, but it is reported that the men are in other lines are coming back very slowly, while cars in the worst shape ever known.

Eastern Kentucky operators are meeting with a good demand from the South, but are oversold on block coal and are filling very few new orders.

Average prices for coal from eastern and western Kentucky based on prices quoted from a number of mines are as follows:

Eastern Kentucky—Block, $4.25@4.50, average, $4.39. Some block selling at $4.75@5; mine-run, $2.50@2.75; nut and slack, $2.10@2.25.

Western Kentucky—Block, $2.05@2.75, average, $2.44; mine-run, $1.90@2.35, average, $2.04; nut and slack, $0.60@2.35, average $1.07.

BIRMINGHAM

Increased strength shown in steam trade the better grades moving easily. Domestic market strong, no stability of prices obtaining in the spot market. Production suffering sharply from shortage of cars. Labor also working irregularly.

The better grades of steam coal are moving with ease in the local market, while the medium and lower grades are showing some improvement in demand, quickened by the shortage in car supply. Quotations are about as follows per net ton mines: Big Seam mine-run, $2.25@2.45; Black Creek and Cahaba mine-run, $3.25@3.45; Carbon Hill, $2.50; Pratt, $2.85.

All the essential elements for a runaway domestic market are noticeable, spot cars of Black Creek and Cahaba lump and nut bringing $5.00@5.50 and Montevallo $5.50@6.00 per net ton mines. It is understood that some of the smaller operators having medium grade steam-domestic coal are considering resumption of grader operations and storing their stock for future disposition in order to have domestic sizes to meet the strong demand in that channel of the trade.

The car supply on the Louisville & Nashville and Southern Railway is only about 50 per cent. of requirements, equipment on the Frisco being a little more plentiful. Mines on all lines are losing considerable time and tonnage due to railroads not being able to furnish adequate equipment, many operations having ample business in hand to maintain steady schedules having to suffer serious loss for lack of equipment for loading.

Coke

CONNELLSVILLE

Sudden advance in prices due to absorption of all floating supplies. Operators very bullish. Consumers not so confident.

The combination of a stiffer market for coal and the sudden demand of half a dozen coke consumers, usually supplied by their own ovens, has lifted the coke market about 75c. Three or four weeks ago a surplus of furnace coke on track developed and operators experienced much difficulty in moving it. While the holders had an asking price of $4 many of them were willing to shade this price. There were occasional sales, not affecting very greatly the visible supply, until about ten days ago eager buyers appeared and the whole accumulation was cleaned up in a short time, some of it at less than $4 and some at that figure. Then there were sales at higher prices, but it appears that the sales at higher prices were of no large volume, though amply sufficient to show where the market stood. $4.50 having been paid in several instances. The whole coke-making trade promptly became bullish and asking prices have ranged from $4.75 to $5.25 on furnace and up to $6.25 on foundry. At the same time producers all withdrew from the contract market.

For the time being at least the market is plainly on the advanced level, but consumers, together with a few producers, have doubts whether it will stay there. A

similar movement in late fall would be attended by no such doubts. There is also the disturbing factor of labor conditions in the iron and steel industry, whereby idle blast furnaces that were contemplating getting into blast are disposed to wait until the labor situation is more clearly defined.

The market is quotable at about $4.75 for spot and prompt furnace coke, with some producers asking more, and at $5.50@6.25 for spot and prompt foundry, depending on brand, per net ton at ovens.

The "Courier" reports coke production in the Connellsville and Lower Connellsville region in the week ended Aug. 16 at 236,182 tons, an increase of 14,012 tons.

Buffalo—The strikes on the upper-lake ore docks have disturbed the movement of iron ore and somewhat affected the coke situation, but the furnaces as a rule have good stocks of ore. It will take some weeks to get the fleet to moving normally again. Meanwhile coke prices remain at $7.60 for 72-hour foundry, $7.25 for 48-hour furnace and $7 for off grades, with domestic sizes selling at $6.75 and breeze at $5.75 per net ton, f.o.b. cars, Buffalo.

Middle West

ST. LOUIS

Mines in Standard district still on strike. Car supply gives mines one day's work per week. Steam demand is easy, but domestic demand picking up, especially in country. So much uncertainty that everything is entirely a day-to-day proposition.

The action of the miners at Springfield on the 19th in voting to call off the strike in the Standard and Mt. Olive fields, as well as in the Springfield and Peoria districts, has not necessarily meant that they are going to work. The miners in the Mt. Olive district for the most part went back at once. In the Standard district they reported for work and asked the superintendent if he would guarantee that no fines would be assessed against them for their failure to work. When they were told that the operators could not make any guarantees, and that it would have to be left to a conference of the union officials and the operators to adjust, they said they would not go to work. Some mines did not start up at all. Some mines started, but on Saturday, the 23d, twelve or fourteen mines in the Mt. Olive and Standard fields that had been working went idle again over the fine, the men refusing to work if they were going to be fined for their violation of their agreement. This is expected now to spread to all other mines in the district that have been working for the past few days.

The car supply in the Standard field is something that is beyond understanding. After being idle for two weeks the mines on the Illinois Central, the first day they resumed operations, could not get enough cars to work with.

Rumors here are to the effect that the Louisville & Nashville and other southern and eastern roads have been shipping their equipment south and east. This week several hundred Illinois Central cars were found on the Baltimore & Ohio, indicating that the Railroad Administration is distributing the few remaining cars in the west over the western terminals of eastern roads after the eastern road equipment has been moved east. The Mobile & Ohio is the only road in the field that seems to be getting full car supply.

The demand is extremely easy on steam coal from the Standard and Mt. Olive fields. Domestic is easy from the Standard field and there is no rate called for. The Mt. Olive field is in better condition, there being a good demand for this coal north and west. The Mt. Olive prices throughout the recent trouble have remained at their fixed schedule, while Standard has gone up and down, according to supply and demand.

At the close of the week Standard 2-in. lump was selling at about $2.25, screenings at $1.75 to $2, mine-run at $2 to $2.15, 6-in. lump and 3 x 6 egg, $2.50 to $2.75.

In the Du Quoin field the car supply has kept the mines to two days a week. There are no labor troubles here. A good tonnage of railroad coal is moving out on account of equipment being furnished for that purpose.

In the Carterville field of Williamson and Franklin Counties the car supply is the one great problem. No mine in the Williamson County field has succeeded in getting cars for more than five full days' work all told between the first and twentieth. Little better time has been made in Franklin County. No mines are working more than four days a week at the most, and these mines have four roads, averaging one day's car supply from each. The Illinois Central is in perhaps the worst shape, both as to equipment and as to movement. The Iron Mountain is a close second.

The railroad tonnage continues good. There is a demand for all sizes, although steam is a little bit heavy, especially screenings.

The movement of foreigners has about ceased for the time being. This, however, may change any time unless working conditions improve.

Practically no anthracite is coming into St. Louis, and there is no smokeless moving. Arkansas has been promised, but it has never been shipped, and orders taken in May are still unfilled.

On the first of September the hauling price for domestic coal in St. Louis increases to $1.25 for domestic and 75c. for steam. Coke hauling for domestic will be $1.75, and coke prices increase on the first on both byprdouct and gas house 75c. per ton.

MILWAUKEE

Railway strike troubles and the walkout of ore dock workers at Lake Superior ports tend to slow up the coal trade. Scarcity of domestic coal.

The coal business at Milwaukee at present is slack, both coming and going. The strike at the Lake Superior ore docks forced a large number of coal carriers to tie up to the docks, thus putting quite a check on receipts by lake. On the other hand, the railway strike operated to cut down the outward flow of coal by rail. Things are expected to improve from now on, however. Small dealers report a scarcity of domestic coal, both anthracite and Pocahontas. Receipts of anthracite thus far by lake aggregate 493,908 tons, a gain of 154,913 tons over last year's record up to the present time. Soft coal receipts aggregate 1,866,971 tons, or a gain of 10,758 tons over 1918.

Prices of coal in Milwaukee are about as follows:

	Per Ton
Anthracite:	
Chestnut	$12.60
Stove	12.50
Egg	12.30
Pea	11.10
Buckwheat	9.75
Bituminous (Domestic):	
West Virginia splint, screened	$7.75
Hi-Heat	7.75
Hocking lump, egg and nut	7.50
Pittsburgh, screened	7.50
Pocahontas, mine-run	8.50
Pocahontas, lump, egg and nut	10.75
Cheerful Chunks (Kentucky, for grates)	9.25
Smithing	8.50
Cannel (Kentucky)	11.75
Steam Coal:	
Youghiogheny, screened	6.75
Youghiogheny, pile run	6.50
Youghiogheny, screenings	5.50
Pittsburgh, screened	6.50
Pittsburgh, pile run	6.25
Pittsburgh, screenings	5.50
Hocking lump, screened	6.50
Hocking lump, pile run	6.25
Hocking lump, screenings	5.50
West Virginia splint, screened	6.75
West Virginia, pile run	6.50
West Virginia, screenings	5.50
Kentucky lump, screened	7.50
Kentucky lump, pile run	7.25
Kentucky lump, screenings	5.50
Pocahontas, mine run	7.50
*Pocahontas, screenings	7.50
Smithing	7.50
*Kanawha Gas, mine run	

* Sold up and out of the market.
An extra charge of 75c. per ton for coal carried in.
An extra charge of 25c. per ton for less than ton lots

General Statistics

ANTHRACITE SHIPMENTS FOR JULY, 1919

The shipments of anthracite for July, as reported to the Anthracite Bureau of Information at Philadelphia, show a substantial increase over the preceding month and exceeded a total of 6,000,000 tons for the first time since October, 1918. The tonnage sent out in July amounted to 6,052,334 tons, an increase over June of 432,743 tons, or 7.7 per cent. Compared with July, 1918, when production was abnormally stimulated by war conditions, the shipments this July showed a decrease of 1,032,441 tons. A large part of this decrease, however, was in the production of steam sizes from washeries that are not in operation this year. Washery production in 1918 averaged 550,000 tons a month, whereas in recent normal years the washery output has amounted to between 150,000 and 250,000 tons a month. Compared with July, 1916, the latest normal year in anthracite production, the shipments this July showed an increase of 619,456 tons

The shipments by companies were as follows:

	July, 1919	July, 1918	Coal Year, 1919–1920	Coal Year, 1918–1919
P. & R. Ry.	1,131,451	1,420,624	4,416,397	5,356,093
L. V. R.R.	1,111,420	1,319,731	4,049,200	5,176,042
C. R. R. of N. J.	544,171	641,547	2,033,175	2,359,412
D. L. & W. R.R.	980,100	1,034,561	3,682,922	4,095,620
D. & H. Co.	731,385	820,530	2,664,082	3,191,764
Pennsylvania R.R.	433,517	504,630	1,591,343	1,929,121
Erie R.R.	663,421	824,242	2,483,139	3,037,121
N. Y. O. & W. Ry	176,524	167,636	656,110	717,326
L. & N. E. R.R.	280,345	351,254	1,032,187	1,345,574
Total	6,052,334	7,084,775	22,608,555	27,208,073

Coal and Coke Securities

New York Stock Exchange Closing Quotations Aug. 25, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	45	....
Burns Brothers, Com.	(BB)	135	136
Burns Brothers, Pfd.	(BB)	100	115
Central Coal & Coke, Com.	(CK)	55	....
Central Coal & Coke, Pfd.	(CK)	63	....
Colorado Fuel & Iron, Com.	(CF)	43	44
Colorado Fuel & Iron, Pfd.	(CF)	....	125
Consolidation Coal of Maryland	(CGM)	75	....
Elk Horn Coal, Com.	(EH)	36	37
Elk Horn Coal, Pfd.	(EH)	41	47
Island Creek Coal, Com.	(ICR)	39	....
Island Creek Coal, Pfd.	(ICR)	75	....
Jefferson & Clearfield Coal & Iron, Pfd.	(JF)	63	....
New Centrsl Coal of West Va.	(NCC)	5	....
Pittsburgh Coal, Com.	(PC)	63	63¾
Pittsburgh Coal, Pfd.	(PC)	92	96½
Pond Creek Coal	(PD)	17	18
Virginia Iron, Coal & Coke	(VIC)	58	61

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	96½	....
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	75½	....
Colorado Fuel & Iron, Gen. 5s, 1943	91	92
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	76½	79
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	83	88
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	96	....
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99½	100
Lehigh Valley Coal, 1st. Ref. to 4½, 1913	74	....
Lehigh Val. Coal & Nav. Con. S. F., 4½, Ser. A, 1954	90	....
Pleasant Valley Coal, 1st S. F. 5s, 1928	80½	....
Pocahontas Coal & Coke, Joint 4s, 1941	80½	83¼
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	83	85
Roch. & Pitts. Coal & Ir., Helvetis Pur. Money 5s, 1946	90	....
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	....	80
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	....	89½
Utah Fuel, 1st Sinking Fund 5s, 1931	87	....
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron Coal & Coke 1st 5s, 1949	84	85½

COAL AGE

Volume 16 New York, September 4, 1919 Number 10

Wanted: A Fair Stand Against Unfair Wage Advances

By R. Dawson Hall

WHEN the self-serving politicians have failed — as fail they certainly will— to lower the cost of living by their futile practice of treeing the wrong cat, then at last we shall save the state by putting in an entirely new set of officials and lawmakers of every shade of political opinion. The two chief classes of profiteers are the members of certain unions and the farmers

So far we have left both entirely alone and gone after excellent people who have for some years, at least, kept reasonably free of profiteering. Our anger seems to lead us to make the most determined effort to convict the least guilty, and the politicians seem bent on satisfying public clamor by leading us in the ridiculous chase. When the public has learned its mistake, as it eventually will, it will look for better leaders.

It is not likely that the new representatives of the nation will prosecute the particular unions that are to be reprobated, nor will they harass the farmer. In fact, no one wants them to do either. All anyone desires them to do is to face facts as they are and prevent the union profiteers from profiteering in any new and undesirable manner. The farmers will probably soon lose the power to demand any more than their products are worth. Theirs has been, in any event, a more creditable profiteering—done without violence, threats or combinations. They have merely accepted the high prices offered them, as honest men are always prone to do.

But the union profiteers have not been content to wait on the supply and demand for labor to settle its value. There are unions that have in no way profiteered — which have not by threat of strike at any time sought or obtained wage increases out of proportion to living cost. Those that are doing so now must be curbed. We ask nothing of the politicians but to stand by, when capital firmly and determinately refuses to permit them to press for such new privileges and wages as will put a ring through the nose of the non-union man and lead the country to bankruptcy and Bolshevism.

Costs of living must continue to rise if wages are to continue to advance, and rise they must if the unfairly rewarded non-union and honest union man are to receive what is due them. This is not a quarrel between capital and labor, but between irresponsible and responsible labor, between profiteering workingmen and workmen who believe in relying on supply and demand, between bandit workmen and the workmen with a keen sense of the duties of the citizen.

A pretty mess we are in. If rents do not rise, houses will not be built because the landlord of the new house cannot make even a bond rate of interest if he has to compete with the landlord who built his house before the war.

But as most landlords have borrowed money on their properties, they have invested only about a quarter to a half of their cost. Just at present the cost of building has gone up roughly 75 per cent. The land cost, which forms perhaps barely a third of the combined cost of building and lot has at present gone up but little. The value of the whole property has therefore risen about 50 per cent. Eventually rents will probably rise to at least that level. They may go higher as costs of building increase and as owners of land discover that the good 100-cent dollars they invested have been juggled till they now only represent 69 cents, or probably only 50 cents, in buying quality.

Though rents and values only rise 50 per cent., a man owning a half equity will make 100 per cent. and a man owning only a quarter will make 200 per cent. on his money. Many more houses will have to be built if the people are to be sheltered, and this will doubtless put up the wages of building labor and probably raise still further the costs of material. In consequence, the owners of pre-war buildings will be assuredly gainers of 50 per cent. on their investment and may make 200 or even 300 per cent. if the wage rates are given many more upward revisions and if the buildings when the war commenced were heavily covered by mortgages.

To prevent the unearned increments, the results of excessive wage agitation and currency inflation, let us keep a firm hold on the wage scale, resisting boldly any attempt to increase wages out of proportion to the increased cost of living. Just at present we should look askance at all employees who wish to increase their remuneration more than 70 per cent. above the pre-war figure.

Mining and Metallurgical Industries to Help Dedicate Bureau of Mines Laboratories

NEW MILLION DOLLAR LABORATORIES OF THE UNITED STATES BUREAU OF MINES AT PITTSBURGH, PENN.

First-Aid and Mine-Rescue Contests Are to Be Some of the Features of a Large Program Arranged by the Bureau of Mines and the Pittsburgh Chamber of Commerce. Teams from All Parts of the Country Have Already Signified Their Intention of Participating in the Events

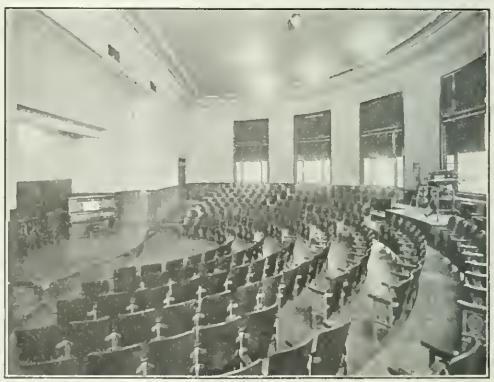
THE new laboratories of the Interior Department's Bureau of Mines at Pittsburgh, costing more than a million dollars, are to be dedicated on Sept. 29, 30 and Oct. 1 with appropriate ceremonies in which the mining and metallurgical industries of the country are to take part. The program for the three days has been arranged by the Bureau of Mines in cooperation with the Pittsburgh Chamber of Commerce and promises to be both interesting and instructive.

One of the biggest features of these ceremonies will be the nation-wide first-aid and mine-rescue contest to be held during the last two days. Already nearly 100 teams from the coal- and metal-mining companies throughout the country have entered the lists, and more are expected by the time the entries close.

On Oct. 1 there will be a holiday for the miners of the Pittsburgh district, and thousands will attend this national meet and witness the awarding of the prizes to the winners.

In addition to the usual prizes for these contests, the Joseph A. Holmes Safety Association, an organization created in 1916 in honor of the memory of the first director, for the purpose of giving recognition to persons who had performed meritorious and heroic deeds in the saving of human life in the mining and metallurgical industry, or who had developed some safety appliance to further the saving of life in those industries, will make its first awards. Dr. Van H. Manning, president of the association, will announce the list of recipients of diplomas and medals, and recite the deeds for which they are presented. The committee on awards has recommended that twelve gold medals be awarded, all for heroic deeds performed by miners in coal and metal mines in efforts to save the lives of other fellow workmen. In several instances where men lost their lives in endeavoring to save others, the medals will be awarded to their nearest living relative. It is intended that this organization serve the mining industry in much the same manner as the Carnegie Hero Commission attempts to serve industry generally.

ONE OF THE MAIN CORRIDORS OF THE BUREAU OF MINES LABORATORIES



AUDITORIUM WHERE SCIENCE STUDENTS HEAR OF IMPORTANT DISCOVERIES

Speaking of the accident conditions generally in the mining industries, and of the outlook, Dr. Van H. Manning, Director of the Bureau of Mines, says:

"I am often asked, 'What has the Bureau of Mines accomplished in the saving of human life in the mines?' It is difficult to say that so many miners might not have been killed if it were not for the Bureau of Mines, there are so many varying factors involved. I may say, however, that if you consider the prevailing average death rate in the mines for a period of years before the Federal Government took up this work, and compare it with the average fatality rate since the Bureau was created, you will find that 5000 less miners have been killed. In other words, had the old fatality rate been maintained through the last few years 5000 more men would have lost their lives.

"I am of the opinion that the statement of 5000 lives saved is a conservative one, for it must be remembered that the situation was gradually becoming worse in the mines, and who knows that there might not have been 7000 or 8000 lives lost. We also have to take into consideration that, thanks to the many improvements in life-saving methods and the greater understanding of the causes of accidents, that the tide has definitely turned and that this saving of 5000 human beings within a few years will be accentuated and increased as the years roll on until we can show several times 5000 lives saved.

"Whatever statisticians attempt to make out of these figures, however they may endeavor to twist them, it is indeed a glorious record of human progress. Five thousand lives saved! Perhaps 2000 less widows! At least 3000 children who still have fathers.

"Take away all the other manifold duties of the Bureau of Mines and this one accomplishment is worthy of all its costs to the Government since its establishment, and for years to come. And when I referred to this as an accomplishment, I do not mean that the Bureau of Mines deserves all of the credit. It was, however, the agency that picked up the isolated, sporadic efforts of a few well-meaning men and companies, and welded them into a great national movement for greater safety in the mines. It is true it at once gained the coöperation of the miners, the mine operators, the state mine inspectors and others, and without these the Bureau of Mines would have been almost helpless.

"It was in 1911 that the Bureau held under its auspices a great, national first-aid and mine-rescue meet at Pittsburgh, Penn., which was attended by 22,000 miners. The slogan of that meet was 'Safety First,' and that was the time that the slogan, since internationally famous, became the national battle cry of this humanitarian movement. I understand that a steel company had before that time used the slogan locally, but to all intents and purposes the Bureau of Mines was responsible for its becoming a great world slogan.

"Not only was 'Safety First' immediately adopted by the mining companies—you will see it posted about hundreds of mines and also on their equipment—but it was also taken up by the railroads and by industrial plants of the country until it became a national byword. Safety organizations appeared everywhere; committees of the men were formed in the mines and shops, and determined campaigns were inaugurated to reduce the number of deaths and injuries in the industries. In some of the big establishments the committees printed little papers for the men, giving the progress of the life-saving work and pointing out accidents that could perhaps have been avoided. Safety inspectors and committees were chosen; the railroads built up elaborate safety organizations, and divisions vied with each other as to which could produce the cleanest records. There

DR. VAN H. MANNING
Director, United States Bureau of Mines

D. A. LYON
Superintendent of the Pittsburgh Station

was a spirited rivalry between these committees, and the records of the different establishments began to show results in lives saved and men saved from suffering. In quite a number of mills and factories and railroads there was a reduction in the fatalities of more than 50 per cent. Further improvement was slower, but the original gains were made and added to.

"Just how many thousands of lives were saved may never be known, for there are no statistics that adequately cover industrial accidents; but we do know that the Bureau of Mines and its associated agencies started a movement that not only spread throughout the entire United States, but it also reached the other countries of the world with an equally good effect. And it all started with the modest mine safety meet we held in Pittsburgh in 1911.

"Since that time, the Bureau has gone on its way, improving its methods, interesting the miner in his own safety and that of his fellowman; doing what it could to point out to the owners of the mines the dangerous places that could be avoided and making recommendations as the result of its experiments looking toward still greater safety.

"Today the Bureau of Mines maintains in every mining field of the country a mine-rescue car fully equipped with modern life-saving apparatus, that responds to disasters and assists in the rescue work; in the meanwhile visiting the mines in its district and giving the miners instruction in both mine-rescue and first aid to the injured. As a result there are several thousand miners throughout the country who are expert in the use of the oxygen mine-rescue apparatus and who are familiar with the most modern methods of life saving. Besides more than 50,000 miners understand first-aid-to-the-injured work as well as regular hospital corps. All of these men have been trained by the Bureau of Mines.

DEMONSTRATING THE NEW AMERICAN BREATHING APPARATUS PERFECTED BY BUREAU OF MINES ENGINEERS

Mine Disasters Becoming Fewer

"Happily, great mine disasters have been becoming fewer and fewer as the men come to a better understanding of their causes. Nevertheless, they do happen, and one thing that the Bureau has preached is that upon such a visitation there shall be a more orderly and systematic method of rescue work, for it has been demonstrated that life can be saved in indirect ways. The Bureau has endeavored to tell the miners that in a great catastrophe, it is often better for entombed miners to barricade themselves in, keeping the poisonous gases out of their working place and waiting for relief. In this manner 42 men entombed in a mine for four days were recently rescued, the men even being able to walk out of the mine.

"We are now hopeful that this coming nation-wide first-aid and mine-rescue week in Pittsburgh will give the safety movement another such impetus as the meet in 1911. If its influence is but one fraction of the former meet, the Bureau will be amply repaid.

"As far as the mining industry is concerned, we are not content to rest on the progress made. There are now more than a million miners in the United States, and each year more than 3000 are killed in accidents and a quarter of a million injured. Taking the cold, business calculation of the state compensation commission and eliminating the suffering and sorrow of 3000 killed each year, the economic loss from these fatalities alone is $12,000,000 a year, for these commissions are paying an average of $4000 for every life lost. This is a terrible toll for one industry to pay each year in providing the coal that furnishes the power of the nation and warms the homes of the people. It is hard for us to realize that out of every mining camp of 1000 three are sure to lose their lives before the year is out.

"Mining will always be an extra-hazardous business; there will always be dangers inherent to the industry that will ever take a death toll and beyond which it will be impossible to reduce the death rate.

"But the question is, 'Have we reached that irreducible minimum?' I think not. It is my belief that we can cut down the present fatality rates fully one-half; that we can save each year 1500 of the 3000 killed every twelve months. Isn't such a goal worth striving for? A prize of 1500 human beings saved to life, happiness and their families each year. This may seem like one of those ideals impossible to attain, but so did the saving of 5000 lives already accomplished through similar efforts. Nevertheless that is our goal, and today we see more definitely its attainment than the progress already made when we started this work. The causes of these fatal accidents are now much better known than heretofore. Operators and miners are giving much more thought to the dangers of the mines and the wideawake among them have installed more modern safety devices. The industry is not now groping in the dark on some of those causes that were more or less mysterious some years ago, such as the dangers from coal dust. Through the Experimental Mine of the Bureau, mining men and miners both have a keener understanding of the dangers of coal dust, and they have also learned how to care for this menace that has cost so many lives.

"In the mining industry at least a human life is much more valuable than ever before, and I believe that can be said of all the industries, especially those of the United States. The recent world holocaust in which 7,000,000 men made the supreme sacrifice would seem to belie my statement; nevertheless, it is true as seen in the great advances in safety work, the millions of dollars spent in safety devices and the humanitarian work of the different state compensation commissions. The day of the ambulance chaser and those ghouls that

preyed upon the widow beset with grief over the loss of her husband have happily passed away. The state now steps in and sees that the widow and orphan are protected, and that alone is worth all the fight that we have endeavored to make. I do not say that the Bureau of Mines is responsible for these state compensations, but I do know that these commissions came after the mining industry started its great man-saving drive, and that the disclosures of the conditions in mining furnished the states with facts that favored the establishment of these commissions.

"Cut the mine fatalities in half."

The dedication ceremonies promise to bring to Pittsburgh for the three days the most prominent mining and metallurgical men of the nation, not alone interested in the safety-first movement, but also those connected with the allied industries that use the products of the mines.

The Bureau of Mines, in coöperation with the Pittsburgh Chamber of Commerce, has already completed an elaborate program of events which includes the presence of high Government and State government officials besides the leading men of mining thought in the country. The ceremonies proper open on Monday morning, Sept. 29. The evening before, Sunday, Sept. 28, there will be reception committees at the various leading hotels to receive the guests. On Monday morning the new laboratories at 4800 Forbes St. will be open for inspection, and at 10:30 o'clock the dedicatory ceremonies will be held on the lawn in the rear of the laboratories, with Dr. Van. H. Manning, Director of the Bureau, presiding. After invocation by Dr. S. B. McCormick, chancellor of the University of Pittsburgh, there will be an address of welcome by Hon. E. V. Babcock, mayor of Pittsburgh. Response will be made by the Hon. Franklin K. Lane, Secretary of the Interior, to be followed by addresses by Horace B. Winchell, president of the American Institute of Mining and Metallurgical Engineers; John L. Lewis, acting president of the United Mine Workers of America, and the Hon. William C. Sproul, governor of Pennsylvania. The formal ceremony of handing over the keys of the building by Secretary Lane to Director Manning will follow.

After luncheon at the Bureau of Mines buildings, the guests will board special trains on the Baltimore & Ohio R.R. to the Experimental Mine of the Bureau of Mines at Bruceton, Penn., 14 miles from Pittsburgh. Upon arrival there a prearranged explosion of coal dust will take place in the Experimental Mine as a demonstration to the visitors, and after that there will be an inspection of the mine and the explosives-testing plant, the guests returning to the city at six o'clock in the evening. At 8 p.m. there will be a general meeting at Carnegie Music Hall under the auspices of the Pittsburgh Chamber of Commerce, with an address by Secretary Lane, an organ recital by Dr. Charles Heinroth, and a moving picture prepared by the National Coal Association, "The Story of Coal," will be given its first presentation.

On Tuesday, Sept. 30, the new laboratories will be open for inspection by the guests for the entire day, and at 2 p.m., the elimination contests in the national safety first-aid and mine-rescue meet will be held at Forbes Field, also the awarding of the state championships. At 5 p. m., at Forbes Field, there will be a demonstration of the explosibility of coal dust, and at 8 p. m. the Chamber of Commerce will present a pageant typifying the spirit of the mining industry, with music by the band of the Carnegie Institute of Technology.

On Wednesday, Oct. 1, at 9 a. m., there will be a final mine-rescue contest by the ten successful teams of the previous day at Forbes Field, with a presentation of the national cups and prizes. At 2 p. m. the announcement of the J. A. Holmes Safety Association will be made by Dr. Van H. Manning. At 2:30 p. m. the final first-aid contest will be held. The participants will be the 20 best teams of the previous day, the contest being for several gold cups and prizes. At 5 p. m. there will be a demonstration of a coal-dust explosion at Forbes Field, the events closing with a smoker at the Chamber of Commerce in which the prizes will be awarded and speeches made.

The Honorary Committee in charge of the dedication of the Pittsburgh station is as follows: George S. Oliver, president, Pittsburgh Chamber of Commerce; John F. Herron, president, City Council of Pittsburgh; Harry N. Taylor, president, National Coal Operators' Association; John L. Lewis, acting president, United Mine Workers of America; Horace B. Winchell, president, American Institute of Mining and Metallurgical Engineers; Hon. Franklin K. Lane, Secretary of the Interior; Dr. Van. H. Manning, Director, Bureau of Mines; Dr. S. B. McCormick, chancellor of the University of Pittsburgh; Dr. Arthur A. Hammerschlag, president of the Carnegie Institute of Technology; Dr. S. W. Stratton, director, Bureau of Standards; Dr. R. F. Bacon, Director, Mellon Institute; Seward E. Button, chief, Department of Mines, State of Pennsylvania; Dr. D. Van Schaack, president of the National Safety Council; T. A. O'Donnell, president, American Petroleum Institute; Mortimer E. Cooley, president, American Society of Mechanical Engineers; Fayette S. Curtis, president, American Society of Civil Engineers; J. A. Capp, president, American Society of Testing Materials; Dr. William H. Nichols, president, American Chemical Society; Calvert Townley, president, American Society Electrical Engineers; G. H. Neilson, president, Engineers Society of Western Pennsylvania; Dr. W. D. Bancroft, president, American Electro-Chemical Society; R. T. Stull, president, American Ceramics Society; E. N. Zern, president, Coal Mining Institute of America; James R. Angell, chairman, National Research Council.

Coal Mining in France and Scotland

Some time before the war, writes "Engineer" in the April 19 issue of *Everyman*, I had an opportunity to compare the working of collieries in the French mining district of Pas-de-Calais and some of the Scottish coalfields, and in view of the Coal Commission, the following general impressions may be of public interest.

Coming from a French mining district, particularly one of the wealthy and well-managed districts of the Nord and Pas-de-Calais, the first impression of a Scottish mine is not favorable. Things seem to be scattered about and left to take care of themselves. One misses the studied arrangement of the buildings, the neat appearance of the engine rooms, the bright, regular setting of the engines, the clock-work regularity of the working of the pit. There is a do-as-you-please manner about every detail of the work, from the lifting of the coal to the very attire of the workmen, whose

rough suits, black shirts and ragged caps compare very unfavorably with the blue overall and cork-helmet of their French comrades.

The pit manager was quite a contrast with the Ingénieur des Mines who had guided my steps in B———. The Frenchman came from the Ecole Nationale Supérieure des Mines. He had gone through highly mathematical courses in order to pass the entrance examination, then had followed the theoretical teaching of the school in the beautiful rooms of the Palais Vendôme, whose high windows open on to the Luxembourg Gardens. He was a highly cultivated man, both scientifically and in the more general way in which a Parisian mind is cultivated by the mere influence of the great city. The practical side of his profession he had mastered in about a year's training under his predecessor in the management of the pit. Every morning he went down and visited a sector of his mine, discussing the details of its working with his foremen, observing the geological and other sides of the outlook, and settling questions of price and propping with the men. The visit lasted for about three to four hours, and was so calculated that the manager surveyed the whole of his mine every month. In the afternoon, the manager took up the office part of his work, the main part of which consisted in studying and discussing the cost price.

The Scottish pit manager was a sturdy workman hardly above the level of an ordinary hewer. Of mathematics he had none. He knew nothing about engines, the working of which was entrusted to a different specialist. His knowledge was purely empirical and he was unable to give a clear explanation of most of the things he did or had done in the pit. He had no reading and knew no other methods than those of the district. He could talk of nothing but coal mining. He kindly consented to come down the pit to show his mine to me, but he explained that he usually went down but once a month except in case of accidents. And it struck me as the crowning touch of the contrast that he went down in the same clothes he was wearing and did not change when he came up again; nor was I expected to require a bath before leaving. There were no baths on the premises.

The French mine was run at full speed. The working of the cage was timed beforehand to the second, and the number of trucks lifted per hour carefully checked. The movements of the trucks at both the top and bottom levels were planned so as to get the maximum result from the work of the men who served the lifts.

The Scottish mines did not seem to attach so much importance to the working of the cage, and a loss of minutes, nay, half-hours, was not looked upon as a serious incident in the day; but I was unable to ascertain whether this was due to lack of coördination between the lifting and the hewing arrangements, or to the fact that the mine had more lifting power than necessary, or perhaps to slackness in the market. The methods in use were far less economical than in France. Coal which it did not pay to lift was left at the bottom, perhaps forever. Pillars of coal were left here and there instead of propping. I observed places where propping was obviously defective, and the pit manager, whose attention I called to the fact, explained that it was for the miner to see that it was properly carried out. As the time devoted to propping had to be taken from that given to hewing, and the men were paid by the ton, the effect of this system may be easily guessed. Fear of accidents is hardly a consideration with miners, since familiarity breeds contempt.

Much more was left to luck in Scotland than in France. The working of the cage was carefully regulated in France in order to avoid personal accidents. Thus, while lifting or lowering men, two enginemen were required by law at the levers. An automatic safety brake prevented the cage from climbing too high—an accident not unusual when such a precaution is not taken and one which always ends in breaking the cage and precipitating it to the bottom. The cable—the flat hemp cable which the French consider safer than the steel ones generally in use in this country—was carefully tested every two or three months and records were kept of these tests. The tail-end next to the cage, the most hard-worked part of the cable, was cut off for this operation, so that the results obtained were always on the safe side. I should add that the size and thickness of the cable are calculated beforehand so as to realize the maximum safety with the minimum possible weight, for deep mines require a considerable length and therefore weight of cable, which has to be lifted every time, and any undue overweight of cable represents a relatively high restriction on the amount of coal that can be lifted. Moreover, the walls of the pit and the rails of the cage were inspected once a month by the pit manager, who went down standing on top of the cage which lowered at a very slow speed, and knocking with his hammer every yard of wall. I saw none of these precautions in Scotland, and my questions elicited from the pit manager a complete ignorance about the use, utility, or even existence of any of them. He seemed, however, to know about the safety brake for limiting the rise of the cage, and, indeed, I saw one in a mine (a South Wales mine, I believe); but he deprecated their use on the ground that they tend to weaken the attention of the engineman. As for the cable, he trusted to "a good strong cable, provided by a sound safe firm." Its size was chosen "on the safe side," that is, unnecessarily thick and heavy. Empiricism seemed to be the rule everywhere. Smoking was allowed at the bottom, and ordinary lamps were used.

Both the French and the Scottish collieries visited were privately owned and worked, yet the contrast was great. This contrast was, of course, purely a matter of national character. There was on the one side the empirical tendency of the Briton to let things go by themselves, and to work by rule of thumb; and on the French side, the love of theory and scientific study and the national tendency toward foresight and regulation.

Nothing could better illustrate the differences here set forth than the contrast in social status between a mining engineer in France and in this country. A French Ingénieur des Mines is at the very top of the ladder of social prestige. The Inspection of Mines is entrusted to the body of Government Engineers called Ingénieurs au Corps des Mines, who are the pick of the basket of the Ecole Polytechnique. Most of the great names of modern French science belonged or belong to this corps. Henri Poincaré, the mathematician, was one of them. The root of the difference lies perhaps in that to the French mind business is a science, while to the British mind, science is only to be respected when it means business.

A Small Stripping with Heavy Overburden

By Donald J. Baker
Pittsburgh, Penn.

OBTAINING a fair return from a stripping mine where the overburden in places reached a thickness of 72 ft. has been the problem of C. M. Mayer, general manager and superintendent of such an operation near Presto, Penn. The plant in question is that of the C. P. Mayer Brick Co., and embraces a tract of 37 acres out of some 300 acres owned by the above company. The remaining coal is under development by a drift mine.

The coal is that of the Pittsburgh bed and runs in thickness from 5 to 11 ft. The thicker part of the seam lies under the heavier covering from where it decreases with the overburden, but the average is 5 ft. A creek runs through the property and bounds the stripping operation on one side. This makes an additional drainage problem when it is considered that the coal is in places 12 ft. below the level of the creek bottom. Two Bucyrus steam shovels are in operation. One is a 225B, 90-ft.-boom type handling the overburden, while the other is a 35B, 1½-yd. machine for use on the coal.

VIEW UP THE CUT, OVERBURDEN SHOWN ON LEFT AND SUMP ON RIGHT

The first cut about 100 ft. in width was made around the outer edge of the tract away from the creek. Development was rapid at this point as the covering never exceeded from 5 to 30 ft. in thickness with a comparatively shorter haul to the tipple. Western bottom-dump cars were used for loading at the shovel. These had a capacity of 8 tons and standard-gage equipment was used throughout. A later use of sideboards on the cars afforded a capacity increase up to 10 tons.

Two locomotives are in use: one a 42-ton Vulcan and the other a 30-ton American. The cars as they are loaded are removed to a siding by one of these dinkeys, which also places the empties at the smaller shovel. From this siding the other locomotive takes them to a point within easy reach of and on a slight grade to the tipple.

As the large shovel moved forward toward the creek, the thickness of covering increased. When an overburden of 72 ft. had been reached, a fault in the bed was discovered running transversely to the progress of the development and raising the elevation of the coal approximately 10 ft. No corresponding thickness of overburden was noted and there is little doubt that the geological condition encountered aided materially in the development at this stage of the operation. Progress to a point within 100 ft. of the stream was slow but commercially warranted, as the coal there ran 11 ft. in thickness. From here a sharp turn was made to conform to the outline of the creek, and the present working is at the upper end of the property boundary line within striking distance of the original cut.

The present workings lie in places on a level lower than the nearby creek bottom. A series of ditches have been constructed that lead the water filtering through the rock strata above the coal to a sump located about 100 ft. to the rear of the small shovel. A 6-in. electrically driven Iron City centrifugal pump is employed to return part of the water to the creek. The greater portion, however, flows to a main pool located about 400 ft. down the cut. At this point an 8-in. electrically driven Iron City centrifugal pump is large enough to handle the overflow from the sump above, and keep the collecting water under control.

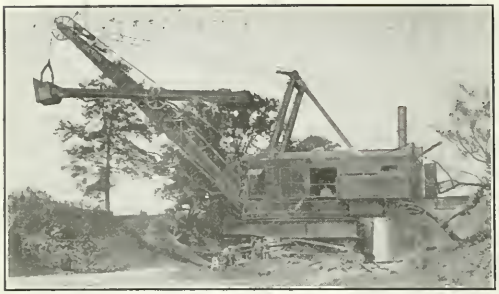
An average force of 40 men gives the plant a daily output of 1300 tons. Two Star drilling machines are in use at the smaller shovel for drilling the powder holes. From this shovel the loaded cars have a run of about 1000 ft. to a siding near the tipple. Three reinforced concrete piers support a trestle spanning the creek to this building. Both the trestle and tipple are of wood construction and both are simple in design. Two men suffice to handle the cars into the tipple whence the coal is dumped into cars without further process.

At the opening of the plant in 1917, it was necessary to move the larger steam shovel over the creek. As this stream has an average width of 50 ft. and a depth of 6 ft., it at first appeared necessary to construct a temporary trestle. This idea was abandoned, however,

VIEW OF OPERATIONS; BRIDGE SHOWS NEARNESS OF CREEK

VIEW OF THE 225B BUCYRUS STEAM SHOVEL IN OPERATION

VIEW OF THE TRESTLE WITH TIPPLE IN THE BACKGROUND



THE SHOVEL IN TRANSIT ACROSS THE CREEK

in favor of trying to cross directly and saving the time that would have been consumed in the building of the trestle. The topography of the country at this point seemed to be favorable to this plan, as the ground sloped gently up from the creek on one side and only a small amount of grading would have to be done on the opposite side.

The shovel was brought to the edge of the stream and put in operation to dam up a portion of it, a passage about 15 ft. wide being left at the opposite side to serve as an outlet. Dirt and rock were then spread out until a footing about 15 ft. wide by 35 ft. long had been attained. On this heavy timbers were placed parallel with the movement of the shovel, thus furnishing substantial support for the ties and rails.

The shovel was then moved to a position halfway across the creek and again put in operation. An opening was made to the rear for the escape of the water and the outlet ahead dammed up. The movement of the shovel was then continued until the opposite side had been reached. A small amount of excavating was then done through the bank to permit of a better gradient.

With one exception, no difficulty was encountered in the entire movement of the shovel across the stream. As the rear trucks were leaving the foundation on the farther side of the creek, the added weight thrown on them from the movement of the front trucks up the grade of the bank ahead forced them through the dirt and down into the water. This necessitated jacking them up and the bringing into place under water of the supporting beams, after which the movement forward was continued without further interruption.

The Rainey-Wood Byproduct Coke Operation

By John L. Gans
Connellsville, Penn.

Interest in the Connellsville coke region centers more in the near approach to completion of the byproduct plant of the Rainey-Wood Coke Co., at Swedeland, Penn., than in any other plant of this character that has been constructed. This is not because of the size or extraordinary character or up-to-dateness of the installation, but because of the relation the Connellsville region sustains to the operation.

Heretofore byproduct installations, both merchant and furnace, have been built by interests outside of the Connellsville region, or by interests already owning and operating beehive plants in the region, directly or through the medium of a subsidiary corporation. In the case of the Rainey-Wood plant the relation sustained to the Connellsville region is wholly different, and altogether a new one in the annals of byproduct coking development.

The plant is being constructed and will be owned and operated by a corporation—the first of its kind—

BYPRODUCT COKE PLANT OF RAINEY-WOOD COKE CO., SWEDELAND, PENN., IN COURSE OF CONSTRUCTION

which represents, on one hand, an owner of Connellsville coking coal and an operator of beehive ovens, and on the other hand, an interest which heretofore has been a consumer of Connellsville beehive coke. The union has been effected by the creation of the Rainey-Wood Coke Co., representing the W. J. Rainey interests and the Alan Wood Iron and Steel Co. It is because the enterprise is the pioneer in such a combination of interests that the Connellsville region is somewhat more concerned in its progress than in any that have preceded it, particularly as to the possibilities that may lie with an extension of the plan to include other interests in a like amalgamation as one of the developments of the changing conditions in the coking industry.

The Swedeland plant, which is to consist of 110 Koppers ovens, of a capacity of 11.7 tons each, is being constructed in two batteries of 55 ovens each, complete with byproduct recovery apparatus. The plant will have a capacity for carbonizing approximately 1900 tons of coal per day, or about 63,000 tons per month.

The plans of the owners are to make this plant a commercial coking operation, disposing of the furnace and foundry grades of coke throughout the territory adjacent to its location. The Alan Wood Iron and Steel Co. will use about one-third of the plant's output at its furnaces; the remainder of its requirements will be supplied by the W. J. Rainey interests from the Connellsville region. Provision, financial and otherwise, has been made for an ultimate extension of this plant to a total of 330 ovens. When that capacity has been attained the plant will be enabled to take care of a large part of the coke requirements of both furnaces and foundries in the Lehigh and Schuylkill Valleys.

That the plant will also have the character of a merchant operation will have additional interest to Connellsville region producers in that its entrance into the general coke trade will have the effect of curtailing the beehive-coke market to the extent represented by the byproduct tonnage the new plant may place outside of its own associated consuming interests. This will not be regarded as alarming, but it is significant of the trend in the industry, which for some time past has been evidenced by the gradual transformation of the Connellsville region from a coke-manufacturing to a coal-producing center. This transformation is apparently by no means complete.

Thoughts on Mine Electricity and Electricians

By M. S. Beddow
Scranton, Penn.

During an electrical mining experience covering almost 16 years, in which I have had to do with hundreds of peculiar and sometimes puzzling cases of trouble, I have often wondered how few mine electricians give a thought to the cause of these various difficulties and their why and wherefore. It is one thing to solve and repair a case of trouble when it crops up and quite another problem to satisfy oneself as to just what was the reason for the breakdown. Just how deeply the man on the job pries into the reason for a piece of machinery failing will determine what that man is going to amount to in his chosen profession.

It is this prying habit that makes one proficient in his calling and enables him at times to see things intuitively, almost by second sight as it were. And after all is said and done, the really proficient electrician is the one who is able to prevent, rather than repair, breakdowns, with their consequent loss in output. Especially is this true at the present time, when the demand for fuel is unprecedented in the history of the world.

As the difficulty of mining increases, because of greater distances to be traversed and smaller beds to be worked, machinery of all kinds will be turned out to overcome these obstacles. Invariably these are and will be electrically driven, so that it behooves the mine electrician to make himself just as proficient as it is possible for him to become. True, the duties are sometimes weighty and discouraging, but the realization that one has learned something new is in itself a high reward. And there is always something to learn when a new piece of machinery makes its appearance at the mine. The electrically driven air compressor, coal cutter, pump, rock drill, fan, etc., have features aside from the electrical that are interesting and well worth while learning something about.

Of the pump, for instance, one should know that it requires a certain horsepower to lift a certain number of gallons of water over a given head in a given time. This is almost as interesting to the electrician after a while as knowing that a certain pressure (voltage) will force a certain current (amperes) through a wire having a definite resistance (ohms). About the air compressor we can learn that it will operate so many jackhamers or other machines, while the means provided by the makers for taking care of the excess pressure in front of the piston when little or no air is being used, or when it is being supplied from the receivers along the line, is highly interesting. This pressure protection is automatic, and it is only necessary to say in passing that when the pressure of air in the receiver, or tank, close to the compressor exceeds a predetermined amount, valves are raised which allow this excess pressure, which would become dangerous, to escape to the atmosphere. The compressor, of course, stops compressing air and does not resume until the pressure in the receiver or tank falls off to a predetermined value, when those valves once more return to place and air is again compressed and sent into the receiver and thence to the line.

A number of years ago I had occasion to make a series of tests to determine just how much power various makes of coal-cutting machines required. These trials were conducted carefully with a view to determining whether or not it paid to mine certain beds in this manner. The results were surprising in that they showed quite conclusively that certain measures of coal which, to the naked eye, seemed identical, were far from being such. The current consumption was all worked out in watthours per square foot of undercut, and the power was so great in some of the measures that it was thought to be prohibitive; and the places were stopped. It was also revealed that the picks on the cutting chain had much to do with the amount of power taken. Vari-

ous shapes were given these picks, and after months of tireless experimenting a form was evolved and a certain position for the pick in the chain discovered that gave a maximum yield for a minimum amount of power.

Carrying experimentation beyond the cutting chain, some time was spent on the speed at which certain machines traveled across the face, and it was surprising how some of them were made to "stand up" after frrequent breakdowns, just by changing the gear ratios, which gave slower speeds. While the time of cutting a chamber was of course increased possibly four or five minutes, the yield in coal at the end of a given time was much augmented because the machine was kept in operation over a greater period. Less power was taken, too, and this last is an important item in these days of high prices.

Mine locomotives play probably the most important rôle in electrical mining, yet how few of the men who come into direct contact with them understand their actions and honestly endeavor to apply those first-aid measures which would often tend to keep them in continuous service? If the man on the ground could be made to understand, for instance, the absolute necessity of keeping the resistance, with the aid of which he gets the load started smoothly, in as nearly perfect condition as possible, how many less armatures would be burned out to say nothing of field coils, controllers, brush holders, blowout coils, etc.? To understand the reason for this one must of course know that it is the current that does the damage, and this is held to a minimum only when the armature generates sufficient counter e.m.f. (electromotive force, potential or voltage) to hold the applied, or line, e.m.f. to its proper magnitude. Now, to generate this counter e.m.f. the voltage from the line must be fed into the armature and field coils in easy stages, and this can only be done by the use of resistance. If this resistance is in good shape, just enough voltage will enter the armature and field coils to start the armature to turning smoothly, and it will not only start the load but will generate an e.m.f. which is counter, or in direct opposition, to that furnished from the line through the resistance. The counter e.m.f. is of course slightly less than the applied, and there is therefore enough potential left to develop torque and start the load.

As soon as the armature has attained full speed at any given voltage the controller is thrown to the second notch, this action cutting out more resistance. A slightly increased voltage is thereby allowed to enter the armature and fields, and the speed of the armature is increased sufficiently to generate enough more counter e.m.f. to hold the current taken from the line, through the resistance, to a minimum.

As long as this resistance is cut out in regular gradations, from the first to the last notch, the current in armature and field coils, as well as that in the resistance, does not reach a high peak and there is no undue stress on the equipment. I believe that 40 per cent. of the armature burnouts arise directly from resistance connected improperly or to "jumpered" panels. "Just to keep us going for the day," is the explanation. But, alas, it is not infrequently left in this condition for many days!

When it is considered that the heat given off by this excess current increases as the square of the current, it is not hard to see why the burnouts take place, and why every effort should be made to see that the resistance is kept in the best possible condition. In assembling the resistance for mine locomotives most electricians trust too much to memory and are liable to get too many, or too few, panels, or grids, in series or in parallel, as the case may be. If too many are in series the resistance offered by them is so high that the voltage allowed to pass through and into the armature and field coils will not be sufficient to start the armature and thus the load. If too few are placed in series, too much voltage is allowed to pass into the armature and field coils, and the panels themselves are destroyed by the heavy current that passes through them. The load is started with a heavy jar, and damage is done to every part of the locomotive.

Reasoning along similar lines will hold good for the parallel arrangement of the panels. The idea of this connection is to secure capacity; that is, to get enough panels together, or side by side, to handle the heavy currents when the controller is on the last notches and when the armature is developing almost full load torque. If too many are in parallel too much voltage is allowed through them, and heavy currents are of course taken from the line, and burnouts of armatures, field coils, controllers and resistances are the natural result. When 40 or 50 locomotives, all drawing current from the one station, are in this shape one can easily understand the disturbance created at the generators when all of these machines try to start their loads at the same time.

Thus, considered from all standpoints, the progressive electrician around the coal mines today must know more than how to tell the difference between series, shunt, compound, induction and synchronous motors. These, speaking plainly, are only the means to an end, after all. To be a success in the work he has chosen to follow he must learn something of the equipment driven by those motors. Moreover, he must also learn that there is no hard and fast line of demarcation existing between where the electrical repairs stop and where repairs to the other portion of any given machine begin.

Obviously it is easier for the electrical man to grasp these things than for the mechanical expert to solve the intricate electrical problems which come up from time to time. I mean by this that having shown more than ordinary ability in reasoning out things which have puzzled him electrically in the past, he will find the other side of the question more easy of solution in comparison.

Removing Old Babbitt Metal From Bearing Boxes

By T. S. Sherman
St. Louis, Mo.

Usually most, if not all, of the babbitt metal can be removed from a bearing box with a cold chisel and hammer. However, if this procedure is not feasible, the box may be placed in a forge fire and the babbitt melted out. The melting method is undesirable because of the probability of losing considerable of the metal. Where the bearing box is small, it is sometimes possible to melt the metal out of it by permitting the flame of a blow torch to play on the box, but, where the box is large, the blow torch method requires so much time that the forge process may be preferable. Where the blow torch is used, the molten metal can, as it drops from the box, be collected in a tray placed in proper position below the box.

Avoidable Degradation of Coal*

By Benedict Shubart
Denver, Colo.

FOR several months I have been compelled to make a careful study of a number of tipples on account of breakage of coal and complaints arising therefrom. Thus I know this is a subject of real interest and one well worth consideration. The designer in future must have a freer hand both in design and expenditure, for while some operators now grant this, there are many more, more than would be believed, who put first cost ahead of last cost—often to their sorrow. Recently an operator in Colorado called me in to make his failure of a tipple work. By way of introduction he said: "I couldn't let you figure on this job at first, for your price would have been a third higher than I paid." Then he went on to say that the tipple had cost him $25,000 to fix up so far, and he asked me to plan an entirely new outfit for next year's installation, to replace the present one from the ground up. And he still believes he saved money!

> In tipple design, gravity is a convenient force to utilize, but it needs careful control. Coal preparation requires short, steep screens, the avoidance of falls and a slow movement of material down chutes. The box-car loader is often blamed for degradation for which it is not responsible.

Not long ago an operator said to me: "The trouble with the technical engineer is that he always attempts to make a complicated proposition out of a simple one." That is altogether too often the operator's attitude. The reverse is usually true in tipple design. The operator attempts to make a simple operation of what is usually a complicated engineering proposition. Entirely too often he assumes that inasmuch as there are three sizes of coal to load, all that is necessary is to place three tracks at about 16 ft. centers, build some screens over them, and run some chutes to some cars. If the chutes are too steep, it can't be helped—chutes are chutes, and gravity is gravity. But operators can not shut their eyes to the fact that complaints as to preparation cause expense of investigation, rebates, loss of trade and prestige. With a little more care put into the design of the tipple, a little more expense put into the machinery, legitimate complaints can be almost entirely avoided.

It has been difficult to get designers to realize the expense of breakage to the operator. To this carelessness the designer frequently adds a lack of knowledge of market and railroad conditions, two points that have to be studied carefully in tipple design. No two tipples can be exactly alike.

Avoidable degradation of coal occurs in mining, loading, dumping, screening and placing in railroad cars. In mining every good operator takes care to so produce his coal as to secure the largest amount of lump with the smallest amount of slack.

Outside the mine the first point where breakage can be avoided is in dumping. The goose-neck dump, or the ordinary end-dump cross-over type of tipple, is bad. The miner always puts his lump coal on top of the car. It is thus in position to get absolutely the maximum drop when discharged, and the resulting breakage is only tolerated because it happens to be customary. The rotary dump affords a much easier method of discharging the coal, and even here the usual installation of a rotary dump could be much improved were the expense justified. In shaft mining, the ordinary type of self-dumping cage with end gate car, using a weigh basket at the top, is also another excellent coal smasher. The cure for this is not easily found, although if the coal is weighed on the bottom, a large part of the chute and fall can be eliminated on the top. For proper sizing, the coal should be fed evenly onto the screens. For this purpose the reciprocating feeder offers the least drop and the least amount of degradation to the coal. It has another advantage in that it can separate the lump from the small coal, allowing the smaller sizes to drop onto the screen first. The ordinary type of apron feeder allows something like 18 in. of drop. This does not sound like much, but the amount of breakage it causes is entirely too great to be neglected by the careful operator.

After the coal is on the screen, and it is assumed that it goes onto the screen in small and regular amounts, it must get off the screen plate just as soon as possible. In other words, after the coal is sized, there should be no more screen for it to traverse. The average shaker screen is too narrow and too long. Wide screens of short length mean less degradation of coal. A perforated screen is substantially a coarse file. The coal must be crowded over this rough surface, and in being crowded over it degradation inevitably occurs. If the coal tends only to slide along the screen, there is strong tendency to catch in the perforations, leaving the larger pieces to crowd down the smaller ones, break them up, and force them through the screens. This costs the operator money, by giving him an unnecessary amount of the smaller sizes of coal. The cure lies in placing the screens at a good angle. A flat screen with a quick motion will afford a good-looking product, but it will also put an unnecessary amount of coal through the screens because of abrasion and breakage. The nearer the coal can come to rolling down the screens without actually doing so the less will be the degradation. My conclusions are that the screens should be wide, short, at a good pitch, fed with regularity and run at not too fast a speed. None of the breakage mentioned above shows in the screened coal, but the money loss is present just the same.

In getting the coal to the railroad cars, a process is encountered wherein probably more improvement can be made in avoidance of degradation than at any other point outside the mine. Our old friend "gravity," while active, is not reliable. It will not take weather conditions into account, the temperature, the degree of moisture, the amount of snow or ice on the chutes, the rusty chute of the late spring, or the polished chute of the early fall. Gravity will help us, but we cannot depend upon it to give us just what we want all the time. It needs help.

*Paper presented before the Rocky Mountain Coal Mining Institute, Spring Meeting, Salt Lake City, Utah.

Gravity is also a mighty active agent. Give it a little chance, even an extremely little chance, and it is surprising what it can do in putting speed into a piece of coal. A drop of one foot will put a speed of 480 ft. per minute into a lump of coal. That is not exactly moving slowly, and this point will be referred to later.

To show what extreme conditions an engineer runs up against, I have made a sketch of an actual operating coal tipple in one of the Rocky Mountain states. It will be observed that the coal drops onto a diverting chute, throwing it to either track. Slack coal is loaded in the middle track, and lump on each side, when egg is not being loaded on one side. The drop is bad enough when open cars are being loaded, but consider it when box cars are being loaded! There is an absolutely clean fall of nine feet before the coal touches the first chute. Inasmuch as this is a friable coal, it can be easily imagined why we were called in to try to better these conditions. Even with the best chute we could work out, we got a grade of more than 60 per cent.; and for handling large lump coal, without danger of clogging or breaking, we were obliged to devise a special type of conveyor. This machinery has not been put to work as yet, so I do not intend to describe it. If it operates as successfully as we anticipate, much will be heard of it later.

At a tipple in the Western states, where we were asked to put in box-car loaders, after examining the conditions we refused to put them in place until retarding chutes had been installed. These chutes we are now designing. It may be that in this case, too, we will be compelled to resort to the elaborate type of conveyor which we suggested before.

This tipple, by the way, was designed essentially for loading open cars. It contains an elaborate system of booms, is excellently designed, and operates smoothly. The designers, however, were not Westerners, and entirely failed to realize the necessity for loading lump coal into box cars in this territory, so that no attention at all was paid to the box-car chutes. This defect can be remedied, but at a heavy expense to the operator.

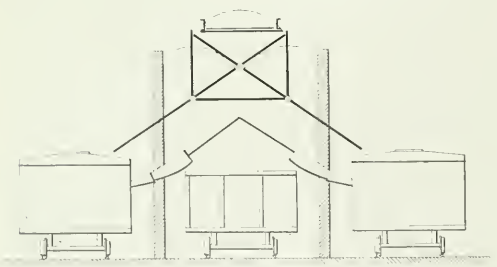


DIAGRAM OF TIPPLE CONDITIONS, SHOWING EXCESSIVE DROP GIVEN COAL

Without some kind of a retarder, not only would the coal be smashed to pieces but the box-car loader would not last long.

In general, box-car chutes are made too steep. They must be made steep enough to move the coal under all conditions, with the result that most of the time the coal moves too rapidly; in fact a great deal of breakage occurs for this cause. We find, then, that nothing is more necessary to retard the coal than to roughen the chute. Of course, if we roughen the chute actually, the coal will stop most of the time, so we accomplish the purpose by putting in a conveyor chute made with a strong short-pitch chain carrying square flights, so that it will keep the coal moving all the time, without permitting it to get away. This chute should be entirely self-contained. It should carry its own motor, be stoutly built, and be entirely separate from the rest of the tipple. The accompanying diagram will show plainly the general design of this chute. By reason of the small sprocket wheels, the drop at the end of the chute is absolutely negligible.

At a mine in southern Colorado I was called on to investigate excessive breakage in the preparation. The management here had a pretty fair combination of prac-

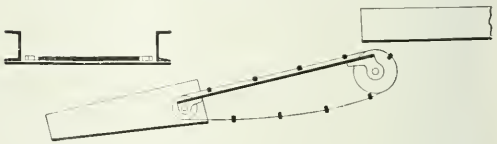


DIAGRAM OF CONVEYOR OR NON-GRAVITY CHUTE

tically all the troubles that a mine can have. The complaint made was about the small coal that was being loaded. An investigation showed that not 10 per cent. of the material being treated was sufficiently large to go over a 4½-in. perforated screen. Furthermore, the coal was badly shattered in mining. It was then dropped down a long chute. The chute was so long that a retarding conveyor had been installed, but for some reason this had been removed by the superintendent and a gravity chute put in.

The complaint originally was against both the nut and the lump box-car loaders. In company with the sales manager of the company, we made some tests. We stopped the lump-coal loader entirely and allowed the coal to simply run down, stopping it at the end of the chute. We then picked away the lump coal, and found that probably 15 per cent. of slack had been made by reason of the fall. The coal landed at the end of the chute with a rate of travel probably three times the speed of the box-car loader, and the sales manager himself acknowledged the unfairness of blaming that machine.

The complaint regarding nut coal was an equally unjust one, for practically the same reasons. The nut-coal chute was steep, had a reverse curve in it, and the amount of slack found in the nut before it struck the box-car loader was astonishing. The complaints against both box-car loaders were withdrawn, and we were asked to design proper chutes.

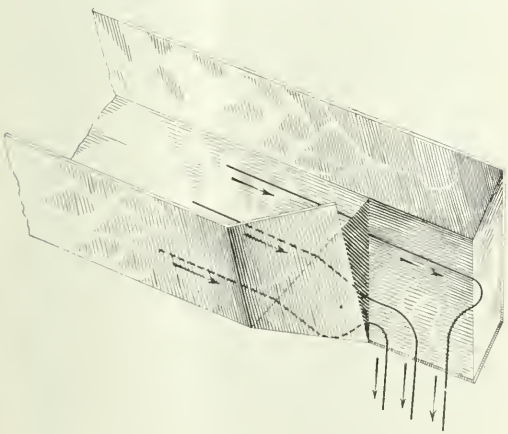
Where shaking chutes can be used, they are excellent. They can frequently be arranged so as to get considerable adjustment in height; they are easy on the coal and economical to operate. The retarding conveyors hitherto employed have utilized entirely too large sprockets. They give too much of a drop over the end, and attempts are now being made to build apron conveyors that will operate over very small sprockets. The standard apron conveyor is good for a loading boom, but hardly suited for box-car work.

Loading booms over the lump and egg tracks for loading the large sizes of coal into open cars are coming into such general use that they are no longer uncommon. They must be well designed, otherwise they fail of their purpose. They must be properly balanced, so constructed as to be rigid, must be easily operated, and must be provided with power-driven hoisting and low-

ering mechanism so that the men will keep them in their proper positions. It has been found that where hand winches are depended upon, the men will not go to the effort of using them. We now insist on providing a small electric hoist just like a little shop trolley hoist. These are operated by a small switch and are so quick and convenient that they are really used, not discarded.

Almost invariably, the screen discharges onto the loading boom at an angle. Frequently the loading boom is one rigid pivoted piece, so that the fall from the screen onto the loading boom is considerable on one side. Frequently side chutes are used from the screens, and these chutes are usually also ill-advised. The accompanying diagram shows an excellent way for working out a chute from a shaking screen for side discharge. It will be noted how each piece slides down the inclined surface, never at any point dropping nor at any point gaining appreciable speed. On the job where this chute was installed, experiments were made in the shop to determine the proper size and incline of the various sides of the chute. The results so far have been found excellent.

Where loading booms are installed, it is frequently necessary to pick the coal. It is a mistake to try to pick coal on the inclined portion. There should be a horizontal portion long enough to permit this operation to be carried on, and the movable portion should



SIDE DISCHARGE FOR A SHAKING CHUTE

be pivoted beyond this point so as not to interfere with the action of the pickers.

The essential point is to get the coal into the car without dropping it. This means that the action of gravity must be nullified as far as possible, and the coal conveyed or slid onto the box-car loader substantially without shock. This brings the coal to the box-car loader, and I know that in many cases this machine is blamed for much of the breakage that occurs long before the coal reaches it.

Standard loaders in general are of two types—the so-called apron variety that throws the coal a certain distance into the car, and the conveyor type that carries it gently and deposits it on the car floor. There are two makes of apron leaders, one of which extends something like 10 ft. toward the end of the car from the center door while the other projects inward about 11 ft. Both of these loaders use an apron similar to that of a picking table and throw the coal with a certain amount of violence. They can be raised or lowered or turned to any point of the car, and the speed is subject to control, so that a careful operator can load with no substantial breakage. In practice, however, the careful operator is hardly ever found, so that the breakage is usually more than it should be.

There is another type of loader rapidly coming into use—an extension loader—employing a flight conveyor, pushing the coal gently along, operating at a speed of about 250 to 300 ft. per minute, capable of being raised, lowered or pointed, just as is the other type, but having the additional advantage that, after the loader is in the car and the loading of coal is commenced, the frame may be extended to reach a point almost 20 ft. beyond the center line of the car door. While this loader is comparatively new the design is simple; it embodies little mechanism, and the machine appears to be a success.

With a good loader and proper chutes and screening appliances, an operator can be reasonably sure that any complaint concerning preparation is based on mighty poor grounds.

Legal Department

WAIVER OF MINING COMPANY RULES—A mining company's rule that cutting-machine operators shall sound the roof of their working places and do necessary propping before beginning work is rendered inoperative by the company assigning a special crew to work of preparing safe places for the operation of the machines. (United States Circuit Court of Appeals, Sixth Circuit, Marcum vs. Consolidation Coal Co., 257 Federal Reporter, 287.)

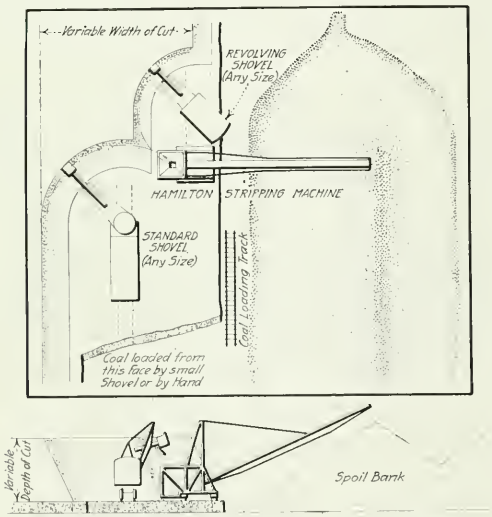
WASHROOM LAW VALID—The Illinois statute which requires "every owner or operator of a coal mine, . . . or other like business in which employees become covered with grease, grime and perspiration to such extent that to remain in such condition after leaving their work without washing and cleansing their bodies and changing their clothing would endanger their health or make their condition offensive to the public, shall provide and maintain a suitable and sanitary washroom at a convenient place in or adjacent to such mine . . . or other place of employment for the use of such employees," is a valid police regulation. (Illinois Supreme Court, People vs. Cleveland, Cincinnati, Chicago & St. Louis Railway Co., 123 Northwestern Reporter, 579.)

DEFECTS IN SIMPLE TOOLS—An employee of a coal-mining company injured in wielding an ax, through a slipping of the blade on the handle because of a defective condition of which he previously knew, is not entitled to recover damages. The reason upon which the legal rule requiring an employer to use reasonable care to provide his employees with reasonably safe tools and working place rests upon the employer's presumed superior knowledge of any dangerous conditions existing. But when a tool, such as an ax, is so simple that every person of ordinary understanding and experience must be presumed to know its use and understand incidental dangers, the rule is inapplicable. The employee, under such circumstances, is charged with that knowledge which exercise of ordinary prudence for his own safety would bring to him. The employer need not inspect such simple tools to discover existing defects, when it is readily discernible and can be readily corrected by the employee using it. (Kentucky Court of Appeals, Music vs. Consolidation Coal and Coke Co., 199 Southwestern Reporter, 1074.)

Hamilton Portable Stripping Conveyor

The portable conveyor recently placed on the market by the Hamilton Manufacturing Co., of Hamilton, Ohio, is designed to permit the use of the ordinary types of steam shovels for coal or other mineral stripping and loading operations. This conveyor solves the problem of disposing of overburden in an effectual manner and opens up a new field for the use of all types of steam shovels, enabling them to successfully do work heretofore requiring locomotives and train equipment. It also increases the efficiency of the shovel itself.

On a stripping operation where this machine is used, such as in removing overburden for the recovery of coal, the only delay to the shovel operation is the move-up time. In the accompanying illustration it will be seen that the location of the hopper of the conveyor reduces the swing of the shovel one-fourth as compared


Variable Width of Cut
REVOLVING SHOVEL (Any Size)
HAMILTON STRIPPING MACHINE
STANDARD SHOVEL (Any Size)
Coal Loading Track
Coal loaded from this face by small Shovel or by Hand
Variable Depth of Cut
Spoil Bank

TYPICAL OPERATION OF HAMILTON STRIPPING CONVEYOR

with the swing necessary to dump into a car. Two shovels are here shown, one a standard railroad steam shovel on railroad wheels and a smaller shovel working on the initial or contour of a stripping operation for the recovery of a 3-ft. bed of coal. The swing of the small shovel, which is opening the way for the conveyor, is also reduced when working in the thick side of its cut.

As the work of all shovels divides itself into 20 per cent. digging time and 80 per cent. swinging and dumping time, if we reduce the swinging and dumping time 25 per cent., we increase the shovel's efficiency 25 per cent.; and in obviating the use of dump cars and dinkey locomotives, we remove the inevitable delays in waiting, dumping, track shifting and spotting cars. This means 25 to 50 per cent. additional yardage moved per hour.

The use of the conveyor also fixes a uniform height for the elevation of the dipper. Another efficiency factor is thus secured that must not be lightly considered.

While the illustration shows a large railroad-type shovel and a revolving shovel in operation with the conveyor, it is practical and feasible to use smaller shovels in the same manner. Thus only one revolving shovel, or one railroad type non-revolving shovel, may be successfully employed. In the latter case the conveyor would be located parallel to the shovel.

The Loading Problem

By A. M. Young
Masontown, Penn.

Twenty years ago coal was largely mined and loaded by American citizens—foreign-born, perhaps, but citizens nevertheless. These same men every year taught thousands of their sons to follow coal mining as a means of livelihood, so that the supply of miners was approximately adequate to produce the coal demanded.

As immigration to this country increased, many of the immigrants entered the mines and large numbers of native or naturalized miners turned to other kinds of work. This loss was however not seriously considered until about 1910.

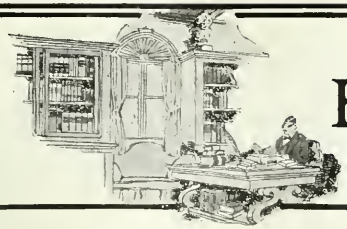
During this period coal-cutting machinery was gradually coming into use and doing a large part of the miners' work, so that when war was declared between the United States and Germany in April, 1917, the tonnage from mines using coal-cutting machinery was twice that obtained from mines operated on pick-work alone. But since practically all of the modern mines in this country today are using coal-cutting machines, we have to all intents reached the limit of production, with conditions as they now obtain throughout the mining regions.

What will the installation of more coal-cutting machines profit us if to operate them it becomes necessary to draw on the present force of loaders, the supply of which is becoming less and less every day? There has been practically no immigration during the past five years, and the number of native-born entering the mines has been so small as to be almost negligible. If every mine foreman in the United States today were to inform a central bureau of the number of new men trained in loading coal during the last five years, the total would be so small as to make the coal operators of this country put their thinking caps on just a little bit tighter than they have to in figuring their income taxes. What will be the result of the present tendency?

Banquet to Be Given Herbert Hoover

Herbert Hoover expects to arrive in America some time before the middle of September, the exact date to be determined by cable from him. The engineers of America, under the auspices of the American Institute of Mining and Metallurgical Engineers, have decided to express their admiration for Hoover's services during the past five years, in international affairs, by giving him a large dinner, to be held in New York, shortly after his arrival. He expects to go right on to his home in California, there to resume his engineering practice.

An organization has been completed—a general committee appointed by President Winchell of the A. I. M. E., also an executive committee as follows: W. L. Saunders, 11 Broadway, New York, is chairman of the committee; Charles R. Rand, 71 Broadway, New York, and E. P. Mathewson, 120 Broadway, New York, being vice chairmen.



BOOK REVIEWS

Review of Coal Trade in Past Year

SAWARD'S ANNUAL, 1919. By Frederick W. Saward, assisted by James P. Mahoney, Guy H. Burbank and the Editorial and Office Staff of *Saward's Journal*. Pp. 192, 6 x 8¼ in., no illustrations. Saward's Journal, publisher, 15 Park Row, New York City. Cloth Boards.

The *Saward's Journal* editors have carefully culled all the most interesting statistics and all the reports of enduring interest from their publication and reprinted them in book form. The excerpts and articles are laid together somewhat at random, but the lengthy table of contents at the beginning of the volume makes the inquirer reasonably at home. The annual largely looks at matters from a market point of view; but there is much information that coal producers will find useful.

Peace and Plenty in Industrial Affairs

INDUSTRIAL GOODWILL. By John R. Commons, University of Wisconsin. Pp. VI + 200 + 13 index; 5½ x 8¼; 3 ill. McGraw-Hill Book Co., Inc., 239 West 39th St., New York City. Cloth Boards.

This book, dedicated to industrial goodwill, naturally treats on matters which have been discussed editorially and at length in the pages of *Coal Age*. The remarks which have been made in the editorial pages relative to the disadvantages of piece work are quite forcibly enumerated by Professor Commons. "Piece rates," he says, "*must be cut*, sooner or later, or else either industry will stagnate or wage earners will get all of the gain from improvements and none will go to the consumer and the employer; or else the employer will be driven out of business by competition."

Professor Commons has nothing to say about coal. It is not found in Wisconsin. However, the reviewer cannot help applying his words to that business and calling attention to the fact that in the coal industry piece rates are not cut; the union will not allow it. No one is driven out of business by the competition resulting from any improved facilities that may be provided to piece workers, except where nonunion fields still compete and are able to undersell by reason of lower piece rates which they alone can secure. But no one can deny that industry is stagnating as a result of the inflexibility of piece rates, just as Professor Commons has stated. There has been little adopted improvement for many years in the methods employed in the actual digging of coal. There are methods that would be approved if they were given an opportunity for demonstration, but there are no new adopted improvements, for the piece rates are not cut, and there is no incentive for the operator to introduce such improvements till piece rates are abolished, or supplemented by day rates.

Professor Commons goes on to speak of the task-and-bonus system, the method practically of a minimum wage with a piece rate based on the excess production above a certain definite task. This is not quite the plan that has been proposed editorially in this publication, for that which was advocated was a payment well below a reasonable and fair wage with a large bonus or piece rate on *all* the product whether great or small, the piece rate being quite substantial.

Difficulties are found by Professor Commons in the task-and-bonus system, but they hardly appear adequate. Those who have put up with the straight piecework system and can look to a union to prevent the making of agreements such as are likely to prevent unequal competition will surely find the task-and-bonus system or the part-day-wage-and-part-piecework arrangement satisfactorily workable, and productive of efficiency.

Professor Commons makes a statement which is surprising. On page 15 he says "Machinery and factory organization are continually approaching a limit of diminishing returns." It is hard to credit that statement as being applicable to the coal business. A big improvement in machinery and methods is still possible. At least five times as much as now performed should be done by the average man with proper equipment, methods and organization.

Later, Professor Commons say: "That limit turns attention to the human factor, and it needs only a candid attention to the experiments of scientific management to become convinced of the large resources and unusual possibilities within the human animal when once his motions and energies are studied and measured as the engineer studies and measures the other forces and materials used in production."

We much doubt if the possibilities of cheaper production are to be found in the muscle and agilities of man. There is some probability that an interest in work "when inducement is nicely adjusted to output through ingenious methods of compensation" may perhaps double production. If it does, the mine worker is entitled himself to all or nearly all that comes out of his greater self-adjustment and energetic abandonment to his task. It is his efficiency and skill, and the profit belongs rather to him than to his employer or the consumer. Machine development is different.

If the only change in production is due to personal development and initiative, then there is little justice in cutting piece rates. It is the impersonal advancement, the mechanical assistance, that should be rewarded with a lower rate scientifically calculated so as to leave some of the advantages in the hand of the workman. However, the plans for task-plus-bonus payment or dual payment by day and by product automatically provides a recompense to the operator or manufacturer without any scientific adjustment. He is not so much concerned whether the recompense is fair as whether it exists and will be received. Just now the operator knows he will not get it at all—hence his inertia.

After finding so much interesting—howbeit debatable—in the two first chapters headed Commodity and Machinery respectively it is necessary merely to indicate those that follow: Goodwill, The Public, Democracy, Solidarity, Theory and Practice, Security, Labor Market, Insurance, Health, The Shop, Education, Loyalty, Personality, Depression, The World.

Geographical Directory of West Virginia

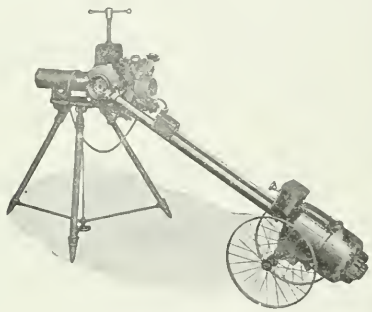
MINE DIRECTORY OF SOUTHERN WEST VIRGINIA showing location and tonnage of mines on Chesapeake & Ohio, Norfolk & Western, Kanawha & Michigan, Coal and Coke, and Virginian railroads; 36 x 40 in. Scale, 1 inch = 4 miles. Prepared by W. H. Cunningham, Huntington, W. Va. West Virginia Mining News, Charleston, W. Va., distributors. Paper. No cover.

This map shows the names of the companies on all the above roads, the roads that the mines are on, the names of the mines, their postoffices, their shipping points and their annual tonnages. The counties included are Cabell, Wayne, Lincoln, Putnam, Boone, Kanawha, Nicholas, Fayette, Raleigh, Greenbrier, Wyoming, Logan, Mingo, McDowell and Mercer in West Virginia and Pike in Kentucky.

NEW APPARATUS AND EQUIPMENT

The "Toledo Power Drive"

The "Toledo Power Drive," a new electrical device for operating hand pipe-threading and cutting tools, is now being manufactured by the Toledo Pipe Threading Machine Co., of Toledo, Ohio. The manufacturer states that this new device is another step forward in pipe-threading practice. That the drive is a labor saver is shown by the fact that while it would take an hour to cut a 12-in. thread by hand, the same tool operated



NEW ELECTRICAL DEVICE FOR OPERATING HAND PIPE-THREADING AND CUTTING TOOLS

by power drive will do it in not to exceed 7 min. There is no reason why it cannot just as successfully be used on tools of other makes of similar design.

The drive is portable and can easily be wheeled about to different jobs on its strong, but light wire wheels. The motors are of 1½ hp., of special design, and are furnished for the necessary type of current. Each outfit includes 25 ft. of flexible cable with a single plug connection for attachment at the switch box on the shaft housing of the "Drive." It is started and stopped by a specially designed push-botton switch. It has a two-speed transmission gearing, and the change from one speed to another is accomplished by merely pulling out or pushing in a knob. There are no universal joints, chains or other cumbersome mechanism, nor is there any change required in connection with the threading or cutting tool.

Controlling Apparatus for Elevators and Other Devices

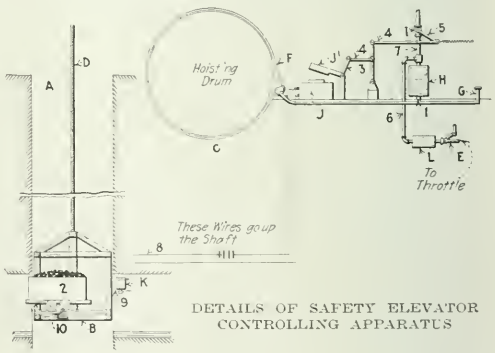
BY H. GOODNOW
Du Quoin, Ill.

Life-saving devices are always of interest to the thoughtful employer. When we consider the appalling waste of life in the past four years and link it with the live interest in mine safety appliances, the following description of McSherry's elevator controlling apparatus should call for the careful consideration of mine men in particular and everybody in general.

The inventor, James McSherry, of Du Quoin, Ill., is a practical coal man well known in the southern Illinois coal field. He has tried out his invention at the Majestic Mine at Du Quoin and perfected and demonstrated its workable value. His patent has recently been allowed, and a lively interest has already been shown by the miners and operators of Illinois.

Stated simply, the device is an attachment to the hoisting engine that places the power of instantaneously stopping the hoist directly in the hands of the cager at the shaft bottom, where conditions dangerous to life and property most frequently arise.

As shown in the accompanying diagram, the strong magnet J with the clapper J' in the engine room is connected to the valve I by the lever rods 3, 4 and 5. When the knife-switch K at the shaft bottom is closed, the magnet attracts the clapper, which in turn opens the valve and allows steam (or any other medium) to pass through the pipe 7. From here the medium acts simultaneously through the two cylinders H and L, the



DETAILS OF SAFETY ELEVATOR CONTROLLING APPARATUS

one applying the brake F by the action of the piston 1 on the lever G, the other closing the throttle by acting on its knuckle E. The hoist is now stopped and the cage held until a signal from the bottom causes the engineer to close the valve I and release the steam in the cylinders H and L.

As to the advantages derived from the use of this apparatus, the saving of property may be considered first. Any practical coal man knows that it is not uncommon, particularly where the hoisting is rapid, for a car to become misplaced on the cage after it has been rung away. Coal in the keepers, or any break or defect in them, might cause them to be open and thus allow the car to project over the cage. What would happen is almost too well known to be described—a wreck in the shaft which might well delay the whole mine for from one to eight hours.

Now consider the McSherry controller attached and the car started. The cager, always on the alert, as he

values his job, notices the car is out of place in a position a few feet lower than shown in the diagram. He simply slaps his hand against the insulator 9 and the switch is closed. By actual test, before the cage has risen to the dangerous position indicated, it has been stopped and the wreck averted.

Now comes the far more important feature—namely, the protection of life. Whenever men are hoisted on the cage they run two chances: First, that through some error of either the cager or the hoisting engineer the cage may be started before all are fully aboard. (If men never made such mistakes there would be no need for this or any other safety device.) Second, after all the men are on the cage and before they have passed out of sight of the cager, one or more of them could either be crowded over the edge, faint, or otherwise be placed in a dangerous position. In any case the cager could see this and stop the cage in time, where, if he had to signal the engineer, who in turn would have to act, the damage would have been done.

Although this article has stuck pretty close to the specific purpose described, the patent issued covers the broader field of any such elevator-controlling apparatus that might be used for a similar purpose in a different field. Such use, however, is not within the scope of this article, which is directed to coal-mining men.

To conclude, I believe that too much credit cannot be given to Mr. McSherry for his idea and its development, nor to the company whose representative, General Superintendent T. S. Cousins, backed up the inventor in every way and furnished him a place wherein to try it out and perfect his apparatus. Let all such work receive due encouragement so that the chances taken by the underground worker may be reduced to a minimum.

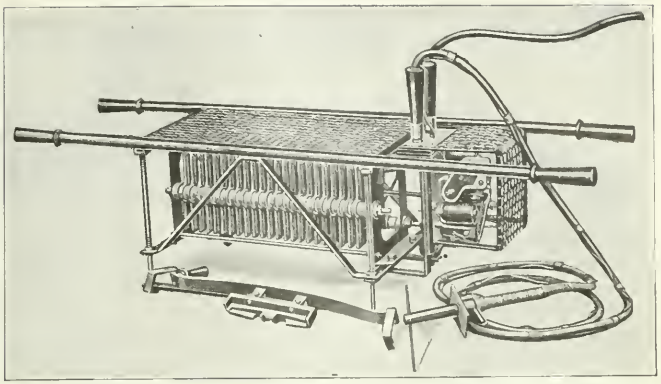
An Arc-Weld Bonding Machine

Electric-welded bonds are coming into favor in mines because when they are properly installed they are mechanically and electrically permanent. The Ohio Brass Co., of Mansfield, Ohio, has developed an arc-welding machine and arc-weld bonds that make it easy for an operator, after a reasonable amount of practice, to get a good job at every joint.

The machine is simple, embodying a cast-iron grid resistance with an automatic throw-out switch and a circuit breaker. If an overload comes on the machine, the circuit breaker shuts off the current automatically. The operator has remote control of the circuit and to interrupt it he merely pushes a small switch on the holder. This remote control makes for both convenience and safety.

The cast-grid construction of the resistance makes the machine rugged and, in case of accidental breakage, the grids can be renewed easily. The machine is never in the way, for it is small enough to fit into odd corners and let the trip pass by. Two men can handle it easily.

There are two types of bonds—the AW2 and AW3. Essentially they are alike, being copper strands mechanically and electrically connected at the factory to a steel terminal or sleeve. On the job the operator welds steel to steel with steel—the easiest of all welding.



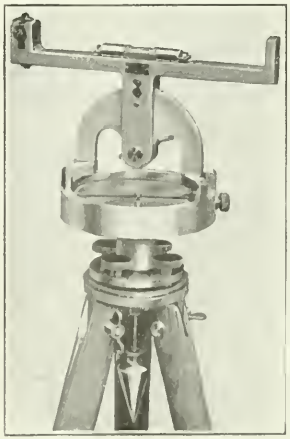
ELECTRIC ARC-WELDING MACHINE FOR BONDING RAILS

The bond conforms to another fundamental arc-welding principle in that the weld is built up in a 90-deg. angle. Experts have found that in order to get a good weld between the two parts being joined, the arc must be played into an angle of not less than 90 deg. Otherwise the arc will play against one side or the other of the groove and will not effect a permanent union down in the bottom of the weld—the important place in rail bonding.

The electric arc-welding machine here described is also useful for shop work as well as for rail bonding.

Baltimore Sighting Compass

The Davis Instrument Manufacturing Co., Inc., has recently placed upon the market what it calls its Baltimore sighting compass. As may be seen in the accompanying illustration, this is a combination level and compass particularly useful in mining and architectural work. The instrument is provided with a 4-in. graduated horizontal circle and a vertical arc, each reading to ½ deg. The compass needle is 4-in. size. The outer frame rotates around the needle graduations. Readings may be taken independently of magnetic variations of the needle, this arrangement being particularly useful where local variations are encountered. The sighting bar is equipped with adjustable cross hairs which allow clear vision. The tripod head shifts and is provided with leveling screws. The nstrument is strong and rigid, and together with its tripod weighs about nine pounds. It therefore may be carried about easily.



COMBINATION LEVEL AND COMPASS

NEWS FROM THE CAPITOL

BY PAUL WOOTON

Investigation of Coal Industry Now Under Way

What is regarded as the most important Congressional investigation ever made of the coal industry began Aug. 26 under authority granted by the United States Senate. On the developments of this investigation much will depend, it is believed. It is expected to furnish the data on which Congress may decide whether the Government will undertake some form of peace-time supervision over the coal-mining industry. In opening the hearing, which is before a sub-committee of the Committee on Interstate Commerce, Chairman Frelinghuysen made the following statement:

The important question before the committee is to ascertain the best methods to enlarge the production of coal for the coming year, in order to meet the demands, to prevent a coal famine, to prevent a shortage and, in that connection, to provide coal for the consumer at a reasonable price.

This inquiry is to be conducted in a broad spirit, with a desire by the Congress to make a study of the question without any prejudice; to ascertain the facts, with no desire to punish anybody or to have anything sensational, but, as citizens of this common country, to do what we can to alleviate the present situation—join together in a broad spirit of coöperation, in a united effort to solve the problem; and the committee wants the suggestions of everyone—all the coal men, and anyone connected with this industry, or having anything to do with it—to see if we cannot join together to bring about a solution.

The committee must, of course, look into the questions of transportation, car facilities, methods of distribution, the labor situation and the export situation; and as we go along I hope the committee will absorb enough knowledge of the coal situation so that they can decide what is best for Congress to do in the matter; but we want your help, gentlemen, and we want your suggestions.

Harry N. Taylor, president of the National Coal Association, made an extended statement to the committee. He was questioned at length by the Senators. Extracts from his statement, with some of the questions asked, are as follows:

One of the reasons for the slowing down of production even when the demand is on is the right of selection. That is, the public will often place an order for a certain sized nut coal, 2 x 3 nut, or a 3 x 4 nut, or a 4 x 6 nut, or some other sized coal, 3 x 6 egg, or some specially prepared size of coal. When they do that, the orders do not come in in exactly the best way to take advantage of the screening arrangements of the mines. The way these mines operate is as follows: All the coal is started on the screen and run over it. In this coal are any number of different sizes. If the public insists on one or two special sizes, it means that other large amounts of coal that have no ready market must be run over the screens and kept lying in the bins. In that way, equipment is tied up and transportation delayed, all because the public is selecting a certain class of coal.

We will have to produce at the rate of a little over 11,000,000 tons of coal a week if we are to complete the program of 500,000,000 tons estimated as this year's requirements. That is entirely possible. We feel it is possible to save the public from a coal shortage if we can provide for three things: First, we must not have an extraordinarily severe winter. This nobody can foretell, and it is entirely out of our power to guard against it. Second, the Railroad Administration must move coal in a regular manner. Third, the miners must redouble their efforts.

If the miners' convention that is to be held on Sept. 25 results in a disagreement, I do not know whether we are going to be able to mine any coal in this country or not. In fact, I very seriously doubt whether we will.

With that condition confronting us in the mining world, and I am simply telling this without passion and without any feeling, except that it is a fact, easily ascertainable, because there is no hiding a thing of that kind, the United Mine Workers, if you would call them in here, would give you the same testimony that I have as regards the published policy, and with that condition confronting us it is very serious. Of course, it might be changed in their meeting; I do not know whether it will or not. But, if that goes into effect there is little or no hope of overcoming a very serious shortage of coal this winter, and great suffering in this country.

Labor Is Not in Any Way Controlled

If we can keep the miners at work, and if the Railroad Administration can give us cars, I am sure the coal operators can produce the coal to take care of the public requirements; but those two elements are beyond our control and they enter so largely into this question that I do not believe any human being can predict what the outcome will be.

We are confronted in the coal business with this condition: The miners' organization is entirely exempt from the Sherman law, and can get together and make any demand on the operators they want after consulting wi[illegible] in different parts of the country; they can f[illegible] mand based on their own ideas, absolutel[illegible] their organization, which is nationwide and [illegible] scope, and they can have those conference[illegible] demands without any infringement of the[illegible] the coal operator of this country is con[illegible] bination of labor which is not in any w[illegible] without infringement of the law can get t[illegible] ulate a collective demand upon the ope[illegible] up his cost both in price and in the cond[illegible] the men are employed.

On the other hand we are confronted [illegible] in the form of the Railroad Administration, a buying combination, which is to do all the buying that was formerly in the hands of the local purchasing agents scattered all over the country. This purchasing power is now in a centralized body, in the hands of one man; and as the railroads use practically 30 per cent. of all the bituminous coal mined in the country, the coal operator, scattered as he is, is confronted with a most harassing condition and combination of conditions. Labor can force up his cost price almost indefinitely, and the combination on the other hand of the Railroad Administration can force his selling price down almost indefinitely. Now, the coal operators have no right to get together and agree on a method of holding the price up in any way, and I believe that the figures that Mr. Morrow has given you show clearly that the combined efforts of the centralized buying power has had a very marked effect on the price at which coal has been moving from the mines. The natural consequence of that condition is such that it is not right. I am going to be very frank in saying that it is not right for such a large

percentage of our coal to be forced down to cost or below cost by a centralized buying power.

There is nothing that the coal men are so anxious to accomplish, if it is possible, as to take out from their business the seasonable feature; that is, if it were possible to have the industry active throughout the year, instead of inactive for six or seven months of the year and active for five or six months of the year. It would be a great thing, not only for the coal industry from an operating standpoint, but from the standpoint of the men engaged in the production of the coal and for the general public.

As the matter now is, there is always a time every summer when the railroads' sidetracks are full of empty coal cars, when others are lying idle and the men who make their living in those mines are out of employment because the mines have no orders for their product.

The railroads use, as I said before, practically 30 per cent. of the bituminous output. When there is no business in the mines they naturally have no business for their coal cars or that class of equipment that is peculiar to that business. If the railroads could arrange to take their coal supply at the time of the year when their equipment is idle, and when the mines are idle, they would accomplish three very important things.

In the first place, they would get their supply into storage, they would have the assurance of the already mined coal. They would use that idle equipment at a time when it is idle, and they could make it active, and would keep the men at the mines employed, and would relieve the labor unrest. As it is now, when the men are thrown into a period of idleness for three or four or five months every year, and only working, as they did, in pre-war times, 150 to 155 days out of a year—if that employment could be more regular, it would not be so necessary to make demands for higher rates per ton in an effort to get a whole year's living out of a few months' activity.

In other words, the more regular employment would largely offset the labor unrest. It would use the idle equipment that is doing nothing but lying on a sidetrack. It would bring the coal in at a time of the year when it is possible to dig it, and it would relieve the equipment for the use of the public in the fall and winter, when the public so badly needs coal. An equal distribution of the coal over twelve months instead of over six months would have a tendency to lower prices and make less labor unrest, better use of railroad equipment, and would stabilize the industry all along.

THE CHAIRMAN: Mr. Taylor, in that connection, prior to the war, when the railroads were under private operation, was any difficulty in procuring cars encountered? Were the railroads following the same practice as the Railroad Administration follows now in purchasing their coal only at the end of the year, or at a time when you are busy, or was the situation different?

MR. TAYLOR: Almost all railroad contracts that I have ever seen, covering a great period of years, contain what they call a minimum and maximum clause; and in the times of the year when they do not want to invest money in storage coal, and they are not running particularly heavy, they take the minimum; and in the time of the year when their business is good, and they want coal, they take the maximum. That spread is one of the causes of the troubles in the fall, because then the coal business is good and that is when they take the maximum. That always produces a car shortage, and a great deal of equipment that should go to public use is used in the taking of railroad coal. That prevailed before the war, and it has prevailed since.

THE CHAIRMAN: Can your association assist the committee in an effort to keep stable these prices by exerting influence with the members of your association to prevent their taking advantage of the present situation and raising the prices abnormally?

M. TAYLOR: Undoubtedly so, and it would be to the interest of the coal trade not to invite criticism from the public. All this association wants is a fair business margin on its coal, and we would much prefer to have a reasonable margin all through the year than to have no margin for a part of the year, and a great big peak load in the way of a margin for the rest of the year. Our efforts are being directed in that way. That was our reason for trying to relieve the situation, which we saw would make a runaway market in the fall, and we spent the money of the association in advising the public of that fear, so that there would be no misunderstanding about it; and the public, in a way, responded; and as far as they did respond, the increased tonnage immediately began to develop a car shortage, and from that time on it has been accentuated by this carman's strike within the last week or two weeks. The railroads were crippled and could not send their cars to the mines, and immediately there was a marked drop in production.

In order that time be allowed or the collection of further facts and figures, the committee recessed from Aug. 27 until Sept. 2.

Bureau of Mines Sampling Coal for Swiss Government

At the request of the Swiss Government the Bureau of Mines is sampling its purchases of coal in the United States. All expense of the work is being met by the purchaser. Other governments are expected to make a similar arrangement in the near future. This development has paved the way for the introduction of legislation looking to such a service for coal going to the individual buyer abroad. It is stated that coal represented to contain a maximum of 6 per cent. ash has been found to contain 30 per cent. ash when it was sampled abroad. The arguments in favor of government fuel inspection are as follows:

The representations of coal producers and consumers and the interests of foreign commerce have shown the need of some form of coal inspection that will at once assure to the consumer the grade of coal that he pays for, protect the interests of those preparing clean coal, and without discouraging the mining of poorer grades of coal, exert an influence toward good coal preparation, especially in time of coal shortage.

The proposed coal inspection system contemplates as a salient feature public advice as to the quality of coal as shipped. The force depended upon to produce results is a public statement of facts. For this purpose the machinery for accurate sampling of full carload lots is necessary. The Government now possesses facilities for analysis and publication.

It is proposed that each mining company set its own standard of quality consistent with the particular bed worked, the preparation and market which the business affords, and that the Government shall publish such standard and certify as to whether such standard is being maintained by the mining companies. Such work would not replace inspection by the mining companies. It would not certify as to the quality of each and every shipment, but it would inspect and sample at irregular intervals a sufficient number of cars of coal as shipped to indicate whether the declared standard of the mining company was being maintained.

Mines entering the system would be privileged to advertise that their product was from a mine whose standard of preparation was certified to by the Government. In case coal shipments were sub-standard the mine would be advised of the fact. If the condition continued, the facts would be given publicity and the mine, to retain a place as a certified mine, would be required to declare a new and different standard and one which its product could meet.

Mines entering this system would agree to allow shipments to be sampled en route at sampling stations and stand any added expense of transportation and handling incident thereto. All analyses would be published from time to time giving accurate information about American coals. Mines need not come into this system, but there would be manifest advantages in being on a Government approved list which would gradually increase the number using the service.

COAL AGE

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Do As You Would Be Done By

IF AGAINST those who strike unfairly, strikes were declared, the striking habit would be cured. If only the man who refused to make shoes for the miner were told that he could not get coal to warm him or cook his food, or milk and meat to strengthen him, or the doctor to cure his ills, or bread to feed him. If, when he closed his shop in reasonless anger, all shops were closed to him in reasoned wrath, perhaps it would be different. He tells the world that it couldn't do without him. Can he do without the world?

He who works by the day should furnish such energy and judgment that a good day's work is delivered. Conversely, he who engages a man to produce coal by the ton should furnish the man so employed such energetic superintendence and adequate equipment that a fair opportunity to mine or load a large tonnage is afforded him.

Pit Wagon Has Growing Pains

WHEN stage coaches were first put upon rails they were hauled by horses from farm to market or dock. So long as horses were the motive power, the vehicles remained to all intents and purposes stage coaches. Weight continued to be an important factor till the locomotive came and replaced the horse, then the stage coach changed its guise and turned into a passenger car. The old hand brake disappeared; for a while another hand brake, but little better, took its place. Then came the vacuum brake, and then a brake operated by compressed air. Then came greater length and breadth, heavy draft rigging and springs, and solider and yet solider construction. In a like manner sizes of freight cars increased till at length a capacity of 100 tons was reached.

In Great Britain, however, it was thought well to use a few horses for "shunting," that is, for switching or shifting cars. For years the capacity of these horses held back the trend toward heavy equipment. Old Dobbin could not pull such big cars, therefore they were not desirable. And in the United States, in the earlier days, the grades under our tipples were often inadequate, and horses were used to place the cars and to drag them away. Perhaps for this reason the 35,000-lb. capacity car for a while looked like a pretty fair limit.

Again, in Great Britain, the women dumped mine cars, which were therefore apt to be small. Boys, and sometimes men, "put" them to the working face. The strength of the "putters" at the face and of the women at the tip had, with the weight of the loaded car, especially the latter, no little effect in keeping down car size. With cars of small capacity the gages and the wheel bases were perforce small. The rails were light and the curves were sharp, and soon the road beds restricted the size of the cars as much as did the strength of the female dumpers and the putter boys, not to mention the thinness of the coal, which also had an effect.

Nor was it much otherwise in the United States. On our tipples, we relied on the muscles of the men, and at one time the wagon grades were none too heavy at the dump. The managers did not choose to make them heavy, for while the loads went down the grade the empties went up it also. There were no crossover dumps, and perhaps there was a plane with both tracks at its foot on the same level. So what cars came loaded to the tip had to be pushed back to the foot of the plane on the same grade, which it was not well to make excessively adverse to the empty cars.

Inside there were often wood rails in the headings and nobody so much as dreamed of steel rails in the rooms. Every miner placed his own cars at the face. The mule brought them to the room mouth, and the two miners, or one of them, did the rest. Early gages and the wheel bases also had their effect, and, as a result, cars were light and of small capacity.

There are still mines where nearly a hundred mules supply the power for transportation. Some mines still exist where cars are delivered to the miner at the room mouth and are placed by him in the same position when loaded. Still may be found wood rails and crooked roads. But on the whole locomotives and ropes now perform all the inside transportation work that men and mules and sometimes ropes performed exclusively in the early 90's, while, outside at the dump, the car hoist now replaces human muscle. We can look therefore for all manner of changes in the build of the mine car.

The weight of the car will increase immensely. Roller bearings will be universal. Spring draft rigging will replace the old drawbar and looselink. The car will be made without an endgate and so be additionally strong. It will have a good brake, something that few, if any, cars have now. Is it too much to anticipate that it may have an air brake? The car will probably be of steel. Too many steel cars wander crippled into mine machine shops where the equipment is too inadequate to expeditiously repair them. But with proper tracks and greater rigidity and good brakes, why should not wrecks and consequent repairs be few? Surely, at least, when properly constructed they will not be wrecked by overloading.

One difficulty remains—falling roof. There is the possibility of roof falling in the room face or directly on the car or into the roadway of the mine, causing a derailment. All other possible causes of damage should be, at least, infrequent.

The late Samuel Dean, a keen American observer with extended British experience, declared that the United States supremacy in output per man came from the largeness of the cars. Perhaps in part he was right. We now have a chance to see whether his surmise was correct. The wythes that bound the car and kept it small and weak and puny have been cut, and we shall see it grow; and loading methods will doubtless grow with it.

If your mine is still using the equipment installed a quarter of a century ago—the boilers, the buildings, the engines, the fans, or the cars—it is not producing coal economically. Equipment, like debts, is subject to a statute of limitations.

As They See It From the Train

A BROKENDOWN, unpainted tipple; a score of ramshackle sheds dropped promiscuously around; piles of bony coal; a towering heap of rotting shale or slate afire; a building, half torn down, but still standing; a boiler house, shedding steam and smoke on all around; a burning ash dump pervading the air with sulphurous smells; the village with houses on stilts, with rickety stairways and small unfinished porches front and rear—this the generality of mining towns as seen from the train. No wonder the newspapers find ready readers of their defamatory articles; no wonder we hear it said that the mining life is so joy-destroying.

Look at the picture with which Simpkins, Slattery & Smith adorn their writing paper. It may not represent their place of business at all, but it shows that they believe there is an appeal in a good-looking establishment. A good village and a good tipple will not only produce much tonnage, but good coal; and, what is also good, it will sell it when mined. There are lots of better villages than that described—for the most part, they are back from the main line of railroad travel. A few more of these would brighten the industry. There are companies advertising their coal by pictures of their camps bedded in blossoms and overshadowed by trees, but there should be more of them.

Industry today is so complicated that working men and capitalists alike fail to see that progress for labor and for capital lies not in skillful manœuvers for advantage but in adding to production. He who does less, or inhibits others from doing as much as they might, is not doing his duty to his fellowman.

Still in the Dark Ages

TILL the beginning of the past century the houses of all but the wealthy were in comparative darkness. The light used was that of the candle; its function, strictly speaking was not the illumination of a room but the lighting of an operation. It gave light to a loom or to the diligent work of a sewing woman. The candle was usually carried from place to place where need for it might be found. The pictures of scenes of that day most happily contrast the warm yellow light of the candle with the cavernous darkness of the room around—a pleasing study in light and shade, such as might be duplicated in almost any mine today.

In 1792 William Murdock introduced gas lighting, and slowly the art of illuminating dwellings developed. The world began to move around without carrying a light. Passing from one chamber to another, the public found the illumination by night, as by day, sufficient for every occupation. Electric light later came to increase, yet further, lighting efficiency, and illumination became a science, with a learned society of its own to study its laws and their application.

But the mines are still in many cases, at least a century behind. The workingman in most cases sees everything by the light of the lamp on his head. The roads and the working places are only rarely illuminated. The driver and motorman frequently have to travel along unlighted roadways, which often swarm with human beings whose lights are burning poorly or are actually extinguished.

Probably most accidents from mine cars are due to defective illumination as much as any other one cause. The risks are made immensely greater by reason of the darkness. Falls over lumps of coal or rock, hidden by the Stygian murk, inability to find safety points for passing, impact with low roof or timbers, falls into ditches and over switch rods and pipes—all these are the outcome of darkness.

Where men are not hurt, it is largely by using a caution that interferes with efficiency. No one can do a good day's work in the dark. The dilated pupils accustomed to the darkness are dazzled by an excess of illumination and become unable to function at their best when confronted with the locomotive light. In any event a generally disseminated light, that will reveal the whole entry is what is really wanted. The light on the cap or on the locomotive hardly does this. Both are doubtless necessary, but the lighted heading or room exceeds them both in safety and efficiency.

Stationary electric lights have long been used at landings; they are being extended along headings; they have even found their way to working places. Before long we shall find them in all live workings where there is no gas. The mine workers may be last to receive light, but it will not always be denied them, for the denial does not pay. Both along the track of the mine and the roads of the village, illumination is needed for safety, efficiency and comfort. A good light is necessary also for proper eradication of impure coal; slate and bone at the face.

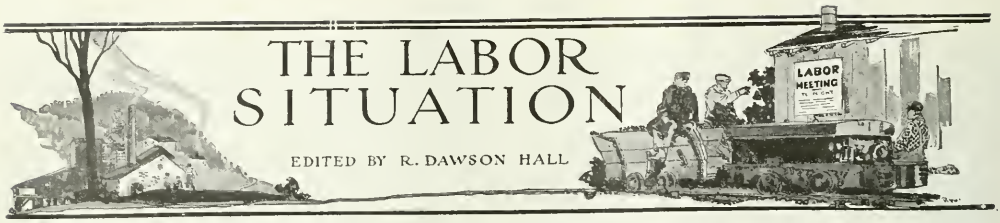
No nation can become poor by buying the idle hours of its people, even if the works constructed at such times are of little relative value. The only fear is that the work thus started may extend into the hours that would in any event be hours of activity.

A New Type of Landlordism

WORD from Portage, Penn., shows that if the mine workers can enforce it, a new landlordism is to spring up in Pennsylvania. Houses used to be so poorly constructed, and the rents of houses relatively so high, that the renting of them to mine workers was one of the valued perquisites of the operator. That was the case perhaps 30 years ago. As the years passed, houses were better built. No longer did the air whistle through them. They were plastered and wainscoted. They were provided with cellars, coal sheds, fences and sidewalks. They were piped for water, gas and electric light.

Rents were not raised, so that the rate of profit soon became as low as four or six per cent. on the investment after repairs were made. It was a time when profits on mining were low, and often there were no profits. The house rent alone showed a profit for, small as it was, it was never wholly extinguished. It seemed to some an evil sign that while coal was sold at or below cost, house rent was profitable. Yet it paid at best merely a bond rate of interest.

But now renting is to be wholly a debit. It is no longer to pay a profit large enough to compensate for obsolescence or depreciation. The yearly papering of every room, with the yearly repairs, with the cost of free gas, or free electric light and free water, will eat up all the rent if the Portage program of $1 per room per month gets wide acceptance in the biennial contract. The housing of the employees is to be not a profitable but a dearly paid, privilege.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

During the past week the trend toward reason in labor matters has advanced by leaps and bounds. Perhaps there is some advantage in nationalization—few are the things without advantages—for when the nation has an industry in charge it learns that high wages really do make operation either costly or impossible, and the experience of the politicians is thus communicated to the people. The Government has learned in its management of railroads that the reason why the corporations do not grant higher and higher wages is not that they do not want to see prosperous workingmen, but that they cannot afford to increase wages without raising prices in proportion. Our nation is, as far as the railroads are concerned, a democracy running an industry, an industrial democracy, and it is beginning to cry for sanity.

Still Small Voice of the Average Man

The sounder minds among laboring men and capitalists are for the more reasonable courses. As William C. Redfield, Secretary of Commerce, says in the *Nation's Business*, "While on the surface of our life the demagog may rant and the anarchist may proclaim and the extremist, whether for capital or labor, may shriek with equal futility, the thing we are to find, if we can, is what saith 'the still small voice' of America concerning the basic facts of work and industry."

That voice is just now, at last, being heard, after two or three months of demagogy, anarchy and extremism. The old middle way, *media via*, is going to be tried. The majority of American workingmen still have a conscience which condemns the demanding of unfair wages by a strike-and-violence method. They believe in getting all the wage they can when seeking a job, in leaving a small-wage company for a large-wage one, in looking for the best place to work, but do not believe in forcing unusual and unreasonable wages on their brother workingmen by means of a strike and a threat of revolution.

Anthracite Program, No Evidence of Sanity

Still there are things to record this week which will seem to contradict this prophecy of sanity in labor affairs. The events, however, are largely a week old and those that are newer as in the Belleville, Ill., district cannot be said to be the work of profiteering labor. In fact, with such few working days, as the Belleville mine worker has, he cannot profiteer. He does well if he lives—if he insists on staying in Belleville. He is parading 125 miles to get what he wants. It would be better if he spent his money and energy not in striking and touring the country, but in migrating. For migration is the best cure. If Belleville has no orders, then let it go where the coal is in demand. If wages make prices too high for Belleville coal to get into the market, let Belleville clamor for a reduction in wages or leave the county of St. Clair for places where the coal is better. Let it not seek a big wage and so put the county out of the running altogether. This applies to many other places.

In the recent anthracite convention representing the 135,000 union men of the anthracite region, it was Secretary-Treasurer William Green who spoke for the union administration. John L. Lewis was present but he evaded the issues, saying that he was desirous of becoming better acquainted with the conditions in the anthracite region before making a decision.

William Green was cautious. He spoke about the necessity for steady work—a desideratum which both capital and labor agree on but which rests with the consumer and not with the producer. The consumer, whether workman or steel magnate, may in time be as generous in *giving* work as he is now keen in *seeking* it. Mr. Green emphasized the closed shop as the main demand of all those the union purposed to make. But while he was clear about the closed shop, about the shorter day he was somewhat more general. He declared that the day was now too long. It shortened the miner's life to work so many hours in a dank, dark atmosphere. This story may go a long way with those who know nothing about it, and, as the consumer is the person who is to be moved to sympathy, perhaps this kind of palaver has its good points. However, the mining man knows that the miner lives long and heartily. On Labor Day Will Green would be just as likely to say that mining bred stalwart men and that there were no finer body of hardy soldiers than the mines supplied—which would be true. But just now, of course, the limp, not-long-for-this-world mine worker is the one to be painted.

Surely Another 60 Per Cent Is "Substantial"

As for a wage increase, the secretary-treasurer merely said it must be "'substantial." Some one drained a glass of water during a lull in the convention—it was Andrew Matti, vice-president of District No. 9—and in a jocular mood he toasted the "6-hour day and 50-per-cent increase." The crowd was in no mood for 50 per cent. and shouts of 60 per cent. came from all quarters. The mine workers are sure of what they want even if the international headquarters is not, and no wonder the mine leaders who know the truth hesitate to lay so great a burden on their brothers toiling in other industries, some of which industries are far more distressing to health and even comfort than mining, and mostly less well paid.

Another speaker was Mrs. George Moyer, of Berwick, who is a sort of professional contemner of the state police which she opposes as an organization. She got the convention to vote unanimously that no member of the union or any body of mine workers would take part in any parade headed by the state police and no member of the union would participate in any festival in which the police took part. It would be easy, if this rule is followed, to arrange for the disbanding of a miners' parade, having a sinister purpose, simply by putting the police at its head.

Fourteen Points of the New Contract

On Aug. 22 the scale committee made its report which, as amended later on the same day, is given as follows practically verbatim. The amendments of the second day are recorded later. The words "We demand" appear in the original at the beginning of each clause in painful iteration. Nowadays, when we say so much about democracy and one man being as good as another, it might be well for all of us to outvie one another in courtesy. But the miners apparently do not believe in *noblesse oblige*. The demands are as follows:

(1) That the next contract be for a period not exceeding two years and that the making of individual agreements or contracts be prohibited.

(2) That the contract wage scales be increased 60 per cent. and that the increase secured in the supplemental agreements of 1917 and 1918 be included in the wage scale as the basis upon which the 60 per cent. shall be added and that all daymen be granted an increase of $2 per day

(3) That a uniform wage scale be established so that occupations of like character at the several collieries shall command the same wage and that shovel crews operating for coal companies shall be paid not less than the rates paid by contractors to shovel men.

(4) That a work day of not more than 6 hours from bank to bank be established for all classes of inside and outside day labor and monthly men, according to the agreement for a five-day week, the uniform rates to be the basis upon which the advance demanded shall apply with time and a half for overtime and double time for Sundays and holidays.

(5) That a closed-shop contract be granted, meaning full recognition of the United Mine Workers of America as a party to the agreement.

(6) That all dead work be paid for on the consideration basis existing at the colliery and that where more than one miner is employed, they shall all receive the same rate.

(7) That payment be made for the erection of all sheet iron, props, timber, forepoling, and cribbing; and, that, where miners are prevented from working on account of lack of supplies, they be accorded the opportunity of making a shift at some other work at the consideration rate.

(8) That, in the settlement of grievances, the aggrieved parties shall have the right to demand settlement upon a basis of equity and if such equity settlement is requested the conditions of 1902 shall not enter into or prejudice the case.

(9) That a uniform rate of 17c. per inch be paid for all refuse in all kinds of mining up to 10 ft. wide.

(10) That, wherever practicable, coal shall be paid for on the legal basis and that dockage shall be eliminated.

(11) That, on all reel motors, one motorman and two brakemen be employed and that, on all other motors and engines, assistants or patchers be employed and that, when motormen or engineers are repairing their motors or engines their assistants shall be employed to help.

FOR BETTER OR WORSE

(12) That when any tools are lost through no fault of the employees as the result of squeezes, water or fire, they are to be compensated for such losses.

(13) That where contract miners are employed in company work, the company shall supply them with the necessary tools and, failing to do so, shall compensate them by paying each miner not less than one extra hour per day for the use of such tools and that the company shall supply to all company men the necessary tools free of charge.

(14) That where contract miners encounter abnormal conditions in their working places, they shall have the privilege of receiving consideration work.

(15) That the supplemental agreement which terminates with the declaration of peace shall be continued until the expiration of the contract and that our officers be instructed to immediately notify the representatives of the operators regarding this decision.

The committee's report not only included this fifteenth clause (that has reference not to the new contract to become of force Apr. 1, 1920, but to the old contract which at the conclusion of peace is to be extended), but also made the following provision to be followed in making the new contract: The scale committee to negotiate the contract shall be composed of the officers and the executive board members of the three districts together with the resident international officers and the three mine workers from each district affected. Each district president shall select the three mine workers in his district, subject to the approval of the executive board. Thomas Kennedy, president of district No. 7, served as chairman of the scale committee and James J. McAndrew was its secretary.

Each clause was carefully considered. Delegate Matti, vice president of District No. 7, Hazelton, who possibly feared that his toast to a 50-per-cent. increase might make him unpopular, asked that the scale provide for a 75-per-cent. increase instead of 60 per cent. President Kennedy declared that 60 per cent. "hit a good average of the many suggestions received from the locals." Matti again failed to convince the meeting that he had hit it right.

Section 4 as presented opened as follows: "We demand that a work day of not more than 6 hours be established." It was amended to read "not more than 6 hours, from bank to bank, be established." As a result, if the new reading is accepted by operators, it will mean that the working day will start from the time a man is supposed to present himself at the head of the shaft or mine mouth ready for work and end when he arrives at the shaft head or mine mouth at the day's end. The men claim correctly that the travel from the shaft mouth to the working place takes 15 to 20 min. and that it takes 5 or 10 min. to be raised to the surface. About this there can be little question. Whether they should be compensated for this work of traveling is a fairly debatable matter, for everyone has to travel some distance to work unless he is fortunate or unfortunate enough to be a resident janitor of an apartment. Under the agreement of 1916 no allowance was made for traveling, the rule being 8 hours from time of reaching the working place to the time of leaving it. It was Christ Golden, of Shamokin, president of District No. 9, who asked that "and monthly men" be inserted in this section, which replaces 6 hours for 8 hours. He also wanted to leave out "day" in "day labor." Several argued for the amendment saying that the companies were forming an organization of monthly men, who would take strikers' places in the event of trouble if they, the monthly men, were not in the United Mine Workers of America. The amendment was lost but later in the day a vote added to demand No. 4 the words "and monthly men."

In discussing section 5 some one wanted the "checkoff" added to the "closed shop" but this amendment failed of approval after much debate and some remarks by the acting international president, J. L. Lewis. William Green stated that the scale committee intended that the closed shop should include the checkoff. There was much bitter debate on the lack of uniformity of rates between mines and companies, and criticizing the fact that the establishment of uniformity had been so long delayed.

On the following and closing day a demand was added requiring that checkweighmen and docking bosses be allowed to serve on mine committees. Another amendment was one made to section 9 which now not only demands that "a uniform rate of 17c. per inch shall be paid for all refuse in all kinds of mining up to 10 ft. wide" but adds that "proportional rates" shall be paid "for all mining over 10 ft. wide." Some one wanted to make the rate 28c. per inch but that amendment was voted down.

Section 14 had also to stand for amendment, or rather for addition, for the different kinds of consideration work were written into the manifesto. There is a complaint that in many cases contract miners are compelled to remain at home for days and even weeks waiting for assignment to consideration work. Now under the new demand each man is to be allowed to decide for himself

whether he is entitled to receive consideration work. When complaint was made that extra pay was not given when work had to be done by the light of safety lamps it was replied that clause 8 covered the difficulty. In this clause it is said that equity and not the contract of 1902 shall cover any matter where the mine workers so elect.

With This No Other Clause Is Needed

Clause 8 is such a blanket affair that it would vitiate the force of any contract to which it might be appended. Why have a contract any longer than sufficient to appoint an umpire and compel obedience to his dictates, if a clause of this kind is to leave almost everything to his judgment.

All the collieries of the Hudson Coal Co. in the Plymouth district which, between them, employ 3000 men and boys, went on strike Aug. 21 to compel the company to adjust the scale for mining coal in the Top Ross bed in No. 4 colliery and in the Cooper bed at No. 5 colliery, in both of which unusual difficulties in the way of bone or rock are said to exist. There has been a grievance extending over many months but no satisfactory solution has been found. As the company refused to discuss the grievance so long as the men violated their contract by abstaining from work the union leaders persuaded them to return to work Sept. 2.

At the Breckenridge mine of the Allegheny Steel Co., in West Natrona, Harrison Township, Allegheny County, a general riot occurred on Tuesday, Aug. 26, which lasted more than 30 min. For more than five weeks trouble had been brewing at the mine, and a strike occurred on July 21 to which reference has already been made in this department. On Monday, Aug. 25, a mine guard was caught by strikers and beaten. On the following day warrants were issued for several union men, and about 4 p.m. of that day a mob gathered in which were not only men but women and children.

They marched to the mine and there set on the non-union workers. A member of the mob, it is said, threw a rock at one of the guards. It is even said that some of the strikers were armed and fired at a mine picket. This resulted in a general fight in which those armed used their arms and those without them used bricks. The guards, outnumbered 20 to 1, retreated but finding they could not get away, they fired and at the first volley a well-known agitator, Mrs. Fannie Sellins, was killed and the same fate befell an unknown miner.

Stories of Riot Do Not Tally Very Closely

Another volley in which the watchmen deliberately fired high was ordered and two other strikers fell. The mob then retreated but again gathered and advanced, but little damage resulted on this occasion. Five men were arrested on Aug. 27, Michael Szanfranchi, Mrs. Sellins' bodyguard, according to his own statement, Deofil Cherkopski, Steve Glowakski, John Shaw and Martin Rupnik. Philip Murray, the president of District No. 5, and John L. Lewis, acting president of the United Mine Workers, have both addressed President Wilson asking a federal investigation of what is termed "this most shocking crime which has aroused our entire membership." This is how the story reads with Murray as narrator:

One of the alleged victims, a miner, 58 years of age, was overtaken by a deputy while walking down the street, and beaten into a "helpless pulp," after which another deputy fired five bullets at the man. A few minutes later another deputy was ordered by the superintendent of the mine to "kill" Mrs. Fannie Sellins, an organizer sent into the district by the United Mine Workers, who, standing nearby, it was said, had appealed to the deputies to spare the aged miner's life. At the superintendent's order, it was said, Mrs. Sellins turned to flee and was then shot in the back and died.

Previous to the alleged killings the deputies, it was charged, had "opened fire on a number of men, women and children who were grouped around their homes."

For a while after the Springfield insurgent convention it appeared as if the Illinois strike would die out. There was much smoke everywhere but flame at Belleville only. The administration seemed to have won, but they reckoned without Belleville. The men who refused to abide by the convention vote and remained on strike were confronted by notices, when they returned, to the effect that they would be fined for every day they had been idle in violation of the contract, so they went on strike again against the penalty clause and to insist on the reinstatement of all the strike leaders without discrimination.

But before they thus struck a second time the state officials of the union and the operators had held a meeting in Chicago to discuss what should be done with the penalties already assessable against the striking miners. The operators seemed willing not to stand up for their contract rights but the state leaders saw in the second strike when it came to their ears a cunning scheme of the strikers to claim that what would be accomplished in Chicago—if anything was to be accomplished there—would be a result of their strike, thus strengthening the claims of the opposition to the state administration.

"Look," they would say, "we can get anything by a strike and nothing by submission to our contract requirements." However, the operators did actually agree to remit the fines.

Work or Be Expelled from the Union

This was the situation when on Tuesday, Aug. 26, an ultimatum was sent by Walter Nesbit, secretary-treasurer of the Illinois organization, to the secretary of each local in the state giving warning that all miners who were not back at work by Saturday would be expelled. The notification was as follows:

"You are hereby advised that the International organization, under date of Aug. 16, 1919, gave to the district organization the authority to revoke charters of striking locals in District No. 12. The District Executive Board in session held in Chicago on Aug. 25, 1919, decided to exercise the authority given and will revoke the charters of all striking locals that do not return to work on or before Saturday, Aug. 30, 1919."

When the notification was received at Belleville the strike leaders kept the strikers in line by telling them they were perfectly safe, for the National officials at Indianapolis would call a halt on the state officers as soon as the delegation of strikers could lay the case before Acting President Lewis.

When a telegram was received from a member of the delegation to the effect that there was "Nothing doing," it was interpreted by the leaders as meaning that the National organization would not permit the state organization to do anything. Inflamed by this interpretation, which was probably incorrect, more than 300 miners, after holding a mass meeting, marched out of Belleville, two by two, with the declared purpose of visiting every working mine in the district with the purpose of closing it down. They then proposed to continue their march southward.

Start to Rouse State Against Farrington

Headed by a large American flag and led by David B. Slinger, of Glen Carbon, and Luke Coffey, chairman of the policy committee, they are to march 125 miles and they will endeavor to call out men at Duquoin, Carbondale and other important fields. On Aug. 31 they pitched camp at Freeburg, seven miles southeast of Belleville. A large wagon, filled with provisions, followed the parade. Before starting the men were admonished that pilfering would not be tolerated.

The following official announcement of the position of the strikers has been issued by the Belleville strikers' organization:

"The state policy committee of the insurgents has issued from Springfield a call to all the miners of the state to strike immediately as their answer to the expulsion ultimatum."

The call is signed by D. B. Slinger of Glen Carbon, secretary of the policy committee, who said that he expected practically every mine in the state to be closed down by Monday.

What About the Rest of the United States?

A man is really big, not according to the damage he can do to others, or the amount he can compel them to pay him, but according to his ability to recognize and perform his duties to his fellowmen. No one believes that the mine worker can get the big wages he is asking—40, 50 and 60 per cent. increase—but if he did he would make everybody in the United States pay bigger prices than ever for coal —many times higher prices than the mine worker is willing to pay for his. The mine worker must remember the other people in the country have to make a living, and that to demand an increase above the increase in the cost of living is to try to get something that rightly belongs to someone else. Look around at the other people in the United States, and when seeking a wage adjustment, ask if it is one that is fair to the fifty other persons who, like you, are engaged in industry; for, as you know, there are at least fifty other industrial workers for every mine worker.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Problem in Coal Extraction

Letter No. 1—Having read, with much interest the article regarding the extraction of coal, *Coal Age*, Aug. 7, p. 234, where it is said it was possible to recover only about 50 per cent. of the coal in the ground, I want to suggest a method that appeals to me as being far better than the one described in that article and which I believe to be safe, easy to ventilate and giving a promise of a larger percentage of recovery.

Adopting the general plan presented in the article, and driving the cross-entries and room headings in the manner there described, I would only change the plan of driving the rooms. For instance, instead of driving these rooms on 45-ft. centers, with a width of 30 ft., I would suggest using double rooms or chambers, as shown in the accompanying figure.

The headings being driven a sufficient distance to leave a 50-ft. barrier pillar between the first room and the cross-entry and give sufficient space for the purpose, I would turn roomnecks 12½ ft. wide on 37½-ft. centers, thus leaving 25-ft. pillars of solid coal between each opening. I would continue this plan throughout the length of the room headings.

DOUBLE-NECKED ROOMS

Roomnecks should be driven in 30 ft. before being widened out. At that point, the rooms should be connected in pairs, by cutting out alternate pillars between them, but leaving a 30-ft. stump to protect the heading. This would give double rooms, 50-ft. in width, as shown in the figure. As the face of each double room is advanced, a gobpack should be started at the entry stump and kept well up to the face.

A road is carried up each rib and a row of props set on the roadside next to the gob. I would build good crosswalls in the gob so as to give a solid support to the roof in the first working. If necessary, a few props should be stood along the working face, but these must be taken out as the gobpack is advanced.

Should it be likely that a squeeze may develop, 8-ft. cogs of timber, built at regular intervals in the pack along each roadside, will be of material assistance in avoiding the spread of the squeeze. It is my belief that if the packs are well built, the roof will settle on them and there will be little chance of a break occurring at the face. As each room reaches the limit, the miner starts to draw back the 25-ft. pillar and continues until he has taken out all the coal to within 30 ft. of the heading. The entry stumps are left for the final robbing, when the room headings are being drawn back.

This plan is easily ventilated, in the usual manner, by hanging a curtain on the entry, until the roomnecks have been driven and the two openings widened out to form a double room. Crosscuts must be driven in the pillars separating each pair of rooms and the air current carried through these crosscuts will provide good ventilation at the face of each room.

Forty Fort, Penn. ASSISTANT FOREMAN.

Work of Gathering Locomotives

Letter No. 1—A short time ago, there appeared in *Coal Age* [July 24, p. 164] an interesting inquiry asking for more practical information in regard to the work of gathering cars by the use of an electric mine locomotive. It was stated that previous discussions relating to gathering locomotives had not referred to the actual work of distributing the empties and pulling out the loaded cars. While I am unable to give a very extended description of this class of work, the following outline may be of interest:

The sketch on the next page shows a section of a mine over which I had supervision not long ago. The seam had been developed by sinking a slope on the full dip of the formation, the inclination being about 6 deg. The lifts were driven to the right and left of the slope at intervals of from 300 to 400 ft.

At the time of this writing, the slope had reached the basin and a gangway and its air-course were driven at that point, having a grade of 2 per cent. in favor of the loaded cars. As shown in the figure, the plan adopted was to drive the chambers in pairs, on the full pitch of the seam and leaving a block of solid coal between each consecutive pair of chambers. The chambers were driven 25 ft. wide with 22-ft. pillars between them, and the block of solid coal was 116 ft. in width, which provided for the driving, later, of another pair of chambers separated by 22-ft. pillars.

General Arrangement of Tracks and Rooms

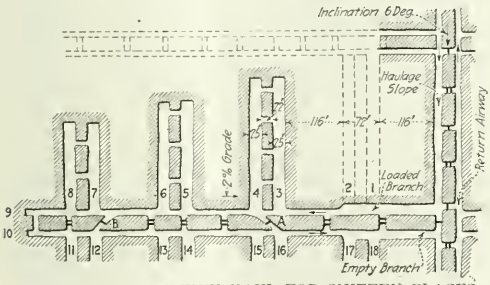
The plan affords loaded and empty tracks on the gangway and the air-course, respectively, and a passing branch at the mouth of the gangway. This passing track allowed the locomotive to operate on either end of a loaded or an empty trip. As indicated by the dotted lines in the figure, chambers 1 and 2 had holed through into the level above and were abandoned. This left but 16 working places on this lift, including the two places at the head of the gangway and air-course. Two men worked in each place, making 32 men in all, and the output of the mine ranged from 150 to 175 tons of coal a day, the miners each loading an average of from 70 to 80 cars having a capacity of 4400 lb. and weighing, when loaded, 6000 lb.

All roads were laid with 25-lb. iron, bonded and fishplated. A 7-ton General Electric locomotive was employed to gather the cars in the 16 places mentioned. The crew consisted of one motorman and two brakemen. The motorman was paid $4.52 and each brakeman received $2.24 a day.

Before going further, I would state that the reason for driving the chambers, as described, leaving every other pair of chambers to be driven later, was that this seam was overlaid with a shallow cover and worked under a river, making it necessary to use every precaution to prevent the mine from being flooded. As each of the chambers reached the limit, it was filled tight with rocks, before opening the adjoining pair of chambers in the block of coal left for that purpose.

Order of Distributing and Gathering the Cars

The work of distributing the empties and gathering the loads was performed as follows: Starting from the empty branch on the air-course, the locomotive pulled eight empty cars through the crossover *A*, till the last car cleared the switch. Four of the cars were then uncoupled and pulled forward to Chamber 5, where two



ELECTRIC LOCOMOTIVE HAUL FOR SIXTEEN PLACES

of the cars were uncoupled, again pulled forward and pushed up the pitch to the head of Chamber 6. Returning to the gangway, the locomotive pushed the other two cars to the head of Chamber 5. Again returning to the gangway, the locomotive then proceeded to push two cars at a time to the head of Chambers 3 and 4, respectively.

The locomotive now returns through the crossover *A* and pulls eight more empty cars, from the branch on the air-course, through crossover *A* to the crossover *B*, on the gangway. Here four of the cars are uncoupled, pulled forward and pushed up the pitch to the head of Chambers 7 and 8, respectively, the locomotive placing in turn two cars in each of these chambers. A brakeman has in the meantime dropped the four empty cars through the crossover *B*, to the air-course, and the locomotive runs back over the switch, reverses, and passing into the crossover, pulls back two of the empties and places them at the head of the gangway. Returning through crossover *B*, the remaining two cars are placed at the head of the air-course.

The locomotive now proceeds to pull out two loads from Chambers 11 and 12 on the air-course. These are taken through crossover *B* to the gangway, where they gravitate, under the care of one of the brakemen, to the mouth of the gangway. The other brakeman returns with the locomotive to Chambers 13 and 14, where four more loads are obtained and taken by the locomotive to the gangway where they gravitate, under the care of the second brakeman, to the loaded branch.

In the meantime, the first brakeman has returned to the air-course through crossover *A* and meets the locomotive at Chambers 15 and 16 where four more loads are secured. In the same manner four more loads are taken from Chambers 17 and 18. This completes the work of distributing the empties to the chambers on the gangway and hauling the loads from those on the air-course. By a similar process, the locomotive proceeds to distribute 16 empty cars to the eight working places on the air-course and pull an equal number of loads from the head of the air-course and gangway and the six working places on the gangway.

The locomotive would always operate on the head end of the loaded and empty trips, in pulling these out and into the mine, the passing track on the loaded branch making this possible. A pressure of 250 volts on the trolley line was found sufficient for our purpose. No trolley wire was hung in the chambers, but a good reel and cable allowed the locomotive to reach the working face in each chamber.

While the work performed by this locomotive may seem insufficient to some readers, it must be remembered that there are countless and unavoidable delays to be considered, in every hauling proposition. Also, the extra brakeman was of great advantage in expediting the work in the plan described.

West Pittston, Penn. RICHARD BOWEN

Mine-Haulage Proposition

Letter No. 6—Kindly permit me to refer to the letter of J. H. McMillan, *Coal Age*, July 10, p. 70, for the purpose of drawing attention to what seems to me an error in the estimate he makes on the saving accomplished by opening up the proposed road to shorten the haulage in the mine under discussion.

Allowing that the shorter haul of the new road would expedite the work to that extent that the output of the mine would be increased "65 tons per day," as Mr. McMillan claims, I fail to understand how he can assume that there will be no increase in the charges, particularly the cost of mining the extra 65 tons each day, and other items that would cut down the saving.

Mr. McMillan estimates the daily saving on the full market value of the coal, which he puts at $3 per ton, making the total saving $3 \times 65 = \$195$. While no one having any experience in mining costs will, for a moment, question the fact that the general hands employed in the handling of this extra tonnage will perform the work without extra cost to the company, and the expense for the general supervision of the mine will not be increased, yet, as I have stated, the cutting of this extra tonnage will require more machines and more men to operate them. More cars may be required to handle the output, and the cost for timbering, trackwork and explosives will be somewhat increased.

In my opinion, the saving effected will be nearer $2 than $3 a ton, making the estimated saving $2 \times 65 = \$130$ per day, instead of $195, as claimed by Mr. McMillan. ANDREW O. BAIN.

McKeesport, Penn.

Letter No. 7—I have been following the discussion of the proposed change in a mine haulage road, as described by J. H. Dickerson, *Coal Age*, June 5, p. 1058, and it has occurred to me that Mr. Dickerson's reason

for temporarily abandoning the proposed change was his fear that roof trouble, arising from the close proximity of the new road to the horseback shown in his sketch, would increase the cost of maintaining the new road; and he has very properly asked for the experienee and suggestions of others

In one of the collieries where I worked, there was a similar instance of a haulage road on a gangway that paralleled a fault for a considerable distance, probably 200 ft. in length. Owing to the fault, the roof on this stretch of road was of a slippy and broken nature and caused much trouble, until the company finally decided to arch the roadway at that place. When the gangway was being driven, timbers were broken, and the roof fell in several places. This continued for some time and it was only after that piece of roadway had been timbered three times that the management finally concluded to arch the section, which ended the trouble.

Arching a Haulage Road with Concrete

If I am right in assuming that this trouble is feared in the present case, let me advise that the same plan be adopted where the proposed road comes close to the fault. I would advise building at that point a concrete arch, for a distance of 100 ft. or more if necessary, depending on the condition of the roof. The sidewalls and arch should be suitably reinforced with old tee-iron rails, and a few holes should be left at the spring of the arch in which to insert crossbars or beams for supporting the trolley wire. In building such an arch, it is a good plan to fill in the space above the arch with ashes or other loose material that will distribute the pressure as evenly as possible and cushion the weight on the arch.

Looking at the proposition from an economic and safety-first point of view, there can be little doubt of the proposed road saving both labor and material and eliminating, to a large extent, accidents and delays caused by roof falls, derailment of cars and a long haul over a crooked road. In my opinion, the best thing to be done is to go ahead with the proposed change as quickly as possible.

Forty Fort, Penn. Robert Thomas.

Efficiency of Mine Workers

Letter No. 8—In the interesting discussion regarding the efficiency of coal-mine officials, opinions have been expressed as to the means best calculated to attain such efficiency. However helpful these ideas may be in regard to supervising and controlling operations, complying with and enforcing orders and regulations for the special purpose of getting results, it appears to me that we miss the real point of this discussion if we go no further.

Even the suggestion of a better coöperation of mine officials and mine workers, as a means of increasing the efficiency of the workers, though a good policy to pursue, presents a limited influence, unless the incentive to such coöperation is based on a real desire for another's good and welfare.

Efficiency is a word that is often misused and its true meaning misunderstood. Efficiency is defined as "The power of producing an intended effect." In its truest sense, it involves a righteous ambition that seeks another's good. Who has not observed that the trend of the present time is to subject all industrial and social matters to the moral code for examination and adjustment. It is the common sentiment of our greatest statesmen and prominent writers of today, and has been made the foundation stone of the treaty of peace between nations. *Coal Age* is no exception in urging the moral code as the basis of all intelligent discussion.

In view of this turn of events, it is stupid to estimate mining efficiency in dollars and cents. By such a course, capital seeks profits out of labor and labor seeks to profit from capital, each having its individual interests in mind; but the highest efficiency is only to be attained by the use of capital and labor for the common good. Our efforts must be exerted to remove every known obstruction and clear the way for intelligent thought and action, which alone can produce real efficiency.

The desired coöperation of employers and employed can only result from a better understanding of each other's conditions and limitations. It is said that "knowledge is power," and a more enlightened understanding of both capital and labor will remove the antagonism that, in the past, has formed one of the chief obstructions to efficiency in every industry. Technical skill is worthless if not exercised for the common good of those who form a part of any industrial operation. This is a simple but vital truth. Likewise, capital is powerless except when employed to advance the common interests of all concerned.

False Conception of Industrial Progress

When one considers the importance of the coal mining industry and realizes that it is a most hazardous calling, it seems a pity that so comparatively few are possessed with a sincere desire to advance the other's good. In place of coöperating with a single purpose, controversies arise and sordid self-interests are advanced that show a false conception of industrial progress.

It is discouraging when appealing to mine workers, who take a more studied interest in mining affairs, to be met with such excuses as, "It is not worth while to spend time and thought on self-improvement when there is already too much unhealthy competition for advancement in positions, and the chances of making good along that line are slim." Instead, many resort to devious ways of gaining promotion. All such advancement is accomplished at the expense of efficiency. Self-centered ambition and the indifference of so large a proportion of mine workers accounts for most of the observed lack of efficiency in mining operations.

Students of mining frequently remark on the wide difference between practice, and theory and many are led to question the advantage of acquiring a mining education. Others are led to inquire whether efficiency is an imaginary state or a real condition, and how it is to be accomplished. My answer is, conditions in mining are just as one makes them and results are measured by one's ambition and action.

While it is true that a more efficient employment of capital would reduce the cost of production and make mining more efficient, this does not meet the need of increasing the mine worker's efficiency, which must depend on and grow out of his own enlightenment and activities. Such enlightenment would make the worker more reliable, less wasteful of material and less subject to accident, and would avert the strikes and controversies that are now so frequent.

Ladysmith, B. C., Canada. William Wesnedge.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Lubricants for Roller Bearings

Kindly publish, in an early issue of *Coal Age,* your opinion as to what is the best lubricant for roller-bearing, mine-car wheels. After trying numerous lubricants on the market, we have been unable to reach a decision as to what kind of lubricant will give the best results, in the use of this equipment.

Tracy City, Tenn. S. R. HAMPTON, Supt., Tennessee Cons. Coal Co.

The object of a lubricant is to reduce the friction between moving parts by preventing the direct contact of their surfaces through the intervention of a thin film of the lubricant. The lubricant must possess the necessary viscosity to withstand the pressure and the heat generated by the movement of the parts on each other.

The proper lubricant to employ, in any case, will depend on the kind of bearing, the load carried or pressure at the point of contact, and the speed of motion. The movement of roller bearings is such as to feed the lubricant between the bearing surfaces, which is a condition favorable to the use of a semi-solid lubricant having the consistency of a paste.

There are a large number of lubricants now on the market, designed for lubricating mine-cars equipped with roller bearings. Several of the manufacturers of this class of equipment have made a special study of the matter of lubrication and, in some instances, exhaustive tests have been made to determine the character of lubricant best adapted to a particular type of bearing.

An interesting pamphlet entitled "Mine-Car Lubrication," by E. N. Zern, has just been published by the Swan & Finch Co., New York. In the matter of recommending the best lubricant to use in a particular case, *Coal Age* can only advise a careful reference to its advertising pages and correspondence with reliable manufacturers of both lubricants and roller-bearing, mine-car wheels of which there are a large number. The proper lubricant to employ will be found to depend wholly on conditions and type of bearing in use.

Repainting Houses

I want to ask if *Coal Age* can give me some information on what is necessary in the repainting of our company houses. So often, when this work is done, the results are far from satisfactory and I would much appreciate suggestions along this line. MANAGER.

————, Ill.

One of the chief causes of dissatisfaction in repainting is the later peeling of the coat applied. This may be due to any one or more of a number of causes. A good quality of lead-and-zinc paint must be selected and this must be applied in dry weather and when it is neither too cold nor too warm. Cold causes the paint to shrivel in drying and hot weather is apt to blister the coat.

Before applying a new coat of paint, the old coat should be examined to see that it adheres closely to the wood. All linseed oil paints shrink in drying and if the old paint is badly cracked or peeled the shrinking of the fresh coat will pull it off. When the old coat is not well preserved nor holds fast to the wood it must be removed before applying another coat. This is sometimes done by scraping or by the use of a steel-wire brush, or by a paint burner specially designed for that purpose. To examine an old coat of paint, slip a pen-knife blade under the paint, in several places, to ascertain whether it is fast to the wood or will flake off.

Spontaneous Combustion in Mines

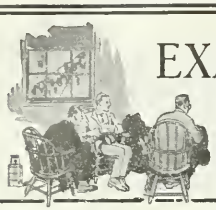
Please state in the columns of *Coal Age* whether a fire found burning in some old abandoned rooms in a mine where I worked some time ago could have been caused, as it was claimed by the mine boss, by spontaneous combustion. I had not thought that this was possible as there did not seem to be anything there to start the fire. What is the cause of spontaneous combustion and how can it be prevented? STUDENT.

————, Ind.

Yes, spontaneous combustion is always possible where carbonaceous material or other combustible matter exists under conditions that generate heat, provided sufficient available oxygen is present to start and support the combustion.

The cause of spontaneous combustion is the slow oxidation of carbon or other inflammable substance. As this oxidation proceeds, it is accompanied by the generation of heat. If the condition is such that the heat is generated faster than it is radiated, a rise in temperature takes place and this may continue until the point is reached where the carbon monoxide gas produced within the mass becomes ignited, producing flame and rapid combustion of the material follows. The presence of sulphur (pyrites) in the waste, in mine workings that are damp and moist, is favorable to spontaneous combustion taking place where fine coal and dust are present.

In order to prevent, as far as possible, spontaneous combustion taking place in coal mines, every precaution should be taken to avoid coal and slack finding its way into the gob. This is more important where the workings are moist, the ventilation poor and there is more or less sulphur present in the waste. Also, it is important to prevent the accumulation of oily waste in pumprooms and other places in the mine.



EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Mine Examiners' Examination Springfield, Ill.. June 17, 18. 1919

(Selected Questions)

Ques.—Assuming you were about to examine a mine for explosive gas, what would you consider your first duty as a mine examiner before you entered on your rounds of the mine?

Ans.—The mine examiner having trimmed and lighted his lamp proceeds to examine the ventilating apparatus to ascertain that it is working properly. This done and before entering the mine, he must place a suitable danger signal, at the shafthead or mine entrance, as a warning for no one to enter the mine until the signal is removed at the completion of the examination by the examiner, who then enters the mine and proceeds with his work.

Ques.—If, in making your examination of a mine, you find gas on the falls, what would be your method of procedure, and what would you recommend for safety, the mine being operated by naked lights?

Ans.—The finding of any considerable quantity of gas on the falls, by the mine examiner, indicates that a dangerous condition exists in that section of the mine, and he should at once proceed to safeguard the situation, by preventing anyone from entering any portion of that section until the gas can be removed. It may be possible for the examiner to erect a temporary brattice so as to deflect the air current over the falls and remove the gas when he has finished with the further examination of the mine. In that case, the work should be done before the men enter the mine.

In any case, after the gas has been removed, it will be necessary to examine all that portion of the section that is on the return of the air passing over the falls where the gas was accumulated. This is required in order to insure that these places are free from gas and safe for work.

When it is impracticable to remove the gas before fully completing the examination of the remaining portion of the mine, the affected section should be closed and safeguarded and no one permitted to enter it for work. Whether or not it will be necessary to keep the men from entering other portions of the mine will depend on the quantity of gas found on the falls and the conditions affecting its removal. This matter, however, can only be settled by the fireboss.

Ques.—If an open light was placed in a lodge body of marsh gas (CH_4) unmixed with air, what would be the result? Give your reasons.

Ans.—A safety lamp introduced into a body of gas unmixed with air would be promptly extinguished, the reason being that methane or marsh gas contains no available oxygen that would support the burning of the lamp. The gas is only inflammable when in contact with air. There would be some difficulty experienced, however, in introducing a safety lamp into a body of pure gas, owing to the flaming of the lamp,. which would take place in passing through the surrounding zone of mixed air and gas. Because diffusion of the gas is constantly taking place, a body of pure gas, issuing from a feeder in a mine, must always be surrounded by an explosive zone of mixed air and gas, which would cause a safety lamp to flame and might produce slight explosions within the lamp before it reached the pure gas and was extinguished.

Ques.—The total rubbing surface of a square airway being 160,000 sq.ft., the length of the airway, 50,000 ft., the quantity of air passing 80,000 cu.ft. per min., what is the velocity of the air current, in feet per minute?

Ans.—This question is probably intended to give the length of the air as 5000 ft., instead of "50,000 ft." Dividing the total rubbing surface of the airway by this length gives, for the sectional area, $160{,}000 \div 5000 = 32$ sq.ft. Again, dividing the quantity of air in circulation by this sectional area gives, for the velocity of the air current, $80{,}000 \div 32 = 2500$ ft. per min.

[There is evidently a typographical error in the printing of this question. As it reads, the sectional area would then be 3.2 sq.ft. and the velocity of the air current, 25,000 ft. per min., which is absurd.—Editor.]

Ques.—If the water gage shows ½ in. depression, what is the velocity of the air per minute when a cubic foot of air weighs 0.076 lb.?

Ans.—This is a theoretical question that must be worked by means of the formula giving the theoretical velocity (v) of an air current, for any given head-of-air column (h), which is, $v = \sqrt{2gh}$. The pressure corresponding to a water gage of 1.5 in. is $5.2 \times 1.5 = 7.8$ lb. per sq.ft. The head-of-air column, expressed in feet, is now found by dividing the pressure in pounds per square foot, by the weight of one cubic foot of air, in pounds; thus,

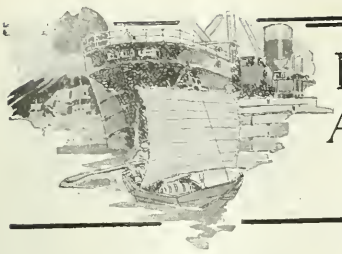
$$h = 7.8 \div 0.076 = 102.63 \text{ ft.}$$

Finally, the theoretical velocity of air due to this head-of-air column is

$$v = \sqrt{2gh} = \sqrt{2 \times 32.16 \times 102.63} = 81.24 \text{ ft. per sec.}$$

Ques.—Why does an explosion of firedamp, in a mine, render the air therein dangerous to life and health?

Ans.—The gases resulting from explosion of firedamp are chiefly carbon dioxide (CO_2) and the nitrogen remaining after the oxygen of the air has been consumed by the burning of the methane. These gases, the products of the explosion, are irrespirable and will not support life. It frequently happens that the explosion takes place in a limited supply of air or, in other words, the methane is in excess, there is then always more or less carbon monoxide (CO) produced, which is an extremely poisonous gas and fatal to life. These irrespirable and poisonous gases constitute the afterdamp of an explosion and render mine air dangerous.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Interesting Figures on American and British Coal Production

The serious complaints of coal shortage in Great Britain lend interest to figures recently compiled by the National City Bank of New York regarding the world's coal production in the last half century and the relative share of Great Britain and the United States therein. The figures show that the coal output of Great Britain grew from 124,000,000 short tons in 1870 to approximately 225,000,000 in 1918, while the output of the mines of the United States grew from 33,000,000 tons in 1870 to 685,000,000 tons in 1918. The British output in 1918 was double that of 1870. The United States output in 1918 was 23 times as much as in 1870. In all parts of the world aside from Great Britain and the United States, the output grew from 80,000,000 in 1870 to 500,000,000 tons in 1918, or about six times as much in 1918 as in 1870.

The United States, according to the Bank's figures, produced about 14 per cent. of the world's output of coal in 1870, 20 per cent. in 1880, 28 per cent. in 1890, 32 per cent. in 1900, 39 per cent. in 1910, 43 per cent. in 1918. Curiously, however, the United States, although turning out 2½ times as much coal as Great Britain, has not been, until very recently, an exporter of coal, in any considerable sense. Our exportation of coal had never reached as many as 20,000,000 tons prior to 1913, and even in the highest war record of exports only reached 26,000,000 tons in the fiscal year 1918, the highest record ever attained. On the other hand, Great Britain's exportation of coal was in 1913 72,000,000 tons, or nearly four times as much as that of the United States in that year, in 1910 62,000,000 tons against 13,000,000 tons exported by the United States. British ships, scouring the world for food and manufacturing materials and carrying only manufactures on their outward voyage needed ballast, and thus Great Britain became the world's great coal purveyor, especially in view of the fact that the United States, a much greater producer of coal, had few ships of her own to send over the ocean, and the value of her exports and manufactures was about a quarter of that of Great Britain.

Production Growth in United States

Growth in production in very recent years has been much more rapid in the United States than in Great Britain or Germany, or in fact any other country. Our own production of coal, according to the Bank's statement, grew from 270,000,000 tons in 1900 to 685,000,000 in 1918, while that of Great Britain was 252,000,000 tons in 1900 and 255,000,000 tons in 1918, that of Germany 165,000,000 tons in 1900 and 260,000,000 tons in 1915, the latest year for which figures are available. In the remainder of the world the output in 1900 was only 160,000,000 tons and in 1918, 230,000,000 tons.

The possibility of the United States becoming a large exporter of coal and perhaps the world's chief coal purveyor looks comparatively easy, when we compare the relative supply of coal in the various sections of the globe. The world's total available stock of coal according to the Bank's statement, is 7,397,553,000,000 metric tons of which the United States has 38,386,507,000,000, or 52 per cent. of the world's total. Canada ranks next to the United States with 1,234,260,000,000 tons; China, 995,587,000,000; Germany, as it existed in 1913, 423,356,000,000, and Great Britain, 189,533,000,000; these figures are those of the Geological Congress held at Toronto in 1913.

As to the sections of the United States in which our 3,838,657,000,000 tons exist, the Geological Survey figures accredit North Dakota with 697,921,200 short tons; Wyoming, 670,545,100,000; Montana 381,053,800,000; Colorado, 317,589,600,000; Illinois, 199,951,500,000; New Mexico, 199,777,900,000; West Virginia, 150,363,600,000; Pennsylvania, 124,627,000,000; Kentucky, 123,015,000,000; Ohio, 92,943,900,000. The coal supply of the world by grand divisions, as estimated by the Geological Congress above referred to is, for North America, 5,075,431,000,000 metric tons; Asia, 1,279,586,000,000; Europe, 784,190,000,000; Oceania, 170,470,000,000; Africa, 57,839,000,000; South America, 32,697,000,000 metric tons.

Coal Market at Rosario, Argentina

The quantitiy of coal imported into Argentina in 1912 was 3,707,956 metric tons, of which 3,499,989 tons came from the United Kingdom and only 115,901 tons from the United States. Of the total quantity thus imported, about 10 per cent. was delivered directly at Rosario and small quantities were delivered at Corrientes, Formosa, Santa Fe and Posadas. The custom house valuation was $6.75 per metric ton, United States currency, and no duty was assessed. In 1914 some 3,421,216 metric tons were imported, of which 3,242,519 tons came from the United Kingdom and about 329,807 tons were delivered direct to Rosario by vessel. In 1915 the importation of coal declined to 2,543,887 tons, in 1916 to 1,884,781 tons, and in 1917 to 707,712 tons, and the shortage thus caused has been supplied in the Rosario district by wood, fuel oil, bran and corn.

It may be seen that Rosario and its immediate environs represent about 10 per cent. of the primary coal market of Argentina, the principal consumers being the electric-power plant, the sugar refinery and the railroads.

The depth of the river alongside the docks at Rosario is 24 ft., and cargo boats drawing from 20 to 24 ft. are accommodated in the channel from Buenos Aires to Rosario. Boats drawing more than 20 ft. should make inquiry at Buenos Aires before proceeding up the river.

The three large consumers already mentioned are in a position to take coal in cargo lots, and are familiar with the standard grades of American coal. There are but two dealers in Rosario who import coal and both are British firms, Wilson Sons & Co. (also representing Cory Bros.), and Mann George, Depots, Ltd. The price of coal at Rosario is, of course, dependent chiefly upon ocean freight rates, since the freight represents at present about three-fourths of the cost price of the coal delivered.

In this connection it should be noted that in 1914 the ocean freight rates on coal from South Wales to the River Plate were on the basis of 14 shillings per ton; they rose in 1917 to 120 shillings per ton, and declined by March, 1919, to 50 shillings per ton. The British railways within the Rosario district have converted many of their engines into oil burners, and the use of wood has become quite general for steaming purposes. Some of the flour mills found no market for their bran, due to the loss of their export market, and are burning the bran and thus saving more than its cost to them. The fact that oil fuel has increased in price in proportion to coal prevents any serious and permanent inroads upon the coal demand in that direction. From the present outlook it may be said that the Americans will supply the coal market of Argentina if they can compete in ocean freights to the River Plate.

The stevedore charges for unloading coal at Rosario are about 40c. per ton, and the charges for port dues, weighing, revision, etc., are equivalent to approximately 66c per ton. There is little demand for bunker coal at Rosario inasmuch as vessels can take on coal to better advantage in Buenos Aires, that market being usually 2 shillings per ton cheaper than Rosario.

Venezuela May Soon Be Large Producer of Coal

Although large deposits of coal have been known to exist in Venezuela for some time, the inability to secure materials and supplies, and the lack of transportation facilities during the war has greatly hindered operations. Now that normal conditions have been resumed, it is confidently predicted that coal exploitation will make great strides. The Mercantile Bank of the Americas has received some interesting information on this subject from the affiliated bank in Caracas, the Banco Mercantil de Caracas.

"The coal deposits of Venezuela," says the bank, "are widely scattered and outcroppings have been discovered in five different sections of the country. The most important and the most valuable are located on the Goajira peninsula some sixty miles northwest of the City of Maracaibo. Coal mines here are being developed by an American corporation and as soon as the 100-mile railroad now under construction is completed, a hard bright bituminous coal of excellent steaming properties will be available. It is expected that this coal, of which there are estimated to be deposits amounting to millions of tons, will prove of great utility for the requirements of maritime traffic passing through the Panama Canal, as well as for domestic and manufacturing needs throughout the region of the Caribbean littoral.

"Two other deposits are located in the state of Falcon near the City of Coro, the port of export being La Vela. This coal is suitable for industrial purposes, especially glass and cement manufacture.

"The fourth deposit is located near the City of Barcelona, the mines being known as 'Guanta,' from the adjacent port at which this coal is shipped. Guanta coal is used to a considerable extent by the coastwise steamers. The fifth mine is located on the Unare River, about 120 miles east of La Guayra, and is situated less than five miles from tide water."

Revised Figures of Coal Exports for June, 1919

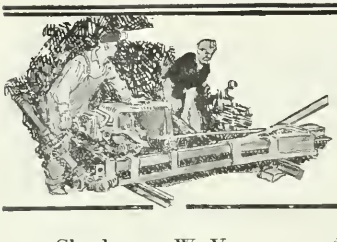
Exports of coal and coke, as reported by the Department of Commerce for June, 1919, and the figures for June, 1918, as finally revised, are as follows:

(In tons)

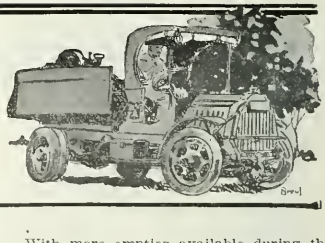
	June, 1918	June, 1919
Coal:		
Anthracite	378,753	474,315
Bituminous	2,205,711	2,179,201
Exported to:		
Canada	1,803,407	1,430,741
Italy	None	126,881
Panama	50,871	None
Mexico	13,508	14,312
Cuba	110,959	84,198
Other West Indies	25,944	30,136
Argentina	43,035	54,796
Brazil	93,782	100,778
Chile	None	8,397
Uruguay	48,105	22,758
Other countries	16,100	306,204
Coke	141,194	56,533

Imports of Coal Into Brazil

Vice Consul Augustus I. Hasskarl reports from Rio de Janeiro that total imports of coal into Brazil during May amounted to 92,963 metric tons, 24,657 tons of which were furnished by the United Kingdom and 68,306 tons by the United States. During the corresponding month of 1918 Great Britain supplied 11,639 tons and the United States 23,800 tons of the 35,439 tons imported. Arrivals in May, 1917, totaled 34,624 tons, of which the United States shipped 23,833 tons and the United Kingdom 10,791 tons.



COAL AND COKE NEWS



Charleston, W. Va.

Production in C. & O. territory still far below normal. Miners slow to report for work, mines short of power and transportation poor. Sixty per cent. production in Kanawha field. Mines greatly handicapped in New River field. New River Operators' Association holds meeting.

Coal production in the Charleston section and the adjacent territory was still being curtailed during the week ended Aug. 23, and although in excess of the previous week, when the railroad shopmen's strike forced a virtual cessation of all mining activities, was still far below normal. At the outset of the week cars were plentiful, some mines being furnished with a 100 per cent supply, but during the balance of the week there was a paucity of cars and in some fields no cars at all were furnished the mines. It is safe to estimate that the time during which the mines were operated did not amount to more than three full days, production, therefore, being not much over 50 per cent. of capacity. Such conditions were undoubtedly due to the fact that the Chesapeake & Ohio Ry. has not been able to get its own equipment in shape for normal coal handling, and also to the fact that empties from connecting lines had not had time to reach certain parts of C. & O. territory. Following an enforced holiday of about two weeks, miners were tardy about reporting for duty again, even though their earning capacity had been stopped for a portion of a month; and even where miners were working they were indifferent as to the length of time they remained in the mines. During the first part of the week, power trouble developed and some mines were without power at short intervals. In several instances miners became impatient and left the mines after a few hours' work, despite the fact that most mines were being operated with a large percentage of miners absent. On account of power trouble, car shortage and a shortage of labor, production could not be speeded up to any extent in order to offset the heavy losses caused by the strike. It is the spirit of absenteeism which the new wage contract has made provision to correct and it is this provision the miners are objecting to so strenuously.

Kanawha conditions were far from favorable during the week ended Aug. 23 from a production standpoint, due entirely to market conditions. In the first place, the car supply was absolutely inadequate throughout the week on the Chesapeake & Ohio Ry.; the first day's supply was encouraging, but from that time until the end of the week, the number of empties furnished was rather meagre, on Aug. 20 reaching the vanishing point so far as some mines were concerned. Even with cars available full advantage could not be taken of an opportunity to load them, mainly because of absentees among the miners. There was not more than a 60 per cent. production in the Kanawha district, or on a rough estimate 100,000 tons. Taking into consideration the limited output, heavy shipments of run-of-mine, gas and splint were being made to tidewater. There was also an increased movement of byproduct coal to the West. Mines on the Kanawha & Michigan and the Coal & Coke railroads were in a better position to load than those on the C. & O., owing to a more regular car supply.

The hopes of New River producers for the production of a large tonnage in their field during the week ended Aug. 23 were shattered after the eighteenth, when the supply began to dwindle; during the rest of the week plants were able to load only part time since the number of empties was far below the needs of the mines. Even when cars were available, coal companies were unable to get all their men out or to keep those who did report for duty at work. Dissatisfaction of some miners with those features of the new wage contract applying to strikes was causing some unrest here as in other fields of the state. Producers were discouraged because of their inability to load and ship more coal so as to make up in part for the loss resulting from the railroad strike. Operators of the New River field reported that little New River coal was available for spot buying or for additional contracts. By far the greatest portion of the tonnage produced during the third week in August was shipped to tidewater. During the week the New River Operators' Association held a meeting at which President Wilson's recommendation for control of coal prices and the Senate investigation of coal prices were live topics; operators as a rule opposed any form of government control of the industry because they saw no special reason why the coal industry should be singled out for such attention.

Fairmont, W. Va.

Northern West Virginia fields have best car supply of months. Week ended Aug. 23 sees large shipments to tide. Lake movement of coal also heavy. Operators' association keeps members informed on car situation each day in advance.

Car shortages prevailed pretty generally throughout West Virginia during the week ended Aug. 23; the exceptions to this rule were the Fairmont and other northern coal fields in the state, the mines in the fields mentioned having the best car supply they had had for several months. This supply was sustained throughout the week and as a consequence production leaped upward during the time in question, it being estimated that the Baltimore & Ohio, on the Monongah division alone, handled (during the week) about 6500 cars, equivalent to the heavy loading figures of July, 1918. The only drawback experienced was late placement of cars which, in many instances, prevented some mines from getting a full day's loading. However, the supply of cars was so satisfactory that late placements were, in a sense, overlooked. A power shortage, which developed early in the week, tended to interfere with operations to some extent, almost a day being lost from such a cause. A washout on the railroads along the Monongahela River also interrupted the flow of empties to certain mines in the Fairmont region. It was a week of large shipments to tidewater, the movement of coal for export being unusually heavy, shipments on Aug. 22 breaking all records during recent months. The Lake movement of coal was also heavier in volume than during previous weeks, while shipments of railroad fuel reached a large volume. Coke shipments seemed to be rather light.

Notwithstanding the great car improvement, steps have been taken by the Northern West Virginia Coal Operators' Association to keep members informed of the car situation a day in advance. Men were on duty at the association office in Fairmont until midnight for the purpose of receiving reports from the railroads as to the probable supply of cars and to give this and other pertinent information to members who telephoned for it. In other words, the association is arranging for such car information as will enable each operator to plan his work for the following day and thus reduce the cost per ton of loading the coal. Furthermore, it is intended to have two men on the road developing information of benefit to members and investigating complaints. In short, the association is endeavoring to get the handling of coal at and from the mines down to an exact system which will be of benefit to members.

Bluefield, W. Va.

Cars more plentiful. Pocahontas gains in production during third week of August; however, not in the market at any price. Little change in the Kenova-Thacker district. Production about 70 per cent.

With more empties available during the week ended Aug. 23, the mines of the Pocahontas region were able to make headway in increasing production, the gain being 38,000 tons. Production was increased from 257,000 to 295,000 tons. The loss from a car shortage was cut down from 177,000 to 137,000 tons, a decrease of 40,000 tons, but that still made a car shortage responsible for a 30.9 per cent. loss. However, with additional transportation facilities available, the mines of the district were able to increase their working time by about 400 hours. The loss from labor shortage and mine disability remained about the same—10,000 tons. The total production loss was cut down from 186,000 to 148,000 tons. There was a slight increase in the production of coke. Pocahontas producers found themselves unable to supply the demand for smokeless, numerous inquiries only going to show it was not to be had at any price.

Little change was observed in conditions in the Kenova-Thacker district, production in that field still hovering around 125,000 tons, with a shortage of cars cutting off the production of about one-fifth of capacity or approximately 40,000 tons. Mines in this field were producing up to about 70 per cent. of capacity. During the same period of last year, production was running about 160,000 tons. While there was a heavy car shortage during the week ended Aug. 23, conditions were slightly improving in the week following. Coal from this field was finding a ready market, losses from no market being insignificant.

Huntington, W. Va.

Mines in Logan field operating to one-half capacity. Poor transportation discouraging. Logan operators confer with manager of Eastern Car Pool. Tonnage moved in C. & O. territory.

During the week ended Aug. 23, the heavy loss in car shortage in the Logan field was reduced from 328,000 (figures for the previous week) to 167,000 tons—a cut of 161,000 tons—but during the week mentioned there was still a loss of 43.2 per cent., affecting working time in the mines to the extent of 2683 hours. The total production loss was 50 per cent., or 193,000 tons; and, consequently, mines were only operated to about one-half of capacity. This had been anticipated, owing to the condition of equipment and motive power and to the inability of the Chesapeake & Ohio Ry. to secure empties from connections. A strike at one of the mines in the Logan field also interrupted production but only to the extent of about 3000 tons. The car situation was so discouraging, however, that a committee of Guyan operators spent several days in Pittsburgh in conference with the manager of the Eastern Car Pool in an effort to secure a better supply of empties. On the committee were A. R. Beisel, J. J. Ross and Walter Thurmond.

J. D. Frances and other operators of the Logan field were in Washington during the week beginning Aug. 25, attending the Senate hearing on coal prices, etc. During the week ended Aug. 23 the C. & O. Ry. handled 12,817 loaded coal cars, or approximately 640,850 tons, for the following districts:

	No. Car
New River....	2,896
Kanawha	2,846
Coal River.	1,137
Guyan ...	3,884
Big Sandy.	1,240
S. V. & F.	589
Long Fork	173
A. C. & I.	52

Paintsville, Ky.

Northeast Kentucky Coal Association board holds important meeting. Committee appointed to testify at coal inquiry at Washington. Extension of markets given much attention. Advantage of Charleston,

S. C., as shipping port for European and South American markets pointed out.

There was a full board meeting of the Northeast Kentucky Coal Association held at Paintsville recently and action was taken on several important matters. A committee o three operators from the Big Sandy Coal field was appointed to represent the coal men of northeastern Kentucky at the inquiry being held in Washington, D. C., as to coal shortage, prices, etc. In connection with this investigation at Washington, all outstanding cost sheets of coal companies should be available and it is important that this information be up to date.

The committee on extension of markets reported that already considerable tonnage for Europe has been contracted for and shipment awaits publication of the tide-water rate; purchasing agents are on the ground awaiting this rate to contract for a large volume of foreign business. There seems to be a great demand for export coal and not a sufficient tonnage available, with prices advancing proportionately. With a fair rate to tidewater, the Big Sandy operators consider that their output would materially relieve the situation.

A satisfactory rate to Charleston, S. C., from this field, is considered to be more advantageous to the whole country and to the Big Sandy district, than similar rates by way of the heavily congested parts in the Middle Atlantic—Newport News, Norfolk, Lambert's Point or Curtis Bay. Even with a satisfactory rate to these points, which the Big Sandy field now enjoys, it is not probable that the Chesapeake & Ohio could handle much additional traffic. On the other hand, the capacity of the piers at Charleston are said to have not been anywhere near utilized in the past.

This fact has recently been recognized, says the *Ashland Independent*, by the U. S. Shipping Board. For the first time since the beginning of the European war, government-owned vessels have been allocated to South Atlantic ports. In an endeavor to meet the situation caused by the European coal shortage, the Government is contemplating the use of all available ships, even to freighters as small as 3000 tons capacity. The Charleston, S. C., outlet for Big Sandy coal is also most desirable for supplying the South American markets, and all indications seem to point to rapid development of trade through this channel.

Birmingham, Ala.

The Tennessee Coal, Iron and Railroad Co. about completing big new plant at Getmore, in Jefferson County. It supplants Adger, Johns and Belle Sumter operations. Shortens haul for old plants and opens up new territory.

Construction of houses, a commissary, and mining plant will begin in earnest at the Getmore property of the Tennessee Coal, Iron and Railroad Co. during September, this being taken in the district to mean that the development will be well under way by winter. Approximately 2000 miners will be employed, this being one of the largest single slopes in the South. The slope at Getmore has been under construction for the last two years, and the estimated cost of the plant when completed will be in the neighborhood of $1,250,000. The daily output will be more than 5,000 tons, exceeding the combined output of the Adger, Johns and Belle Sumter mines of the company in Jefferson County where about 1,500 miners were employed. These mines have been closed for several months.

The sinking of the slope at Getmore is thought to be the forerunner of a change in coal mining methods in the Blue Creek field. It is in reality a new opening for these three slope mines at Adger, Belle Sumter and Johns, that will shorten the haul by several miles. Reports now current state that the dumps at these three places will be entirely abandoned, and that the mining operations now being carried on at these points will be shifted to the Getmore and other slopes to be sunk near that point. If these reports are true, it means the moving of three camps bodily—with a population of several thousand—and transplanting them from the mountain to the valley, a distance of three miles.

The Blue Creek field is situated in a basin three miles wide; on the northwest border are situated the Adger, Johns and Belle Sumter slopes. From this point the seam has been worked out for a long distance. The new slope is situated on the southeast rim of the basin, and in addition to shortening the haul, will open up a virgin territory. An erroneous impression has been created by the popular belief that the seam now being worked is about exhausted. It is nearly exhausted for practical purposes, so far as mining operations from the old slopes in the northwest rim of the basin are concerned, on account of the long haul, but the new Getmore slope will make available coal for years to come.

It is not generally known that just underneath the top seam, being worked, there is another seam of almost identical thickness. This seam has been proved at various points by engineers of the Tennessee company, and has been found to be of about an eight-foot average thickness. The sinking of the new slope, at Getmore, is one of the largest undertakings yet begun by the coal mining department of the T. C. I. and R. R. Co. and involved steady employment of a large force of men for two years, the building of six miles of railroad track, the installation of expensive machinery and the erection of a new camp at the tipple. The new washer at this operation will soon be completed.

Anyox, B. C.

Valuable coal lands on Vancouver Island in litigation. Granby company successful in one appeal to Privy Council. History of the case. Another decision of the Council decides the "suit pending" until trial. Granby concern makes third appeal involving E. & N. Ry. Co.

The Granby Consolidated Mining and Smelting Co. has been successful in its appeal to the Privy Council regarding the Cranberry district coal rights on Vancouver Island, according to a cable to the company's solitors in Vancouver, B. C. The issue of this litigation, it should be explained, is the coal in 60 acres of land acquired with other blocks of land some 18 months ago; in the opening up and operation of this property, the Granby company has invested considerable capital. The Cassidy collieries—the best equipped of their kind in the Canadian West—are a result of the company's enterprise, and from this source it is proposed taking the coal to supply the new byproduct ovens at Anyox, which will solve the problem of obtaining coke for the large smelting plant at this place.

To revert to the matter of litigation, the case which has had a favorable outcome to the company was brought by a Chinaman, Bing Kee, who asked that he be declared the owner of the coal rights in the 60-acre tract referred to. In 1905 Bing Kee purchased the property from the Ganner estate; the trustees of this estate are Angus Mackenzie and Charles Wilson, two prominent citizens of Nanaimo. Subsequently, the Ganner trustees applied for the coal rights and obtained a Crown Grant to them. The Granby company purchased the Crown Grant from Messrs. Mackenzie and Wilson for $45,000 and Bing Kee entered action to have it declared that his deed included the coal. Unfortunately for him the deed had been lost and the evidence appeared to indicate that only the land was intended to be sold.

While Bing Kee's suit is dismissed, the Granby company's troubles in regard to this coal are not ended. Another Privy Council decision affecting the same property continues a "lis pendens" (or pending suit) filed by the Esquimalt & Nanaimo Ry. Co., which claims that the Provincial Crown Grant to Joseph Ganner is invalid, on the ground that the same property was granted to the company by the Dominion Government, as part of its subsidy for the construction of the island railway. The action of the Esquimalt & Nanaimo Ry. Co. has not yet come to trial. The Granby company, applied to the Supreme Court of British Columbia, for the right to register title to the land and the coal purchased from the Ganner estate; but it was held then, and the judgment now is sustained by the Privy Council, that the "lis pendens" shall continue until the trial. The Granby company, however, has a third appeal to come before the Privy Council, the contention in this case being that the Esquimalt & Nanaimo Ry. Co. has failed to include the attorney-general of the Province as a defendant in the suit. It being argued that this is a fatal omission, as it is the Crown Grant which he issued which is under attack.

PENNSYLVANIA

Anthracite

Yatesville—A serious mine cave occurred recently in the Cork Lane section when the three tracks of the Delaware & Hudson R.R. dropped over 5 ft., while the Oneonta freight train was passing over. The fact that the freight was going slowly probably prevented a serious wreck, as two of the box cars of the train went into the mine cave. The D. & H. tracks are directly over the Hillside Coal and Iron Co. workings.

Bellevue—The Delaware, Lackawanna & Western R.R. Coal Department intends to erect a large modern breaker here on a site between the Dodge and the Bellevue collieries, it is reported. The breaker when completed will take the output of both the Dodge and Bellevue mines, which is approximately 2200 tons daily. The Bellevue and Dodge breakers are two of the oldest structures of the Lackawanna company, and during the last few years have been closed quite frequently for repairs.

Bituminous

Brownsville—Three men were instantly killed in the Roberts mine at this place recently while riding on a trip. The car on which the men were riding was caught under tons of rock which required several hours to remove.

Pittsburgh—Following the acquisition by J. H. Hillman, Jr., of this place, of the control of the Diamond Coal and Coke Co., the election of the following officials is announced: J. H. Hillman, Jr., chairman of the board; T. W. Guthrie, of Pittsburgh, (president of the other Hillman companies) president; A. R. Budd, vice president and general manager; A. H. Stolzenbach, secretary-treasurer. W. L. Affelder, of Pittsburgh, assistant to the president of other Hillman companies, has been appointed to the same office in the Diamond company. No other changes have been made in the operating personnel. The Hillman interests recently purchased the property of the Brownsville Coal and Coke Co., at Brownsville, Penn., on which are located some abandoned coke ovens and dwellings. Other houses will be erected here for the accommodation of the employees of the Pika mine nearby.

Dubois—Several parties resident here are interested in a new coal operation that is shortly to be started in Jefferson County. G. S. Sink, of this place, is president and superintendent and E. Sink, also of Dubois, is the vice president of the company. Other directors are N. V. Cossbonn, D. M. Straightwell and E. Montgomery.

WEST VIRGINIA

Fairmont—The Consumers' Fuel Co., with an operation at Downs, in Marion County, will send three "safety-first" teams to Pittsburgh to compete in the national field meet to be held on Sept. 30 and Oct. 1. Superintendent Miller of this company has given much time to the drilling of the teams, and has taken great interest in the safety-first movement.

Fairmont—A deed filed in Marion County on Aug. 21, disclosed the purchase of 5660 acres of coal land in Union and Winfield districts. The purchase was made by the Jennings Oil Co. (a West Virginia corporation) from the E. H. Jennings Brothers Co.—a New Jersey corporation. The consideration stated was $1 and other good and valuable considerations.

Logan—Deeds placed on record here show that C. R. Conner and T. Truxton Stiles, Jr., acquired by purchase a valuable undeveloped tract of coal land in the Logan field.

This tract was purchased by Huntington men from the Rocky Creek Coal Land Co., of Cleveland, Ohio. The property is situated on the Guyandotte Valley, branch of the Chesapeake & Ohio Ry. at Chapmansville.

Williamson—After operating a plant for two years at Himler, Mingo County, W. Va., the Himler Coal Co. has extended its operations into the Buck Creek section of Martin County, Ky., near Warfield Ky. The officers of the company are Martin Himler, president and general manager; Lorin Hanczinger, vice-president; Eugene J. Lang, secretary and treasurer; W. M. Miering, general superintendent. The company hopes to be able to produce about 2000 tons of coal a day at its new operation. A new town will be established. The Himler Coal Co is a co-operative concern, its stockholders being mostly miners of Hungarian origin.

Charleston—Many wagon mines are reported to have started up throughout West Virginia during recent weeks. An impetus has been given to the production of coal at these small operations by the increase in the price paid for run-of-mine fuel. During the war many of such mines were operating and producing coal in this state at the rate of 1,000,000 tons a year. However, when the Fuel Administration no longer allowed a price of 75c a ton over and above that permitted other mines, then it became no longer profitable to work the wagon mines. Of late prices have reached such a level as to justify these small mines in getting out coal again.

Charleston—Accidents during July, in West Virginia, having a fatal ending ran heavier than usual, there being a total of 46 casualties during the month; one explosion—that at the Carswell mine in McDowell County—costing, it will be remembered, six lives. There were 25 lives lost from one cause—fall of roof and coal, the gas explosion taking the next largest toll of six. There were more deaths than usual from electricity—five in all, while the number of fatal mine-car accidents was three. One motor accident resulted fatally and a mining machine was responsible for the death of one miner. There were only five deaths on the outside of the mines, mine cars killing two, electricity one, a motor one, and one being killed from a miscellaneous cause. McDowell County had by all odds the largest number of deaths—16, more than a third of the total. Standing second on the list was Raleigh with five casualties; Logan with four; Kanawha and Brooke with three each; Fayette, Marion, Monongah, Taylor and Tucker, with 2 each; Harrison, Mercer, Mingo, Ohio and Upshur with one each. Twenty-nine Americans and 17 foreigners were killed.

KENTUCKY

Madisonville—The St. Bernard Mining Co., of this place, has nine operations in Hopkins County, in the western part of the state, and an annual production of 1,500,000 tons when running full capacity. This company is now completing a power plant at an outlay of half a million dollars, it is said. Two thousand miners are employed at the plants of the St. Bernard company.

Hazard—Construction and development work goes steadily on in Perry County, Ky., says the **Manufacturers' Record.** This county, of which Hazard is the county seat, is in the southeastern part of the state. Among the fields opened up here in recent years is Lott's Creek; one of the new companies about to start shipping coal in this field is the Indian Head Coal Co., made up of New York and Pennsylvania people. There are seven operations shipping coal on this creek, the Indian Head company is about to start up and another concern is organizing. It is expected that the production of the Lott's Creek field will be the largest around Hazard; the Hardy-Burlingham Mining Co's big tipple here is planned for a capacity of 5000 tons. New territory is being opened up below Hazard on the Louisville & Nashville R.R. and gives good promise if conditions are improved. Surveys have been made for a branch of the L. & N. above Hazard up Leatherwood Creek and a number of coal leases have been taken. The Carr's Fork branch of the L. & N. will be opened up shortly, it is said, and six or eight companies are getting in readiness to begin shipping coal when the railroad is completed.

ILLINOIS

Duquoin—The "Majestic" mine of the Equitable Coal and Coke Co., of Chicago, has been temporarily idle as the result of a fire in the workings of the mine about a mile from the shaft bottom. The local mine-rescue team, of which James Robinson is superintendent, after a hard fight succeeded in extinguishing the flames and the mine is now working as usual.

Foreign News

Sydney, N. S.—W. D. Ross, vice president of the Nova Scotia Steel and Coal Co., states that the company's coal mines are now operating at their full capacity and that the outlook shows a steady improvement. Some improvements are being made at the plant and further extensions are under consideration. The steel plant at New Glasgow is operating at 60 per cent of capacity.

Tokio, Japan—The output of the coal mines of Japan increased from 21,083,000 tons in 1913 to 22,901,000 tons in 1916 and 27,500,000 in 1918. The growth of the industry is shown by the increase in industrial consumption from 7,530,000 tons in 1914 to 10,426,000 tons in 1916, and 16,020,000 tons in 1918. As 16 new mining companies were established in Hokkaido, Kyushu, and other islands, it is expected that the production will be considerably increased this year. The total consumption of coal in Japan was 18,055,000 tons in 1913, 20,440,000 tons in 1916, and 25,980,000 tons in 1918, thus leaving relatively little margin for exports.

Personals

J. E. Graham, sales engineer, is now assisting Mr. Nash, the manager of the Huntington district of the Hyatt company.

L. W. Brown, Warwood, W. Va., formerly superintendent of the Richland Coal Co., has been appointed general superintendent of the Apex Coal Co., Apex, Ohio.

Herbert E. Preisch, of Buffalo, N. Y., has been appointed manager of mines of the Buffalo-Kanawha Coal Co., with headquarters at Putney, W. Va.

Harry M. Giles has been appointed general superintendent of the South Philadelphia works of the Westinghouse Electric and Manufacturing Co. to succeed the late Oscar Otto, killed last month.

Guy S. Hamilton, formerly advertising manager of the American Steam Conveyor Corporation, of Chicago, has been appointed editor of the "Booster," the corporation's newly established sales organ.

Superintendent Thomas Griffin and **Chief Engineer J. P. Broderick,** of the E. J. Scott Coal Co., operating a strip mine near Duquoin, Ill., have resigned their positions with the company to accept positions in St. Louis.

Professor Robert Z. Virgin, of the mining extension department of the West Virginia University, at Morgantown, has tendered his resignation to join the mining extension department of the Carnegie Institute of Technology, at Pittsburgh, Penn.

H. E. Moran, until recently eastern representative of the Main Island Creek Coal Co., has been given charge of the Norfolk office and also the New York office, at No. 11 Broadway, of the recently organized Lake and Export Coal Corporation, of Huntington.

L. A. Wyman has been appointed sales manager of the Burton, Beidler & Phillips Co., of Cleveland, Ohio, producers and shippers of coal and coke. Mr. Wyman was formerly with the Ingersoll-Rand Co. The other officers of the Cleveland company are: J. P. Burton, president; R. N. Smith, treasurer.

N. S. Braden, former sales manager, has recently been elected vice president of the Canadian Westinghouse Co., Ltd., of Hamilton, Ont. **H. M. Bostwick,** assistant sales manager, has been appointed sales manager, to fill the vacancy created by Mr. Braden's promotion.

Paul Sutcliffe, formerly advertising manager of the Edison Storage Battery Co., has been appointed manager of the Industrial Truck and Tractor Department of the company. **M. D. Salsbury,** formerly assistant advertising manager, has been made advertising manager.

George L. Carter is reported to have sold his entire coal mining interests in southern West Virginia and southwest Virginia to one of the leading producers and shippers of bituminous coal in the country. The consideration is said to be approximately $8,000,000.

George Arbuckle, mine manager for the Victory Collieries Co., at Tamaroa, Ill., has resigned his position with that company to accept a similar one with the Union Colliery Co., of St. Louis, Mo., at its Kathleen mine at Dowell, Ill. This mine was just recently completed; it is located near Duquoin in Perry County.

D. L. Van Trump has been appointed superintendent of the plant of the Weganoke Coal & Coke Co., at Lowe, W. Va., having been transferred from Merrimac where he was superintendent for the White Star Mining Co. **Charles W. Murphy** has been appointed superintendent at Merrimac. R. D. Patterson and associates own both mines.

A. B. Reynders, former director of production of the Westinghouse Electric and Manufacturing Co., at East Pittsburgh, Penn., has recently been made works manager of its new East Springfield plant. **A. E. Kaiser,** formerly assistant to the director of production has been appointed to the position made vacant by Mr. Reynder's new appointment.

T. H. Williams, who has been mine inspector at Fernie, B. C., has retired and has been succeeded by A. Strachan, formerly inspector at Merritt, B. C. **D. McLean** has been appointed inspector at Merritt; this is a new appointment. He conducted a mining school at Ladysmith, B. C., before going to the front, and on his return managed one of the mines in the Nicola-Princeton coalfield for a few months.

R. N. Jones, of Wilkes-Barre, Penn., has been placed in charge of the Clarksburg offices of the Alden Coal Mining Co., Inc., of New York, suceeding **Frederick J. Kandt,** resigned. The latter is embarking in business for himself at Clarksburg, W. Va. Mr. Jones has long been a mining engineer in the anthracite fields of Pennsylvania. He recently returned from overseas, where he was in the balloon corps.

R. J. Stegall has resigned as county clerk of Fayette County, W. Va., to assume charge of the accounting systems of the companies operated by Geo. M. Jones and associates of Logan County, with headquarters at Amherstdale. It is said that he has secured an interest in the various Logan County companies. Mr. Stegall served as county clerk of Fayette County for a period of five years.

A. Pflazer, who for some time past has been an inspector connected with the Louisville headquarters of the Kentucky Actuarial Bureau (the fire underwriters' rating bureau), has been assigned to the management of a new inspection office at Pineville, Ky. From this point he will handle inspection of coal property insurance risks in the Harlan, Jellico and Straight Creek fields, as well as in the Middlesboro section. Headquarters will be maintained at Pineville, but Mr. Pflazer will spend almost his entire time in the field.

Geo. D. Rowland, of Cleveland, Ohio, has been appointed general manager of the Hanover Coal Co., with headquarters in Wheeling, W. Va. The operation of the company is at Burgettstown, Penn., on the Pan Handle railroad where the company has about 2000 acres of Pittsburgh coal. Up until two years ago Mr. Rowland was the sales manager of the Richland Coal Co., at Wheeling. At that time he was made president and general manager of the Coal Ridge Mining Co., of Cleveland, and about a year later he also became vice president and general manager of the Apex Coal Co., also of Cleveland.

Obituary

Robert A. Dornan, aged 65, died at his home in New Alexandria, Penn., on Aug. 25. He was president of the Dornan Coal Co.

John C. Miles, auditor for the Philadelphia & Reading Coal and Iron Co., died at Pottsville, Penn., on Aug. 25. He was 60 years of age and had been in the employ of the Reading almost a lifetime, starting out as a coal weigher at Mahanoy Plane.

Coming Meetings

The United Mine Workers will hold a convention at Cleveland, Ohio, beginning Sept. 9.

The Bureau of Mines on Sept. 30 and Oct. 1 will hold a national first-aid and mine-rescue contest at Pittsburgh, Penn., included in the events will be the dedication of the Bureau of Mines Building.

The National Safety Council will hold its annual meeting Oct. 1 to 4 at Cleveland, Ohio. Secretary, S. J. Williams, Chicago, Ill.

New York Coal Merchants' Association will hold its annual meeting Sept. 11-13 at Alexandria Bay, N. Y. Executive secretary, G. W. F. Woodside, Albany, N. Y.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

Indiana Retail Coal Merchants Association will hold its annual convention Sept. 17 to 18 at the Hotel Severin, Indianapolis, Indiana. Secretary, R. R. Yeagley, Fidelity Trust Building, Indianapolis, Indiana.

National Exposition of Chemical Industries will hold its first annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

Alabama Safety Association will hold a field meet Oct. 25 at Birmingham, Ala., at which first-aid and mine-rescue contests will be held. W. B. Plank, engineer in charge of the Mine Rescue Bureau at Birmingham, Ala., is chairman of the Board of Managers.

American Mining Congress will hold its 22nd annual convention Nov. 17-22, at the Planters Hotel, St. Louis, Mo. Secretary J. F. Callbreath, Munsey Bldg., Washington, D. C.

Trade Catalogs

Blaw Cableways. Blaw-Knox Co., Pittsburgh, Penn. Bulletin No. 200. Pp. 16; 6 x 9 in.; illustrated. Shows details and general views of cableway in operation.

Vulcan Soot Cleaner. The Vulcan Soot Cleaner Co., Du Bois, Penn. Pp. 8; 8½ x 10¾ in.; illustrated. Notes six vital features of Vulcan soot cleaner superiority and also the cost of the cleaners.

"Hard Service" Portable Electric Tools. Van Dorn Electric Tool Co., Cleveland, Ohio. Catalog A. Pp. 40; 6 x 9 in.; illustrated. Complete information about Van Dorn drills, reamers and grinders.

Blaw Single Line Clam Shell Buckets. Blaw-Knox Co., Pittsburgh, Penn. Booklet. Pp. 20; 5¼ x 7¾ in.; illustrated. These completely automatic buckets are illustrated and briefly commented upon.

Osgood. The Osgood Co., Marion, Ohio. Booklet. Pp. 31; 8½ x 11¼ in.; illustrated. Osgood steam shovels, cranes, clamshell outfits and dredges are here described and illustrated by fine cuts.

Type B Erie Locomotive Crane. Ball Engine Co., Erie, Penn. Bulletin S-30. Pp. 6 (folder); 8½ x 11 in.; illustrated. The bulletin shows the different uses to which the Erie Crane can be put with profit.

Van Dorn Portable Electric Drills and Grinders. Catalog 19. Van Dorn Electric Tool Co., Cleveland, Ohio. Pp. 44; 3¾ x 8¾ in.; illustrated. Describes and illustrates the drills, reamers and grinders made by this company.

Buckeye Multiblade Fan. The Buckeye Blower Co., Columbus, Ohio. Bulletin No. 101. Pp. 51; 7¾ x 10¾ in.; illustrated. Complete details about the various styles of this type of fan to assist purchasers in selecting equipment.

W-S-M Automatic Ore Unloaders.—The Wellman-Seaver-Morgan Co., Cleveland, Ohio. Bulletin No. 27. Pp. 12; 8½ x 11 in.; illustrated. This bulletin is a description of installations of automatic ore unloaders on the Great Lakes.

Portable and Stationary Mine Pumps. The Deming Co., Salem, Ohio. Bulletin No. 310. Pp. 23; 6¾ x 9¼ in.; illustrated. This bulletin gives information about its horizontal, single and double-acting pumps; typical sizes being selected for each class as an illustration.

New Europe. The Deister Concentrator Co., Fort Wayne, Ind. Map 13 x 19 in. This map gives information about the changes in the boundaries of European countries as a result of the war. The Deister company will be glad to send the map to anyone upon request.

The Blaw System. Blaw-Knox Co., Pittsburgh, Penn. Catalog No. 16. Pp. 128; 6 x 9 in.; illustrated. A book of descriptive text and numerous photographs which illustrate the adaptability of Blaw steel forms for concrete work of all kinds.

Mine Car Lubrication. By E. N. Zern, E. M. Swan & Finch Co., New York. Pp. 18; 5¼ x 8¼ in.; illustrated. A bulletin on various oils and greases and roller-bearing equipment for mine cars. Distributed complimentary by Swan & Finch Co., manufacturers of "Slo-Flo" lubricant.

The "Ironclad-Exide" Battery. The Electric Storage Battery Co., Philadelphia, Penn. Booklet—Form 881-R. Pp. 24; 4 x 6¾ in.; illustrated. This is a sketch of the development of the "Ironclad-Exide" battery, which is a revised and up-to-date edition. It is now ready for distribution.

Cutler-Hammer Mine Duty Apparatus. Cutler-Hammer Manufacturing Co., Milwaukee, Wis. Booklet. Pp. 8; 8½ x 11 in.; illustrated. This booklet makes special reference to the Cutler-Hammer mine apparatus installed in the plant of the St. Louis Smelting and Refining Co., at St. Francois, Mo.

Recent Coal and Coke Patents

Stoker. J. S. S. Fulton, assignor to United Stokers Corporation, Chicago, Ill., 1,285,671. Nov. 26, 1918. Filed Dec. 6, 1917. Serial No. 205,869.

Dustless Ash Sifter. A. C. and C. Notti, Brooklyn, N. Y., 1,286,068. Nov. 26, 1918. Filed June 28, 1913. Serial No. 242,476.

Coal Chute. W. V. Heinz, La Salle, Ill., 1,286,618. Dec. 3, 1918. Filed Jan. 25, 1917. Serial No. 144,387.

Briquetting Machine. W. D. Alexander, Los Angeles, Cal., 1,291,705. Jan. 21, 1919. Filed Oct. 15, 1917. Serial No. 196,568.

Safety Device for Mines. A. G. Biondi, Los Angeles, Cal., 1,292,236. Jan. 21, 1919. Filed Sept. 6, 1918. Serial No. 252,962.

Fastener for Sectional Coal Auger Nuts. J. H. Wenzlick, assignor to Fulton Tool Works, Fulton, Ohio. 1,286,859. Dec. 3, 1918. Filed May 3, 1916. Serial No. 95,625.

Industrial News

Welch, W. Va.—The Central Pocahontas Coal Co., is planning for the immediate erection of about 100 miners' houses at its mines at Capels.

Chicago, Ill.—The Wisconsin Steel Co. is planning to increase the capacity of its coal properties at Benham, as regards new development work. It is proposed to double the present output.

Dunville, Va.—The Merrill Coal Mines, recently incorporated, are planning for extensive operations on their properties near Henlawson. A new connection will be constructed with the Cheaspeake & Ohio R.R.

Powellton, W. Va.—The Elkhorn Piney Coal Co., Huntington, W. Va., is planning for the erection of 32 one- and two-story houses at its local properties for miners' use. Garner Fletcher is manager.

Pulaski, Va.—Notice has been filed by the Heuser Coal Corporation of an increase in its capital from $50,000 to $100,000, to provide for proposed business expansion. C. W. Heuser is president.

Seneca Falls, N. Y.—On Sept. 1 the Goulds Manufacturing Co., of this place, opened a district sales office in Detroit, Mich., in charge of E. B. Gould, who has recently returned after 18 months' service in France.

Canton, Tex.—The Hercules Power Co., now being organized by A. B. Saline and associates, with capital of $10,000,000, will mine lignite coal on a property which has been leased, totaling about 20,000 acres. A byproduct plant will also be operated in connection with an electric power plant.

Bluefield, W. Va.—It is reported that about $200,000 is to be expended by the Ashland Coal & Coke Co. on the erection of a modern steel tipple at the company's plant in the Pocahontas field. The company may also build another tipple during the coming winter.

Cleveland, Ohio—The Atlas Car and Manufacturing Co., of this place, states that the Coast Equipment Co., Merchants' Exchange, San Francisco, Cal., has been appointed the representative for the Atlas company for California and Nevada and requests that all inquiries from this territory should be addressed to them.

Pittsburg, Kan.—The Bucyrus Company, of South Milwaukee, Wis., has established an office at Pittsburg, Kan., for the convenience of coal stripping contractors and coal mining companies in ordering repairs for steam and electric shovels operating in the Pittsburg district. A. M. Nielsen will be in charge.

New Cumberland, W. Va.—The West Virginia-Pittsburgh Coal Co., of Pittsburgh, Pa., has commenced the construction of a new power plant at its La Belle mines; the company is also planning for the construction of about two miles of railroad at the La Belle, Colliers and Gilchrist mines. The work is estimated to cost about $100,000.

Grafton, W. Va.—The Connellsville, Cumberland and Baltimore divisions of the Baltimore & Ohio R.R. are making record movements of coal from this vicinity. About 1,000 cars daily are being shipped from the Fairmont district, about 600 cars per day from the Connellsville section, 300 from the Somerset regions, and about 100 from the Georges Creek district.

Duquoin, Ill.—The Sunrise Coal Co. has announced its intention of resuming operations at its Cambria mine in Williamson County. The plant has been closed down for some time. An increase has recently been made in the capital stock of $50,000. New equipment and machinery will be installed which will increase the output approximately 50 per cent.

Chicago, Ill.—It is announced that the Wood Equipment Co., of this place, will hereafter be known as the Car-Dumper and Equipment Co. It is considered that the new name will better represent the business of this concern whose principal equipment is rotary dumpers for mine and railroad cars. The general offices of this company are at the company's plant 1216-22 E. 75 St., (Grand Crossing) Chicago, Ill.

Clarksburg, W. Va.—The Philadelphia office of the Orr Coal Mining Co., which has heretofore operated mines in the Harrison County field, has been closed following the transfer of all the holdings of that company to the Hudson Coal Co., organized a short time ago with a capital of $1,000,000. A part of the new company's product in the East will be handled by the Fuel Corporation of America.

Pineville, W. Va.—One of the largest companies organized in recent months, especially in southern West Virginia, is the Barnsdall Coal Co., presaging important development in the smokeless field of Wyoming County, in the Guyan district of southern West Virginia. The new company has a capital stock of $1,000,000. It was organized by F. H. McQuiston, C. B. Mehard, A. W. Wall, T. G. McMasters and Frank Braman.

Huntington, W. Va.—Additional coal land in Boone County, W. Va., will be made accessible to development by the construction of 18 miles of railroad through the heart of the timber region of that county, heretofore undeveloped. Announcement has been made of the awarding of a contract by the Pond Fork and Bald Knob R.R. for the construction of the railroad to Boxley Brothers of Huntington. This road will follow the general route of Pond Fork.

Chicago, Ill.—The American Steam Conveyor Corporation, of this place, announces the appointment of Morton McI. Dukehart & Co. as its special representative in Baltimore and surrounding territory, including Maryland, the District of Columbia, and a few counties in Pennsylvania, Delaware, West Virginia and Virginia. The concern representing the American company consists of Messrs. Dukehart and Denise—both power plant engineers of long standing and sales engineers of considerable experience.

Duquoin, Ill.—The United States Reduction and Atomizing Co., are now rushing the construction of their plant for the recovering of the byproducts of coal mined in southern Illinois mines. The plant, which is located near Herrin, in Williamson County, will cost in the neighborhood of $100,000 and will employ several hundred men. The company has also purchased a tract of land adjacent to the plant and will erect houses for their employees.

The method the company will use is a new invention which has not been used extensively in any part of the country as yet. It was lately proved successful by W. L. McLaughlin, of Decatur, Ill., and the U. S. Reduction & Antomizing Co. was formed through his efforts.

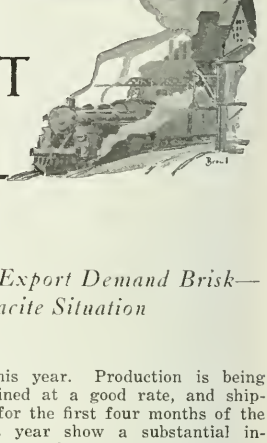
Charleston, W. Va.—The Kanawha & Hocking Coal and Coke Co. contemplates the construction of a tipple at its No. 111 plant at Carbondale. It is said that this tipple will be equipped with conveyors, shaker screens, loading booms and other modern equipment. This company has 6000 acres of coal land leased in Kanawha and Fayette counties and owns in fee, 7000 acres in Fayette County and 14,000 acres in Kanawha County. Eight mines and four coke plants are operated on the Kelly's Creek R.R. The company ships its coal by both rail and river. J. S. McKeever is the general superintendent of the company.

Charleston, W. Va.—Charleston business men are behind a large new company—the Camp Creek Coal Co.—which has been organized to mine coal in Stonewall district of Wayne County. The new company has a capital of $300,000. It was organized largely through the efforts of L. S. Massey, J. Walter Webb, Reed Bigley, L. W. Hamilton and L. A. Tinder. The company has acquired 2030 acres of coal land, the seam being from 6½ to 8 ft. thick. The officers of the new concern are: L. A. Tinder, president; J. Walter Webb and Reed Bigley, vice presidents; L. C. Massey, treasurer and L. W. Hamilton, secretary.

Chicago, Ill.—By order of the Federal Court, the O'Gara Coal Co. has been discharged from bankruptcy and all the property has been turned over to the corporation. This company's affairs will henceforth be conducted by the following officials: Frank H. Woods, president; John B. Russell, secretary; Charles M. Moderwell, general manager. The O'Gara company states that during the period of the trusteeship, the company's properties were put in excellent physical condition and that new machinery and equipment will be constantly added whenever such improvements will assure better preparation of coal or tend to reduce costs. The present capacity of the O'Gara mines is about 15,000 tons a day, with full labor and car supply.

MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Easing Up in Demand Does Not Bring Lower Prices for Soft Coal—Export Demand Brisk—Labor Troubles Interfere with Many Operations—Anthracite Situation Looks Bright—Output Steadily Increasing

ALTHOUGH there was a noticeable easing up in the demand for bituminous coal during the past week, this did not affect prices in the least. Production is steadily increasing, the total tonnage of soft coal mined during the week ended Aug. 23 being estimated at 10,671,000 net tons. If this rate is kept up for the rest of the coal year, much talk of the threatened shortage will go for naught. Maximum production depends on demand and an efficient movement of railroad cars to and from the mines.

The high-grade soft coals are most in request. Inquiries are being made, too, for good grades of gas coal, but only a small tonnage is available. The major part of the tonnage of high-grade coals produced each week is covered by contract.

Many inquiries are coming from England, France and Italy for fuel, the best American coal being specified. Exports of coal to Italy from the United States increased from 10,000 tons in January of this year to 67,000 tons in June.

Mines in the Southwest are losing considerable time because of labor troubles. This is also true of operations in Illinois, where mines are losing a third of their production each week because of extended strikes. Car supply to the mines has shown slight improvement.

The anthracite situation, taken as a whole, looks better than at any other time this year. Production is being maintained at a good rate, and shipments for the first four months of the present year show a substantial increase over the corresponding period of 1918.

Egg and stove sizes of anthracite are most in demand, but the pressure for these coals is easing off somewhat. Dealers in New England are clamoring for more hard coal, and demand from the West and from Lake Ports is also insistent. Output is steadily increasing, however (for the week ended Aug. 23 it is estimated at 1,868,000 net tons), and no particular anxiety is felt as to the outcome if transportation and labor conditions do not interfere with mining.

WEEKLY COAL PRODUCTION

The increase in production of bituminous coal in the week of August 23 to 10,671,000 tons from 9,089,000 the previous week represents a gain of 17.6 per cent. Whereas production in the week of August 16 was 3,000,000 below the corresponding week of last year, that for the week of August 23 is but 3,000,000 below the high level of 1918 at this time. The recovery to a new high level for the year is attributed to a quickening of demand and the abatement of labor troubles, mainly on the railroads.

The production of anthracite, like that of bituminous coal, recorded a good increase in the week of August 23, the output being estimated at 1,868,000 net tons, compared with 1,642,000 tons the week of August 16.

Improved demand was general in the week of August 16, nearly every district reporting less time lost on account of no market than in the preceding week. The general average for the country of time lost because of lack of business declined from 8.8 per cent. in the week of August 9 to 4.8 per cent. the week of August 16. Without reports from the Southwest, where strikes have prevailed for several weeks, the time lost because of labor trouble increased from 4.9 to 9.4 per cent. Illinois mines lost a third of the week because of labor troubles. Southern Ohio, western Pennsylvania, and Fairmont were the only districts to report improvement in car supply, every other district reporting either no change or greater losses of time through lack of cars. The average for the country of mine operating time lost on account of transportation disability was 25.7 per cent. in the week of August 16 compared with 22.5 per cent. in the week preceding.

Beehive coke production continued to increase, the estimated output in the week of August 23 being estimated at 414,683 net tons compared with 387,000 tons the preceding week and 592,800 tons in the corresponding week of last year. Although production of beehive coke this year to date, 12,000,000 tons is 8,000,000 tons or 40 per cent. below last year, the supply appears to be ample to supply the demand.

The drop in production of bituminous coal the first half of August is reflected in the lake movement. The dumpings at lower Lake Erie ports in the week of August 16 are reported as 540,925 tons compared with 973,047 tons the preceding week and 821,983 tons the corresponding week of last year.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods was very largely in excess of the same week a year ago. Orders from road salesmen for immediate delivery were almost double those of the same period of 1918. New lines offered for spring delivery are being accepted in a very satisfactory manner. Customers have been in the house in much larger numbers. Collections are excellent.

American Wool and Cotton Reporter—The August quiet has continued in the Boston wool market during the week under review, but the situation is strong. Demand for fine wools prevails, although there is some request for medium grades. It is largely a waiting game with many of the dealers, and some of them are becoming impatient because medium wools are not called for more than they are at the present time. The actual position of cotton has not changed, although the price is lower.

Dry Goods Economist—Judging from expressions obtained from the members of the Retail Credit Men's National Association at their convention in St. Paul last week, the dry goods and department stores all over the country are enjoying an unprecedented demand. In every section farmers, skilled workers and laborers in various industries are buying goods of higher cost and finer quality than they consumed in former years and they raise no objection to the prices asked. In fact, having no knowledge of the value of the goods, they do not realize the extent to which selling prices have been advanced.

Atlantic Seaboard

BOSTON

Prices firm but market listless. Spot demand very light. Higher grades practically out of market. Low volatiles in fair request at New York and Philadelphia piers. Export and bunker trade steady. Gas coal inquiry not so strong. Hampton Roads loading improves. Anthracite movement continues disappointing.

Bituminous—The market this week shows no material change. Prices are upheld more by the demand in other territory than in New England, for here there is very little inquiry except for small tonnages. There is no comprehensive buying at the moment, although one or two large factors are in the market, presumably trying to cover the arrears on contracts taken early in the season. There is some anxiety also on the part of large steam-users as to possible railroad tie-up in September, but this does not begin to have the influence on buyers that might be supposed. On all grades prices are apparently firm, no weakness having been disclosed. Most shippers, however, report only hand-to-mouth business. Buyers are still reluctant to pay current prices except for spot shipment, and this in spite of car shortages and probable transportation interruptions of more kinds than one.

A thorough canvass of this market shows only a light demand for spot coal. Consumers are resting easily on present stocks, which are ample for the next few months. So much in the industrial situation is uncertain that the smaller buyers especially are disinclined to make further purchasers. Then, too, a large number of steam-users are relying upon contracts made in the spring at prices then current. In some quarters the arrears on these contracts are considerable, but it is doubtful whether there will be the demand in the fall that has been expected from this class of buyers. It remains a fact that this year there is

much more "free" coal available than is usually the case. Operators generally have anticipated an active market and for that reason there are fewer contracts on file.

The demand for low volatiles at the tide-water ports has practically lifted the fancy grades out of the market for delivery all-rail. Prices have been attractive enough to influence this movement and for the most part current inquiries in this market have to be met with only the medium to fair grades that are not so eligible for similar and export trade.

At the Philadelphia and New York piers there has developed a ready market for low volatiles of passable grade. Steamers for offshore destinations have frequently been obliged to wait while coal was accumulated. There has also developed some inquiry for shipment to Long Island Sound ports and along the Maine coast to consignees who have misgivings over the prospects all-rail. Prices at the piers are, therefore, reasonably firm and shippers continue to buy odd lots from one another to make up the tonnage required on their obligations.

At all the ports, Hampton Roads included, the export and bunker trade continues steady, with practically no let-up in the demand. For Pocahontas and New River \$6.00@6.25 is paid with no hesitation, and while that kind of market continues there is small chance of any more of these coals coming to New England than is absolutely insisted upon in fulfillment of old contracts. Apparently the export trade is not expected to slump for several months, if then, and it is the one factor in the present situation that gives any buoyancy to the current market.

Gas coal inquiry is drifting somewhat. There is not the demand that developed a few weeks ago when there were rumors of acute car shortage in western Pennsylvania. Many of the shippers of producer gas coals have refrained from contracting more than 60 per cent. of their normal output and it is quite likely that an amount of free coal in September will have the effect of depressing prices from the premiums paid early in August.

Pocahontas and New River are again moving in fair volume to the Virginia terminals for tidewater dumping. The accumulation of bottoms due to the marine-workers' strike in July has now been cleared up. There is more berth-room available and steamers lately have been cleared with much better dispatch. Receipts at this end continue very light and more than one rehandling pier in New England that last year was bustling with activity is this year idle most of the season. Prices on cars at Providence and Boston show little change. Now that loading conditions have improved at Hampton Roads the item of demurrage has been eliminated for the present.

Current quotations of bituminous at wholesale range about as follows:

	Clearfields	Cambria and Somersets
F. o. b. mines, net tons	\$2.60@3.10	\$3.00@3.60
F. o. b. Philadelphia, gross tons	4.79@5.35	5.20@5.80
F. o. b. New York, gross tons	5.10@5.70	5.50@6.20
Alongside Boston (water coal), gross tons	6.85@7.35	7.10@7.85

Georges Creek is quoted at \$3.70 per net ton, f. o. b. mines.

Pocahontas and New River are quoted at \$6.00@6.50 per gross ton f. o. b. Norfolk and Newport News, Va., in response to export demand. There continue practically no sales for coastwise shipment.

Anthracite—There are few encouraging signs on domestic sizes. Shipments from New York come forward with exasperating slowness and from Philadelphia the movement is practically nil. The Reading fleet is still paralyzed over a wage dispute and in that respect there seems no immediate prospect of change. Meanwhile, dealers all along the coast are waiting with increasing anxiety for coal to come forward.

Not much appears in the newspapers about the extremely light stocks of New England retailers, but before September is half gone it is expected that a howl will go up from consumers who have their coal ordered, but will not be able to get it in. The indications are that there will be increasing pressure for egg, stove and chestnut as the season advances.

NEW YORK

Local dealers are ready to take care of heavier shipments of egg and stove. Receipts here show increase due to railroad troubles in other sections. Final monthly increase takes effect. Bituminous market hit by holiday and demand drops; quotations remain firm. Consumption of oil here increasing. Many new inquiries for coal for export.

Anthracite—The local trade continues to be in the market for considerable tonnages, although shipments show a big improvement. These increased tonnages have gone a long way toward reducing the number of unfilled orders on the retail dealers' books, now so large as they were the past few weeks. Dealers in the New England States claim they are not getting coal as fast as they would like. The fear that they might have to pay higher freight rates before long has led them to urge heavy deliveries both by rail and by water.

Reports of coal handled and on hand coming from Western points are not encouraging. More coal is wanted and shipping agents at Lake ports say their stocks are running low.

The situation as a whole looks better than at any time this year. Production and shipments are strong, and for the first four months of the present coal year show a substantial increase over the corresponding period of 1918.

In this market the sizes strongest in demand are egg and stove, but as previously said the pressure is not so heavy as it was a few weeks back. However, dealers could easily take care of a much larger tonnage. There is a bigger supply of chestnut and pea on hand, but those sizes are by no means a burden. Dealers are willing to take a fair tonnage of these coals is assured of reasonably good-sized quantities of the larger coals.

The buckwheat coals are not plentiful, but this condition is due to the non-operation of the washeries.

Railroad reports show that 6668 cars of anthracite were handled over the local dumps during the week ended Aug. 29, an increase of 426 cars over the previous week. During the first 30 days of August the dumpings were 26,978 cars as compared with 25,542 cars in July and 32,494 cars in August of last year.

The last monthly advance of 10c. per ton for egg, stove, chestnut and pea took effect on Sept. 1, bringing the company prices up to the full winter schedule.

Quotations for company, white ash coals, per gross ton, at the mines and f.o.b. New York tidewater lower ports, follow:

	Mine	Tidewater
Broken	\$5.95	\$7.80
Egg	6.35	8.20
Stove	6.60	8.45
Chestnut	6.70	8.55
Pea	5.30	7.05
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The holiday this week struck the local market and there was falling off in demand. Prices, however, did not suffer and there was no tendency on the part of shippers to dispose of their holdings at prices that indicated sacrifices. Coal at the docks while plentiful was not a drug, and although there were numerous embargoes there was a good movement and prices held up.

The high-grade coals were in good movement and there were many demands for stray lots. Many inquiries were received by shippers of the good grades of gas coal, but there was only a small tonnage available.

Fuel conditions abroad have resulted in local shippers receiving many new inquiries for coal, but the best grades are solicited. The majority of these inquiries come from England, France and Italy, with a good sprinkling from other countries. Importation of coal to Italy from the United States increased from 10,000 tons in January to 67,000 tons in June.

The tendency on the part of coal users to use oil instead has taken hold of many local consumers, and a large number of applications for permits to store fuel oil have been received by the local Fire Department officials. As a result of these applications, which are steadily increasing in number, hearings were begun here on Sept. 3 on a tentative draft of new rules that will govern the storage and use of fuel oils and the construction and installation of oil-burning equipment.

The committee of operators and shippers appointed several months ago to revise the classifications of pool coals have nearly completed their work and a meeting will be held soon at which time the report of the committee will be considered. It is said there will be many changes in the present classifications.

The slackening up in buying did not cause any easing off in quotations. Dealers stood firm and although there were good tonnages of the fair coals on hand here there was no disposition to force its sale.

Lack of cars is coming to the front rapidly. Many complaints are heard and shippers believe they will increase as the season advances.

Dumpings of bituminous at the local railroad terminals during the week ended Aug. 29 were 5830 cars as compared with 5427 cars the week previous, an increase of 403 cars. There were 25,480 cars dumped here during the first 30 days of August as compared with 24,555 cars in July and 31,297 cars in August of 1918.

Quotations on the various pools range as follows: Pools 1 and 71, \$5.85@6.10; Pool No. 9, \$5.85@6.10; Pool No. 10, \$5.75@5.85; Pool No. 11, \$5.50@5.65; Pool No. 18, \$5.25@5.35.

Quotations for the various grade of coals, spot delivery, range about as follows:

	Spot
South Fork (best)	\$3.25@\$3.50
Cambria (best)	3.00@ 3.25
Cambria (ordinary)	2.70@ 2.90
Clearfield (best)	3.00@ 3.25
Clearfield (ordinary)	2.70@ 2.90
Reynoldsville	2.70@ 2.90
Quemahoning	3.25@ 3.50
Somerset (best)	3.00@ 3.25
Somerset (poor)	2.65@ 2.75
Western Maryland	2.50@ 2.75
Fairmont	2.35@ 2.50
Latrobe	2.60@ 2.65
Greensburg	2.50@ 2.60
Westmoreland, ½ in	3.50@ 3.75
Westmoreland run-of-mine	3.20@ 3.35

PHILADELPHIA

Anthracite trade stirred by early cool spell. Dealers urged for delivery. Small stocks on hand except pea. September prices in effect. Individuals make advances. Egg and stove lacking, nut nearly all gone, and pea being called for. Car supply good. Idle cars to be put back. Steam sizes due for early improvement. All collections satisfactory. Bituminous very active. Car shortage affects deliveries. Some prices increase. Some complaints of poor coal.

Anthracite—A sudden spell of cool weather, unusual for this time of the year, struck the city and made the people think of their coal needs. Most dealers in accepting new business are strictly insisting that the price shall be that when delivery is effected. On account of the early arrival of cool weather the dealers are considerably upset at conditions as they exist, as they felt certain they would receive good shipments of coal before now. There is no promise of relief for the immediate future, as with the holiday intervening this week the production is cut down just that much.

As to September prices, the companies strictly adhered to the policy as announced last May and added the final 10c. to the price at the mines, which now makes their winter schedule in effect presumably until Apr. 1 next. A number of individual shippers added advances of 25c. a ton, and the majority of them are now 75c. above company circular, with a few still higher than that. One large independent concern added 75c. for September, but as it had been selling at company prices all during August, this increase places them on the same level as the other independent shippers. It is not believed that the Independents have reached the top as yet, for there is no doubt as the season advances and coal becomes more in demand they will make still further advances.

There is a never-ending cry for stove coal, and all summer long this has been partly met by the retailers persuading their customers to take nut in its place; but lately the call for chestnut has been so strong that even this size is becoming scarce. A few weeks ago it seemed likely that most dealers would be able to accumulate fair stocks of this latter size to carry them into the winter; now it would appear that this will not be possible. There has not been the slightest improvement in egg coal, either, and it is beginning to appear that it will be a difficult matter to fill all the orders for this size.

Pea continues to be quite plentiful, but as is always the case with the advent of cool weather, the first calls for coal were for this size. Of course, this was quite moderate and every dealer was able to take care of the demand, but it is only indica-

tive of what will happen when the weather becomes settled. One of the large companies reports considerable improvement in the call for pea, and in some instances has not filled all orders during the past week. With this in mind many of the individual shippers had seriously under consideration the plan of adding to the price of this size, and it would occasion no surprise if they increased the price of pea before the end of the month.

As yet there has been no particular trouble with the car supply at the mines, and the production has been keeping well up to that of the last normal year. Many dealers, however, do not hesitate to say that it is a mistake to compare this year to 1916, as this does not take into account the natural increase in consumption, nor the fact that this district still continues to house the greatly increased population brought here by war activities in the industrial plants. They admit that much coal is stored in the cellars, but it will still require a much greater tonnage than 1916 if this city is to be spared suffering from a shortage the coming winter. As to the car supply, so far there is a sufficient number to be had, but no dealer is in position to ask for any particular kind of equipment, although shippers try to avoid classes of cars which they know will give their customers added expense to unload. This, though, is becoming more difficult, as it is rumored the railroads are hard pressed as it is to give the mines the exact number of cars they want. It has been stated that it has been about decided to place in service the many wooden cars with a capacity from 25 to 28 tons which were taken out of service and stored along the sidings. One road has 3000 of such cars lying idle along its lines. While this would not help the production in any way, it would in a manner be an aid to the shippers in helping them to spread the production over a wider territory, as with the wooden cars it would mean practically two cars in place of one of the 50-ton capacity, for as one shipper said, "a car is a car whether it contains 25 tons or twice as much."

Taking the steam trade as a whole it can be said to be in good shape, with nearly all buckwheat coal being taken, and it is expected from this time onward that buckwheat will show gradually increasing strength. It is not believed it will be more than six weeks or two months before the storage yards will be called upon for this size. Rice and barley remain practically unchanged from the past two weeks, but there is no question that these sizes will also begin to show gains along with buckwheat, although it is not expected that there will be any shortage due to the vast quantity in the storage yards, occupying spaces which in normal years have been taken up with prepared sizes.

Collections by the shippers and dealers are in fine shape. Very few report any outstanding accounts and such as do become overdue are quickly adjusted in a way which the shippers have in these times.

With the increase of 10c. per ton on Sept. 1 the prices per gross ton f. o. b. cars at mines for line shipment and f. o b. Port Richmond, are as follows:

	Line	Tide		Line	Tide
Broken	$5 95	$7 80	Buckwheat	$3 40	$4 45
Egg	6 35	8 20	Rice	2 75	3 65
Stove	6 60	8 45	Boiler	2 50	3 50
Nut	6 70	8 55	Barley	2 25	3.15
Pea	5.30	6.90			

Bituminous—There is all kinds of activity in the trade, as car supply is making itself more and more felt. Many brokers who have made heavy commitments on the better coals are having difficulty in meeting their orders at this time. There have been quite a number of advances in the good coals, with contract customers calling on their shippers for full supplies. Many of the consumers feel they are being slighted since the market price has gone well beyond the contract figures and they are urging for full deliveries on their orders. Very much of this is brought about by the impending labor troubles on the railroads, with every one trying to stock up at the last minute. The only coals which have not been affected strongely by price changes are the Fairmont grades, but this is purely a local condition due to an embargo at the piers turning some of this coal loose on the spot market.

An unpleasant feature of the trade now cropping out is the increasing complaints of poor coal received from consumers who have taken a chance in buying unknown coals on the spot market. In some instances the complaints were due to coal shipped without preparation, and in others the fuel was from openings that never could find a market in ordinary times and have just recently opened up to take advantage of present conditions.

There continues to be a fair export business, and this week several good cargoes cleared for France and other transatlantic ports. However, there seems no immediate hope for increasing export business with ships so scarce. There is much business offering and such as has been accepted has been at good prices.

The prices per net ton ruling at this time are approximately as follows:

Georges Creek Big Vein	$3.40@3.55
South Fork Miller Vein	3.40@3.55
Clearfield (ordinary)	3.10@3.20
Somerset (ordinary)	3.00@3.15
Fairmont lump	3.25@3.35
Fairmont mine-run	3.10@3.20
Fairmont slack	2.50@2.65
Fairmont lump (ordinary)	2.90@3.00
Fairmont mine-run	2.70@2.80
Fairmont slack	2.50@2.65

BALTIMORE

A fair to good car supply sends through increased tonnage and eases off steam coal market. Heavy export demand holds up gas coals. Hard coal men in doubt as to September schedule.

Bituminous—From western Maryland, West Virginia and western Pennsylvania come reports of a much better car supply. Most of the mining regions say that the run is from fair to good; although there are still some complaints of shortage. The much improved run of coal to tide is having its effect on the market, especially as to steam coals. The domestic situation is not brisk by any means and the increased call for bunker coal is more than covered by the additional receipts. A very heavy export demand is holding up the gas-coal market as a whole, although even that is a little softer than the week previous by reason of the improved run of coal. The heavy export movement is shown by the fact that more than 72,000 tons was loaded for foreign account the week ending Aug. 23, and, while official figures are not available, it is probable that the August total loading will exceed that of July, when 258,495 tons was dumped over the piers here on foreign account, the largest total since June of 1915. At present the trade is simply flooded with foreign orders, the only hitch being in getting vessels promptly and the question of establishing credits. Prices in the trade at the mines are about as follows. Steam Coals—Best, $3 25@3.40; good, $2.90@3.00; fair, $2.50@2.75; poor, $2.35@2.40. Gas Coals—Best three-quarter, $3.50; medium sulphur, three-quarter, $2.60@2 75; run-of-mine, $2.40.

Anthracite—Just what price hard coal will bring in this locality through the month of September is uncertain. When the advance of 25c. a ton was made Aug. 1 the trade figured generally on the same rates for September. Now the constantly advancing premiums on independent coal combined with the fact that many dealers are not getting the proportion of one car of company coal to two of independent coal, as originally figured, is upsetting calculations. With independent premiums running from 75c. to $1, and even more asked at times, the trade claims that the gross margin of profit is now considerably belor the $2.50 allowed back in Fuel Administration control days. While there was some improvement in the run of company coal in August, the increase did not come up to expectations. It may be necessary to fix a new retail schedule during the month of September as a result of the conditions here.

Lake Markets

PITTSBURGH

Byproduct coal easier but still high. Steam and gas unchanged. Domestic demand slightly expanded.

The pressure for prompt lots of coal for byproduct coking has eased off in the past week, steam and gas coal are fully as strong as a week ago, and a little more demand is beginning to appear from retail dealers for domestic coal. There would probably be more demand for domestic coal from householders desiring to stock up against natural gas shortage in the winter were it not for the educational campaign the gas companies recently waged, urging that by the coöperation of the gas companies and the consumers a serious shortage could be averted. The aid of the consumers was to be along the line of installing the most economical gas-using appliances, while the aid the gas companies were to furnish was along the line of mixing manufactured gas with the natural product. The gas companies already have one gas-making plant in operation and promise others. The paid advertisements carried in the daily newspapers did not mention the fact that the manufactured gas has less heat units per cubic foot than natural gas.

About ten days ago Connellsville coal for byproduct coking brought as high as $3, but in the past few days $2.85 has been the highest price obtainable even for small prompt lots. Pittsburgh district coal for byproduct work brings good prices but not altogether as high as commanded by Connellsville coal.

Coal shipments in the lake trade are gradually decreasing and the decrease will be more rapid in the next few weeks, affording a larger volume for the line trade. The market is quotable the same as last week, prices being as follows except for occasional premiums paid on small prompt lots: Steam slack, $1.90@2.10; gas slack, $2 15@2.40.; steam mine-run, $2 35@2.60; gas mine-run, $2.75@3; ¾-in. gas, $2.90@3 20, per net ton at mine, Pittsburgh district.

TORONTO

Supplies still short of demand. Cool weather brings increased orders. Nut and egg substituted for stove coat. Serious car shortage feared. Bituminous demand light.

There is little change in market conditions. Supplies of anthracite coming in slowly and being still far short of requirements for filling orders in hand. The demand for anthracite shows some increase with the setting in of cool weather, which has rendered consumers anxious to secure their winter stocks.

Stove coal, being unprocurable except in cases where orders have been placed earlier in the season, egg and nut are being largly accepted as substitutes. The outlook as regards transportation facilities does not appear any too favorable, and dealers are disposed to anticipate that the difficulties due to car shortage will be greatly increased as soon as the movement of the Western crops has fairly set in. The call for bituminous continues light. Most consumers buying only for immediate requirements.

Quotations for short tons are as follows:

Retail	
Anthracite, egg, stove, nut and grate	$12.50
Pea	11.00
Bituminous steam	8.00
Slack	7.00
Domestic lump	10.00
Cannel	11.50
Wholesale f. o. b. cars at destination:	
Three-quarter lump	6.25
Slack	5.15

BUFFALO

Local bituminous prices still below Pittsburgh prices. Cars generally scarce. Demand not improving. Fair trade only. Anthracite moving slowly. Strike hurts lake trade.

Bituminous—The trade is still moderate. Shippers do not see any improvement in the demand and are afraid that it will not start up this fall, as it was confidently expected to do last spring. As time goes on the talk of a boom dies out. Really, nobody here is anxious to see a rapid trade, for that means always stagnation later on. What all would be glad to see is a steady trade, about such as we have now, with all markets on a level and nobody trying to boom the situation.

The car supply continues to run down. A few shippers find it adequate, but they are especially favorably situated in some way and are quite the exception. It is feared that when the fall grain movement is on, the shortage will make it hard to supply consumers at all promptly, if at all, yet the consumers will not heed the warning, and refuse to stock up. They are looking for Government interference, if prices go higher, and think they are safe.

Visitors to Pittsburgh find the trade there more or less excited, with shippers trying to shove prices up. The export trade is looked on there as sure to create a scarcity of coal if the car shortage does not. Slack is higher than it was, and all sizes are also strong, with mine-run about out of the market.

The quotations given out by the Buffalo trade are as follows: $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh lump, $4.65 for same three-quarter, $4.20 for mine-run and $4.10 for slack, with $4.60 for smokeless and $5.60 for Pennsylvania smithing, all per net ton, f.o.b. Buffalo.

Anthracite—The supply does not improve; the demand incresaes. Several days of cool weather have added to the rush for coal, but the distributors are able to report a supply only about every other day. It

does not look now as though the situation was going to change right away, if at all, which means that the clamor for coal will go on all winter and yield only to the sunny days of early spring. At the same time it may happen that the supply will be sufficient to meet all real needs. Whether people are hoarding more coal than they need is doubtful; and if they are the demand will slowly run down, as one after another gets a supply.

The failure of independent anthracite to come this way as it used to is much regretted. None of the jobbers has been able to get any of account this season, so it is supposed that it finds an easier market in the East than in this direction. This reduces western tonnage materially.

Naturally the lake trade falls off, as the strike of sailors and handlers at Duluth and Superior has tied up all the coal cargoes going there of late and shut up these ports to the trade. At last accounts the iron ore handlers have returned to work, but the coal handlers have not. Loading of anthracite here in the lake trade was only 89,200 net tons, of which 28,100 tons cleared for Chicago, 17,800 tons for Milwaukee, 14,600 tons for Green Bay, 1000 tons for Pt. Arthur, 7800 tons for Sheboygan, 7000 tons for Waukegan, 3000 tons for Ft. William and 1000 tons for Hancock.

CLEVELAND

Operators continue to be hard pressed for supplies. Car supply at southern and eastern Ohio mines is slightly improved, but production seems not to have moved upward with the additional cars provided by the carriers. The lake trade is about normal again.

Bituminous—Labor troubles appear to have been practically entirely eliminated in northern Ohio, and coal consumption is reported to be at the highest point now of any period since the peak of war activity. Some operators believe steam coal just now is being consumed faster than it is being delivered—a condition far from normal for the early fall. Just what continuation of this condition into the winter, with its added transportation and mining difficulties, will bring forth operators hesitate to predict. Most of them expect to see prices go rocketing despite present agitation and efforts to keep commodity costs down.

For a reason operators say is entirely unknown to them, the supply of cars at southern and eastern Ohio mines has been much improved the past few days. Production, however, has not been increased proportionately, due to the unrest among mine labor. With demand in the district as high as ever, prices on all grades of steam coal have been advanced 5 to 10c. a ton. Consumers now are not bickering over prices, and appear to be glad to get supplies.

Talk that United Mine Workers at their convention in Cleveland will demand nationalization of the industry appears not to be causing much alarm here. Just where the proposed 30-hour week will lead to operators profess to be ignorant, but sentiment among the mine owners is unanimous that such a demand is beyond all reason. Several say nationalization is preferable to the lot of a mine operator working a 30-hour week and attempting to keep prices on a reasonable level.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg	$11 35@11.80
Chestnut	11.65@11 90
Grate	11 45@11 75
Stove	11 55@11.80
Pocahontas:	
Forked	9 50@9 75
Lump	8 75@9.00
Mine-run	7.50
Domestic bituminous:	
West Virginia splint	8 00@8.25
No. 8 Pittsburgh	6 60@6.90
Massillon lump	7 60@7.95
Steam coal:	
No. 6 slack	4 60@4 80
No. 8 slack	5.10@5.50
Youghiogheny slack	5 25@5.50
No. 8 1-in. lump	5.70@6.00
No. 6 mine-run	4.75@5.00
No. 8 mine-run	5.20@5.45

Pocahontas and Anthracite—Dealers have been receiving a little more Pocahontas than usual the past few days, but the supply continues far inadequate. Most dealers claim to be getting not over 15 per cent of their requirements, and are five to six weeks behind on deliveries. Prices are unchanged, but firm.

Lake Trade—With the upper lake coal docks again in practically full operation, the bituminous coal end of the lake trade is back in full swing. But even now that shipments have been resumed and vessel tonnage is plentiful for the time being, the demand is not what would be expected for early fall. Efforts to move coal off the upper lake docks have largely been failures. With iron ore in as light demand at the lower lakes as coal is at the upper lakes, the movement in November may be negligible, with December entirely out, some operators say.

DETROIT

Sales of bituminous have not yet attained the volume that jobbers say is necessary to assure adequate winter supply.

Bituminous—Though considerable business is being handled in steam and domestic bituminous in the local market, the aggregate should be made materially greater, the jobbers say, to make certain that the requirements of all consumers will be adequately supplied. The steam-coal trade is still reflecting the dilatory policy of a number of the manufacturing plants and other consumers.

Some of the jobbers say that despite the seeming indifference here, they are placing about all the coal they can obtain with customers elsewhere. They are inclined to lay stress on the fact that those of the local users of steam coal who encounter difficulty in meeting their requirements at a later date will have only themselves to blame.

It is a matter of comment also, that the transportation situation seems to be gradually developing a condition of troublesome car shortage, especially in the West Virginia and Kentucky districts from which Detroit draws a large proportion of its supply of the better grades of coal.

As most of the business is now transacted in shipments direct to the consumer from the mines, there is no great amount of unsold coal on tracks, such coal apparently having little influence as a market factor. Smokeless is in very limited supply. Mine-run is reported selling on the basis of $3.60 per net ton, f.o.b. mines. Hocking domestic lump is held at $3, with nut bringing from $2.50 to $2.75, mine-run about $2.25 and slack $1.60 to $1.75. West Virginia four-inch lump of good quality is quoted at $3.50, while the two-inch lump ranges from $3.25 to $3.50. Mine-run is offered at $2.75 and slack sells at $2.25 to $2.50.

Anthracite—Household consumers of anthracite are not crowding into the market, though dealers believe a considerable amount of the winter fuel supply has been distributed. Stocks in dealers' yards are low and are not being replenished as promptly as the dealers would desire. The mines, they say, are slow in filling orders and there is much complaint about shipments delayed in transit. Several large retail dealers are following the policy of declining to book orders that they are unable to fill from stock.

COLUMBUS

The Ohio coal trade exhibits considerable strength in every department. Buying on the part of retailers and steam users is rather brisk. Production is considerably curtailed by the increasing car shortage.

While more uniform prices are prevailing, there is no lack of strength and a considerable volume of business is reported on all sides. The worst factor is the growing car shortage, which is reducing the output in all fields and is causing some uneasiness among large consumers. All roads are now suffering from lack of equipment, and it is estimated that no district has more than 50 per cent supply. This condition is causing a much stronger demand for steam sizes, and buying is active. Purchasers generally are asking for immediate shipment as the coal is needed in the near future.

The eastern Ohio field is probably in the worst shape as regards car supply, with only about 40 per cent of needs supplied. Pomeroy Bend and the Hocking Valley are also suffering. On the Toledo & Ohio Central, Zaanesville & Western and Kanawha & Michigan the shortage has reached an acute stage. Other fields have their production curtailed to a low point and no immediate relief is in sight.

Domestic business is active in all sections. Retailers are generally short of stocks and are ordering whenever delivery can be assured. Pocahontas and West Virginia splints are quite scarce and prices are ranging high. Hocking lump is now being brought into its own, and a considerable tonnage is moving for domestic use. Pocahontas lump, when it can be secured, is retailing at $7.50 and mine-run at $7. Splints are between $6.50 and $6.75, while Kentucky grades are at the same levels. Hocking Lump is selling between $5.75 and $6.

Steam business is showing marked strength, which is something different from the tone of the trade some time back. Screenings are stronger and prices at the mines range up to $2 and sometimes even higher. Hocking lump is selling at $3.25 to $3.50 for large sizes and $3 to $3.25 for 1¼ in. Mine-run is quoted between $2.10 and $2.50. Reserve stocks in the hands of the larger steam users are not large, and some are concerned as to future supply. Some shutting off in demand, due to strikes, is reported, but generally speaking the demand is strong.

The lake trade is slowing down under the influence of car shortage. Loadings at the various lower lake ports are now as large as formerly, and with a fair tonnage yet to be moved it appears that the trade will run later than was expected. The interior movement off the upper lake docks is reported as improved.

CINCINNATI

Demand for coal is now so urgent that dealers find it impossible to supply their customers' needs. Many grades now high in price. Railroads confiscating coal.

No improvement has been noticed in the coal-car situation in this territory, conditions on the L. & N., C. & O., N. & W. and the Southern being anything but pleasing. With the car shortage coming on top of the unprecedented demand from all sides, operators and dealers in this section see little hope of the situation clearing up in the very near future. The demand is such that it is next to impossible to supply it.

The situation among the local retail dealers is serious. The domestic trade, which would not hearken to the pleas of the coal men in the early spring and summer is at last awakening to the seriousness of the situation, and as a consequence the demand upon the retail dealers has become tremendous.

About the only thing that keeps the retailers in business right now is the fact that they can get some small shipments which they manage to divide equally enough among their patrons to satisfy them for the present at least. With all dealers doing the same thing and adding their excuses of all kinds, things manage to keep moving, but for how long nobody knows.

Many of the companies have withdrawn from the market. The highest grades of Kentucky and West Virginia block have gone so high that they no longer are quoted. Most companies quote mine-run at $2.25, but have none for sale. West Virginia block sold by one company at $4.40, although the average is about $4.25.

There is much complaint from the operators along the N. & W. that the railway is confiscating every pound of nut and slack produced along the line, causing, they say, the increases on nut and slack and mine run. Industries of all kinds are clamoring for coal to continue operations, but with the car shortage, labor difficulties and what not, the chances of getting full supplies right now are mighty slim.

LOUISVILLE

Establishment of maximum prices by mine operators principal feature of the week. Two-day production and heavy demand resulting in mines being oversold and withdrawing from market.

A number of the reputable coal mine operators of eastern Kentucky, especially in the Harlan district, have taken the bull by the horns, so to speak, and have announced that they would sell no more coal of any grade for the present at more than $4 per ton at mine. Coal had been advancing until it was worth $4.50 to $5 at many mines, with some operators planning to go over the $5 mark in September. However, two-day operations, due to shortage of cars, resulted in a better demand for such steam sizes as is produced at higher prices, and the operators decided that in view of the stronger steam prices they would hold block coal prices down to $4, which is the maximum for all grades.

However, this is not helping the retailer or consumer much, as the mines for the most part are oversold, and are delivering on old orders and contracts. New business taken will be at $4, and an effort will be made to take care of old customers. This reduction was not entirely due to philanthropic motives, but partly due to the fact that coals from other sections were coming in at lower prices and shoving eastern Kentucky out of certain markets, Louisville being one of them. Due to the fact that West Virginia pool territory mines are getting a larger car supply than eastern Kentucky and Tennessee, there has been a

good deal of West Virginia coal coming on the market at around $3.50 per ton at mine. These car pool mines have been seeking markets, whereas the eastern Kentucky mines have been staving off business as they could not take care of it. In reducing prices and then refusing to take business that they cannot fill, they cannot be charged with hogging prices. The situation is about the same and prices were really advanced to stave off business, but resulted in the operator being condemned.

Jobbers are getting all that the market will stand, and that is a price of $5@5.25 for block coal in some instances. A few operators in eastern Kentucky are still asking high prices, but while there is no signed agreement and hardly a gentleman's agreement, the larger operators are determined not to be responsible for high prices, or accept the blame.

In a retail way the situation is distressing. Retailers have delivered a good deal of coal, and there is still a fair demand, but prices are out of line. One operator, who is selling coal through a mine-owned-retailing company in Louisville, has refused to raise prices, with the result that retailers are selling coal that cost them $4.50 a ton at $7 a ton, after paying $1.60 freight and war tax, and making deliveries, etc. They are losing money on every ton delivered. Some of the leading retailers claim that they haven't any coal in their yards, and that they should have a 5,000 to 10,000 ton stock. This will mean trouble in the dead of winter, but conditions are unsettled and retailers are afraid that the Government may step in and force prices down again, which would catch the retailer with a large stock of coal on hand, bought at far above the old Government level.

However, a few retailers claim that they will advance prices all around by 50c. a ton within the next ten days, and will let coal stock on their yards before they will sell it for less, as they will stand a chance of selling it at a profit next winter.

BIRMINGHAM

With a slightly better car supply coal is moving better than last week, but there is no material improvement in demand for steam. Domestic continues strong, there being practically no free coal to be had.

Aside from a somewhat better supply of equipment for moving coal from the mines, there is practically no change in conditions in this district. High-grade steam coal, such as Pratt, Black Creek, Cahaba and the like, is being taken up to the limit of production at the mines, but the medium and lower grades are dragging on the market and hard to dispose of. Pratt mine-run is quoted at $2.85@3.00; Black Creek and Cahaba $3.25@3.45, Big Seam $2.25-@2.60.

It is almost impossible to buy a car of lump or nut coal in the district, the mines being pressed under present operating conditions to take care of contract customers and are unable to produce any free coal. Almost any price could be obtained by the producer having any of the domestic grades to offer in the spot market.

Mines in the district are not obtaining over a 60 per cent. car supply, and according to the prediction of Regional Director Winchell this percentage is not likely to be exceeded in the near future. Mr. Winchell is exercising every effort to maintain an equitable distribution of coal-car equipment in this and other southern producing centers. It being asserted that there are as many coal cars in the southern fields as there were a year ago, when production in this district was practically twice the tonnage that is being mined now. Faulty distribution and the diversion of coal-carrying equipment for other classes of freight is thought to be the principal trouble.

The Railroad Administration has published rates via the Warrior River to New Orleans and Mobile, which are 20 per cent. less than the all-rail rate, being $1.60 to New Orleans and $1.28 to Mobile. Some mines in the Warrior field will be greatly benefited by the reduced rate provided by water transportation.

Coke

CONNELLSVILLE

Advanced market well held, but turnover now light. No more ratio contracts.

The coke market has been relatively quiet in the past week as to actual turnover, but the advanced prices attained more than a week ago have easily been held, spot and prompt furnace coke standing at $4.75, against $4 or less prior to a fortnight ago. The heavy buying demand that absorbed the rather large tonnage of coke standing on track seemed to disappear contemporaneously with the much higher asking prices that developed promptly upon the surplus being absorbed, but on the other hand operators seem to have had difficulty in maintaining production at rates necessary to take care of contracts and thus no surplus has developed. Such a surplus might have depressed prices, for the coke market is always very sensitive to slight differences between demand and supply. The operators feel, of course, that they are easily entitled to $4.75 for coke, when Connellsville coal for byproduct coking recently brought as high as $3, and now commands prices up to about $2.85, but they do not seem to give full weight to one factor, which is that while coke cars are in moderately good supply coal cars, particularly for the Connellsville region, are very scarce. Some brokers assert that it is car shortage, and nothing else, that makes Connellsville coal bring what it does.

It has become clear that the Connellsville coke operators exercised poor judgment when they sold large quantities of coke on contract for the present half year on a ratio basis, relative to pig iron. They expected pig iron to advance, while the furnaces had their doubts and were therefore quite willing to buy coke on the basis of the price being settled each month at 6¼ net tons of coke at ovens to one gross ton of basic pig iron at valley furnaces. Pig iron has stayed at $25.75 and coke under such contracts has therefore stayed at $4.12. If the coke operators had been bullish on coal, which they ought to know more about, instead of being bullish on pig iron, they would have fared better. They would not think now of selling coke for the remainder of the year on a ratio basis, but there is hardly any demand since the furnaces now idle are disposed to wait for more settled industrial conditions, particularly as to labor, before they think of blowing in.

Foundry coke continues very strong, with a moderate demand for spot and prompt lots and relatively light offerings. We quote spot or prompt furnace coke at $4.75 and spot or prompt foundry coke at $5.50@6.25, depending on brand, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Aug. 23 at 240,440 tons, an increase of 4258 tons.

Buffalo—The trade is quiet. Furnaces are running at about normal speed, but they are not buying liberally, as the future of the iron trade must be cleared up somewhat before much venturing is indulged in. The prices remain as before, as they are based on coals as follows: 72-hour Connellsville foundry, $7.60; 48-hour furnace, $7.25; off grades, $7; domestic sizes, $6.75; breeze, $5.75. The movement of iron ore has been much interrupted by the handlers' strike, so that during the past week only two cargoes have arrived here of the 13,100 gross tons total.

Middle West

MILWAUKEE

Coal market extremely quiet, with cargo arrivals slow, on account of the Lake Superior dock strike.

The coal market is extremely quiet at present. There is little animation at the docks, as cargo arrivals are at a low ebb on account of the strike at the iron ore docks, which ties up carriers. A rush is expected, however, when the ore traffic is resumed. There is room for improvement in the demand for soft coal from the interior. Docks are piled high and a better outer movement would be welcomed. Scarcity of popular household grades of anthracite and bituminous hampers small dealers, and city deliveries are sluggish. Receipts by lake thus far aggregate 519,364 tons of anthracite and 1,898,129 tons of soft coal. Anthracite leads last year by 146,048 tons, but bituminous receipts are now 52,234 tons behind 1918.

A municipal coal plant has been established at Eau Claire, Wis. The domestic grades of hard and soft coal will be handled at as near cost as is possible.

ST. LOUIS

Strikes in the Standard and Mt. Olive fields attaining serious proportions. Rebellious miners threatening workers and closing mines. Very little coal on the market and demand extremely easy. Country coal light. Signs of impending shortage serious.

The situation in the St. Louis market is unchanged as far as the supply of coal from the Standard and Mt. Olive fields is concerned. The early part of the week, as different mines resumed operations and it was found that the strike leaders were not permitted to work, a new series of strikes took place. At other mines, because the fines were not to be remitted, the miners went out. Toward the end of the week these elements by main strength and threats closed down several other mines in both fields. On Wednesday and Thursday they marched in bodies of from 200 to 400 strong to the mines that were ready to work and prevented the miners from going down, and at other mines they stood guard until the men came up in the evening and threatened them if they resumed work the next morning. In the Standard field they called out several engineers, firemen and pumpmen, and the mines are filling up with water. The workers are more rebellious now than at any previous time against the officials of the state organization.

It is evident that some of these miners at no time since they went on strike made up their minds to resume work. The radical element around Belleville is opposed to working until the general conference between the operators and the miners takes place in Cleveland, and believe the mines should be shut down until that time. Furthermore, the trouble makers have threatened that there will be a disruption of the state organization if Farrington and his followers are to hold office. It is the most critical time that the Illinois organization has ever faced, and it is going to take an extremely strong man to master the situation. It will call for the expulsion from the Illinois fields of the Socialists or Bolshevik members of that organization.

The peaceably inclined miners in the Standard and Mt. Olive districts are afraid to go to work. They are even afraid to voice their sentiments in their local meetings.

A few mines in the Mt. Olive field managed to continue work, and in the Standard field a few of them were working until the close of the week, but the strikers openly boasted that these mines would be idle the coming week if they had to use force to compel idleness.

This strike, however, is not likely to touch the lower Illinois fields at all. It will be confined to the Standard and Mt. Olive fields, and possibly Springfield, where some of the miners are on strike now.

Even with the few mines that are working in the Standard district, the Illinois Central is unable to give them equipment to work every day. The incompetent manner in which this railroad is being handled would discredit any national government supervision. The public in the Middle West, after watching the railroads in the Illinois coal fields, are fully satisfied that the Government cannot take over any kind of an industry and manage it properly.

The demand is easy locally for domestic coal, with very little call for anything. The steam demand is also light. Most of the plants are using their storage supply. The call from the country for domestic coal is good, but it is in vain. Country steam coal is easy, except from the south.

There is no change in the price in the Mt. Olive field, although Standard, the little that could be obtained, was selling as high as $2.75 for 2-in. lump and $3 for the 6-in. lump, with screenings from $2 to $2.25.

In the Carterville field of Williamson and Franklin Counties the only trouble has been the lack of cars. Some mines have been working one day a week on the Iron Mountain. The other mines that had equipment were compelled to load railroad coal. The railroads had ample time in the summer months to store coal, but they did not do it. Now the Government gives the railroads the right to confiscate coal or to refuse cars to a mine unless the mine agrees to load railroad coal.

The service on the Iron Mountain is extremely bad. It does not, however, begin to compare with the Illinois Central. The Burlington and the Chicago & Eastern Illinois are giving good car supply and fairly good service.

The tonnage at all mines is light on account of lack of labor, and no mine in the field is working full time, even at the mines that have four roads. The railroad tonnage is extremely heavy.

There is a market for everything produced at the circular price, even with the independents.

In the Du Quoin field similar conditions exist, except that the mines get very little working time, being exclusively on the Illinois Central rail.

There is practically no anthracite coming into St. Louis and no orders are taken for future shipment. Smokeless is cut off altogether.

COAL AGE

Volume 1 New York, September 11, 1919 Number 11

Labor Seeks a Six-Months' Armistice

A committee appointed by the New York State Federation of Labor to investigate the high cost of living reports in part as follows:

YOUR committee does not intend to burden you with a tiresome dissertation on the causes of the high cost of living. They are patent to all thoughtful men. The representative business men with whom your committee conferred presented facts and figures to show that the high cost of living is due to the high cost of and decrease in production. These facts were well known to your committee.

Your committee is convinced that this condition is all wrong and cannot be permitted to continue unless we—and by "we" your committee means not labor alone but the people of the whole United States—wish to invite a disaster unparalleled in history. The people must be given a breathing spell.

There must be a suspension of struggling for class and party advantage. All Americans must bend their backs to their oars and pull steadily together against the storm-tossed waters until our boat again rides safely on the placid sea of prosperity.

The part that labor can play in bringing tranquility and prosperity to our industrial life has been pointed out by recent events.

The President of the United States in a message to his fellow-citizens on August 25, refers specifically to the threatened strike of railway shopmen and makes a plea which may advisedly be considered as applying to industrial disturbances generally. The President said:

"Only by keeping the cost of production on its present level, by increasing production and by rigid economy and saving on the part of the people can we hope for large decreases in the burdensome cost of living which now weighs us down."

As a result of President Wilson's appeal, backed by the attitude of Samuel Gompers, president of the American Federation of Labor, and the leaders of the railway brotherhoods, the threatened railroad strike was averted and the country spared a terrible tragedy.

On every hand there are strikes and threats of strikes. Most of these disturbances have been provoked by radical agitators who have not the interests of the toilers at heart, but who seek to promote industrial warfare for the purpose of destroying our present economic system and substituting "industrial ownership by the proletariat."

Fortunately, the same leaders of organized labor have, after a short period, succeeded in regaining control of their temporarily rebellious unions and restoring orderly procedure under the laws and rules of the American Federation of Labor.

The conduct of men who call themselves loyal supporters of trade unionism in breaking away from the authority of their duly elected officials and inaugurating uncalled for, unnecessary and unauthorized strikes should at all times be severely condemned and the agitators who foment such outbreaks should be visited with the severest penalties possible under trade union rules.

For trade unions to permit themselves to be brought under the influence of lawless agitators at this time of national stress is treason not only to the principles of trade unionism but to the United States of America. It would not be too severe punishment to revoke the American Federation of Labor charters of such unions and put them outside the pale of decent organized labor.

* * *

Your committee earnestly recommends:

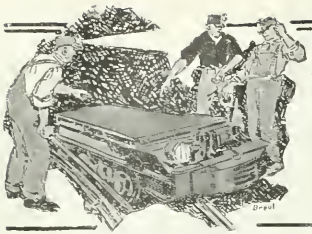
1. That the Executive Council take steps to cancel and suspend all strikes now in progress in New York State and to use their influence to prevent the calling of future strikes except in such circumstances as, in the opinion of the Executive Council, render it imperatively necessary to use the strike weapon.

2. That the truce shall be on the basis of the status quo.

3. That the period of the truce shall be six months, or for such longer period as President Wilson may require to enable him to effect a reduction of the cost of living.

4. That notice be served on all employers that any individual, firm or corporation which attempts to take advantage of organized labor's attitude to serve its own interests at the expense of labor shall be left for a reasonable time to such disciplinary measures as other employers or organizations of employers may wish to put into effect, and that if disciplinary measures be not taken by the employers themselves, then organized labor will fight such unfair and disloyal individual, firm or corporation in a manner that will never be effaced from the culprit's memory.

5. That copies of this report be transmitted to Samuel Gompers, president of the American Federation of Labor, and to the various State Federations of Labor throughout the United States, with the recommendation that the policy outlined herein be adopted by all.



IDEAS AND SUGGESTIONS

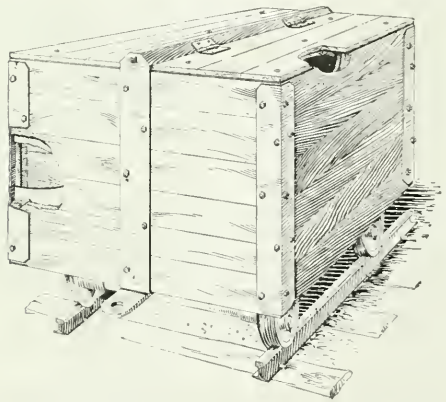
PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

A Safety Powder Car

By George Deuvell
Chicago, Ill.

The Madison Coal Corporation, at its No. 6 mine at Divernon, Ill., J. H. Miller, mine manager, has designed and built a special car for the transportation and distribution of powder within the mine in order to decrease the danger always connected with this operation. This car is built of wood, strapped and reinforced with iron. The planking is double, with two sheets of asbestos between boards. The bolts employed pass through the outer layer of planking only, and the inner planks are dovetailed together at the corners. There is thus no exposed metal inside the lining.

After the car was completed a test was made upon it. Five full cans of powder were placed in the car



SPECIALLY BUILT CAR FOR CARRYING POWDER

together with as many empties as would normally be carried in a full load. A can of loose powder was then scattered throughout the car and its contents. The car was then hauled away to a safe distance and deliberately short-circuited between trolley and rail, full voltage (275) being applied. Repeated tests failed utterly to produce an explosion.

A Simple Ground or Short-Circuit Indicator

By F. W. Sakon
Johnstown, Penn.

In mines where a trolley wire system is used there is frequently considerable time lost in finding a "short circuit" or a heavy ground which ties up the mine if not located immediately. A simple device that can be constructed by the electrician in charge will eliminate this annoyance.

Take a board 10 x 12 x 1 in. in dimension and mount a fuse block upon it. This fuse block may be

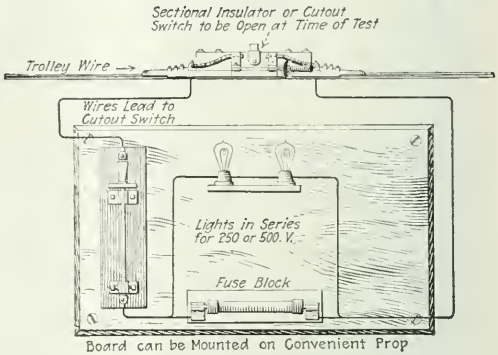

Sectional Insulator or Cutout Switch to be Open at Time of Test
Trolley Wire
Wires Lead to Cutout Switch
Lights in Series for 250 or 500 V.
Fuse Block
Board can be Mounted on Convenient Prop

DIAGRAM OF DEVICE THAT SIMPLIFIES DISCOVERY OF SHORT-CIRCUITS

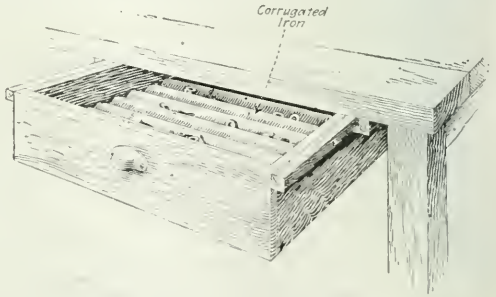
inclosed if necessary. The fuse must of course be posed on the wire. Also mount two light globes and sockets above the fuse block and wire, as shown in the illustration.

One of these boards should be at the cutout switch on each side of the entry. They are inexpensive, and in case the wire falls down onto the rails or there is any other accidental contact of the wire and rail, or a temporary short-circuit, the fuse will blow, after which the lights will light up, thus showing in which entry the trouble is located. The lamps are connected in series; that is, they can be connected for whatever globes there are on hand, and are so arranged as to light and burn properly whatever voltage is in use at the mine. A cutout switch can be mounted on the board for safety purposes.

Handy Smallware Drawer

By C. H. Willey
Concord, N. H.

The simple expedient shown in the accompanying illustration seems worthy of being passed along to others. There is always a generous supply of small sections of



HANDY DRAWER WITH SHEET IRON BOTTOM

corrugated sheet-iron roofing about the mine buildings, and this is all that is needed to make these handy small-ware trays for the bench or for the cabinet drawers. Small screws, bolts, washers, rivets, nuts, cotter pins, etc., are easily picked from the grooves which form the trays, as they are round bottomed and easy on the finger tips.

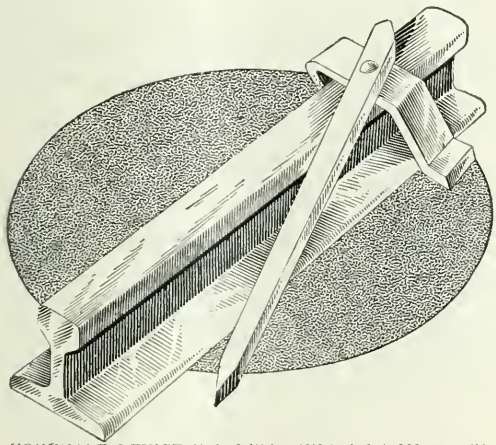
A Simple "Climber"

By John Buggy

Chambersville, Penn.

The accompanying illustration shows what I call a "climber," since it is used to make derailed cars climb back onto the track. It is in reality a homemade car replacer of light weight and simple construction. Where either locomotive or rope haulage is employed, this little device will save its cost many times over in a short time through the rapid replacement of cars.

This climber is made from a piece of 1½-in. bar iron and a ⅝ x 2-in. strap to a U shape and just the height of the rail in the clear. The bar is attached to the strap at the bottom of the U by means of a rivet, preferably with both heads flush. This rivet should be loose enough to permit a considerable rotational movement between the two pieces that it joins.



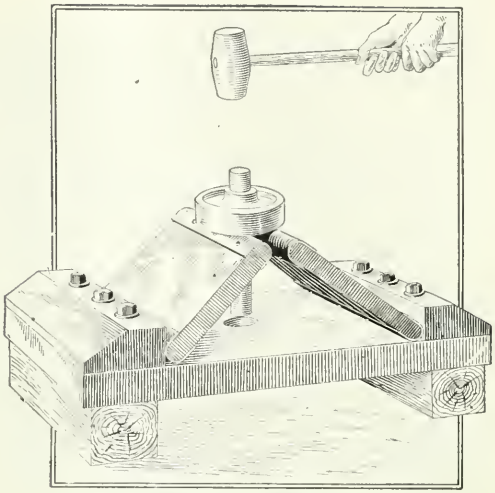
HOMEMADE DEVICE FOR REPLACING CARS ON TRACK

In use, the U-shaped strap is placed with its two legs straddling the rail, while the end of the bar, which may be chamfered, rests on the ground or upon a tie just in front of a wheel of the derailed car. A second climber is similarly placed upon the other rail, and a pull or push on the car causes the wheels to mount the climbers and drop into place upon the track. A second setting of the climbers may or may not be necessary for the other pair of wheels.

Ingenious Arbor or Shaft Press

The accompanying illustration shows a simple affair constructed from pieces of plank, a few pieces of ¼-in. plate iron and some bolts, nuts and washers, forming an arbor press that can be used for driving in or out shafts of pulleys, gears, wheels, flanges, etc.

The base is of 3-in. plank and the two buttresses of 4 x 6-in. stuff. The two supports are of 2-in. plank, each end being capped with ¼-in. sheet iron. These iron caps protect the ends of the plank. The buttresses are bolted to the base with three or more 1-in. bolts. In use, one end of each support rests against the buttresses and the other end supports the work. Any reasonable size of shaft rod or stock can be handled in this device, as the two plank supports adapt themselves to any size. A copper or brass maul is used as indicated, to drive the shaft into place or out of the flange or wheel.



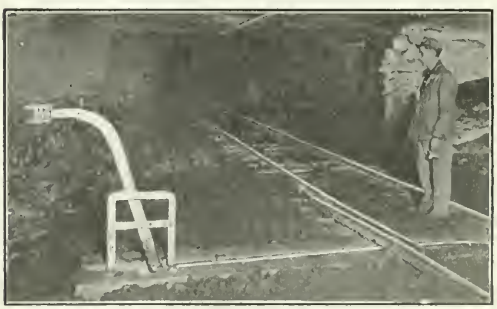
SIMPLE METHOD OF DRIVING SHAFTS

A Safety Derail

By Marshal Johnson

Benham, Ky.

At the mines of the Wisconsin Steel Co., at Benham, Ky., loads are drawn up a 3 per cent. grade for about three-quarters of a mile. For a long time considerable trouble was experienced with the breaking loose of cars, which would run wild down the slope. In order to overcome this difficulty the derail shown in the accompanying illustration was devised. This apparatus is so simple, and is so clearly shown in the photograph, that little if any explanation is needed. The weight on the end of the lever holds the derail switch open. When a trip must pass it is only necessary to raise this weight and hold it until the trip has gone by.



SIMPLE DEVICE THAT PREVENTS CARS FROM RUNNING LOOSE

How the Drainage Problem of Edna No. 2 Mine Was Solved

Serious Difficulties Now Believed to Be Settled For All Time at Hillman Coal and Coke Co. Operation

By Donald J. Baker
Pittsburgh, Penn.

Two mines, near each other and inter-connected, each had a drainage problem. It was decided finally to lead the water to one central sump, from which it could be voided by one pump. The necessary ditching was accordingly done and a large central sump and pump-house excavated. A large electrically driven, wood-lined triplex pump was then installed, while the pumps previously employed were left in place as standbys. It is believed that this arrangement satisfactorily disposes of the drainage problem at this mine for a long time to come.

With the recent installation at the Edna No. 2 mine of the Hillman Coal and Coke Co., at Wendel, Penn., of a vertical triplex mine pump with baseplate dimensions of 10 x 16 ft., a drainage problem of long standing at that place has been solved. The tract of coal owned by the company lies in Westmoreland County and is under the superintendency of E. H. Miller. The coal is that of the Pittsburgh bed and averages 6 ft. in thickness. It has been under development for the past 19 years by two mines—namely, Edna Nos. 1 and 2—which lie on the eastern and western sides of the property within an approximate distance of 3 miles of each other. The No. 2 mine employs 380 men and has a daily output of 1200 to 1500 tons, while the No. 1 mine averages 1000 tons daily with a force of 310 men.

A 360-ft. shaft gives access to the No. 2 mine, while No. 1 is entered by a slope. The coal takes a 7 per cent. dip from Edna No. 1 in a general southwesterly direction toward the No. 2 mine. This has caused a peculiar drainage problem to appear recently, the full force of which has been felt in particular at Edna No. 2. It might be mentioned that the coal has long since been removed between the two openings as far as the property boundary line on the north and south. The present workings as a result lie away from each other and in a more nearly east and west direction.

It can be seen that because of the formations encountered, the water from No. 1 mine will run by gravity in the direction of No. 2 mine. As the two operations developed they approached each other's workings until a junction, as stated above, was completed. Up to this time the water in mine No. 1 had been handled by small portable pumps throughout the mine. It was decided, however, to build a sump at a point about halfway between the two openings. This would serve to collect all of the water from the abandoned region on the north. The remainder coming from the abandoned workings to the south of the sump, being of no appreciable volume, would be allowed to run on into No. 2.

This project was carried out and two Gainsville steam pumps of 500 gal. capacity each were installed at the sump site in No. 1 mine. This left No. 2 free to work out its own drainage system. A sump accordingly was constructed for No. 2 mine at a point about 2500 ft. in a northeasterly direction from the shaft bottom and two Deming triplex pumps installed. These were 5 x 6 ft. and 6 x 8 ft. in baseplate size respectively. Practically all of the water collected at this point by gravity, with the exception of a little in the workings to the west. This was later forced up into an abandoned heading by portable pumps, to run by gravity down to the sump proper.

The foregoing conditions had existed for some time when it was decided to construct a central sump in the No. 2 mine and drain both operations from this point. This decision was reached after considerable trouble had been experienced with the pumps at both stations because of the corrosive action of the water, which has a high acid content. A recent analysis gave the following results per 100,000 parts:

Free acid as sulphur	264 54
Silica	18 70
Calcium carbonate	13 83
Magnesium carbonate	0 84
Calcium sulphate	131 06
Magnesium sulphate	134 10
Sodium sulphate	None
Iron sulphate	528 46
Aluminum sulphate	259 51
Sodium nitrate	Trace
Suspended solids	7 60

The following quantities of reagents were required per 1000 gal. in treatment of this water for boiler use:

Lime (90 per cent)	22 1 lb.
Soda ash (95 per cent)	83 25 lb.
Total	105 35 lb.

A continual replacement of parts in the pumps had made the upkeep expense rise until it had become a considerable item. Furthermore, the capacity of the sump at No. 1 was such that only 24 hours could elapse with the pumps not running when an overflow would result. Likewise, the sump capacity at Edna No. 2 was such that but 24 hours could pass with the pumps shut down when an overflow would follow here. This would naturally endanger both the workings and the lives of the men. Thus a stoppage of the pumps at both sumps, which was entirely a possibility, would bring about a critical situation at the No. 2 sump in less than 12 hours after the shutdown.

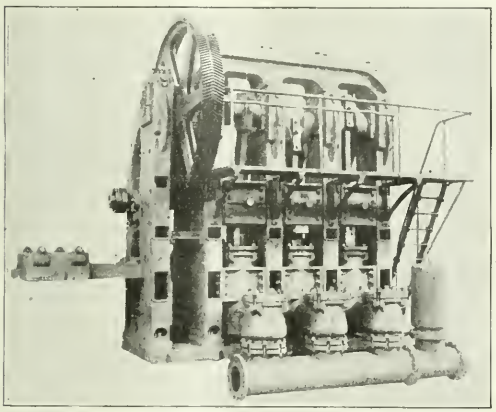
A close comparison of the levels in Edna No. 2 mine accordingly was made with a view toward finding the ideal central location for a sump, a position which would collect the water from both mines as far as possible by gravity. A spot about 8500 ft. nearly due west from the No. 1 sump was consequently chosen.

A 10 x 16 ft. (baseplate dimensions) wood-lined Scranton pump was decided upon as the one best fitted to cope with existing conditions and to work against the head of 550 ft. which prevailed at this point. Considerable excavating was then done, which included space

for a 15 x 26 ft. pumproom 25 ft. high, lying for the most part directly over the sump. I-beams placed transversely were used as roof timbers in the construction of this pumproom, and the whole was given a cement lining. A drill hole had been driven previously from the surface to permit of a 12-in. outlet pipe.

The pump was brought underground in sections, where the assembly was completed. A 150-hp. direct-current Allis-Chalmers motor was mounted on a solid concrete base and connected to the pump through a single herringbone reduction gear. The motor runs at 575 r.p.m., while the pump makes 46 r.p.m. This machine has a capacity of 750 gal. per minute through a 14-in. intake. Subsequent experiments with the capacity of the sump show that the pump must be operated continuously for three days to permit its entire drainage. This gives an idea of the amount of excavating done at this site.

Little or no difficulty was experienced with the installation of this machinery, and completed the pumproom is one of the first of its kind in western Pennsylvania containing this type of triplex pump. Because of



ELECTRICALLY DRIVEN TRIPLEX PUMP THAT HANDLES DRAINAGE WATER OF EDNA NO. 2 MINE

the wood lining in the water end, no trouble is anticipated from the acid water.

It is planned to allow the old pumprooms in Edna Nos. 1 and 2 to remain as they are. The sump at No. 1 will overflow and the water will follow the course to the sump at No. 2. The overflow from this point will run down to the new central location. A small amount of grading was found necessary from the No. 2 sump to the central sump, but this was of no great consequence as the distance is short.

The drainage problem of both mines has now been solved, the dip of the coal assisting materially in the general collection of the water by gravity. The present operations at No. 2, which lie to the west of the new pumproom, are of course on the down side of the dip and do not drain into the central sump by gravity. So far but little water has been encountered here and this small amount has been forced up to the central sump by the portable pumps previously mentioned. As the tract boundary line is in close proximity, these operations will never become extensive, nor will the distance through which the water must be moved ever become so great as to require pumping the water a second time. So while the location of the new sump is not ideal inasmuch as water will not collect there by gravity from all parts of Edna No. 2, yet it is as nearly perfect a location as could be applied to both mines.

A review of the entire situation might raise the question of why the new pumproom was not located a little farther to the west so as to take advantage of the natural slope afforded by the dip, and cover to a greater extent the present workings. This would have meant a stupendous amount of excavating in order to divert the course of the water from its natural tendency to flow toward the No. 2 opening. A location of the central sump farther west without this excavation would have caused the flooding of the shaft bottom.

In view of these facts and bearing in mind that the tract boundary line is nearby on the west, it is practically certain that all future operations in No. 2 will never present a serious drainage problem. The use of small portable pumps may, however, be replaced at some future time by a substation when development of the coal to the south of the shaft has reached considerable proportions. This, however, appears to be the limit of any future needs as all development at No. 1 is on the upgrade of the dip and entirely self-draining to the central sump.

American vs. British Byproduct Coking Practice

An Englishman by the name of Richard Gunderson came to this country several years ago and was employed for a time on the staff of the leading byproduct-oven concern of America. He had an unusual opportunity to become familiar with byproduct practice here and recorded his observations in an article which appeared in the Mar. 1, 1919, issue of the *Gas World*, published in England. This article compares British and American byproduct coke-oven practice and brings out some highly interesting differences.

The English writer frankly admits that American coke manufacturers lead in the coke industry and states his reasons for that conclusion. Three main factors have contributed toward the phenomenal growth of the byproduct-coke industry in this country: (1) The application of science and research to the industry; (2) the location of coke works at steel plants and near large cities; (3) the control by big corporations of raw-material supplies, transportation facilities, sales forces and media for the distribution of products. Of course, the war's requirements made the last few years the psychological period for byproduct-oven construction.

In the United States 2085 byproduct-coke ovens were completed during the year 1918 alone—71 more ovens than Great Britain built from 1915 to 1919, or during practically the whole period of the war. This is not intended as an odious comparison; it is simply a statement showing the difference in the status of the byproduct oven in the two countries, for the progress of Great Britain before the war in the byproduct industry was far greater than ours.

However, while indulging in comparisons it cannot be overlooked that German byproduct ovens produced more coke at the beginning of the war than was made in the ovens of this country in 1918, and that despite the phenomenal expansion of the coke industry here, America only really commenced her byproduct-coke work some 12 years ago.

The application of science and research work did

much to establish the byproduct-coke industry here on a basis adapted to American conditions. A committee of prominent coke and steel men from the United States investigated European practice; they rejected the 8-ton Continental oven and 30-hour coking period and worked out a plan whereby now 12½ tons of coal are coked in one oven in 16 to 17 hours.

The coke masters of Great Britain consider that the shorter coking time in the United States of America is made possible by the use of unwashed coal. Twenty per cent. of the coal used in byproduct ovens here is washed. The secret lies in such coal being dried to 5 to 6 per cent. moisture content, while in Great Britain washed coal is drained rarely to contain less than 15 per cent. moisture.

As to oven operation, uniformity is insisted upon here to a degree not understood in England. Americans have secured uniformity with various mixtures of coal in varying widths of ovens by burning sufficient gas to accomplish desired results. The use of silica brick in the ovens of this country has permitted higher temperatures and higher coking velocities than in England. However, the preliminary treatment of coal, heat control and careful design of oven (considered so essential here) is of less importance, in Mr. Gunderson's opinion, than scientific operation. In Great Britain, oven workers refuse to push more than a certain number of ovens in a shift; in this country the bonus system provides the needed incentive to make the workmen push as many ovens as are ready for that purpose.

The other main points brought out by the English writer—location of plant and unity of control—throw into strong relief essentially American practice: plant layout suited to the greatest efficiency and the organization of the component parts of an industry under one head. In Great Britain the consolidation of coal, ore and steel companies has not progressed materially.

Important changes have taken place in Great Britain recently. The miner has secured a shorter working day and the price of coal has been advanced $1.50 a ton to meet the decreased output per man and the increased mining rate, a turn of affairs in which everyone is interested. If the consumer must pay more for his coal, one way to meet the situation is to make a ton of fuel go further. It had to be done in America during the war, and conservation methods secured an average 10 per cent. saving in fuel, with a much greater percentage in certain cases. Many wasteful methods were eliminated.

Technical men here point to the byproduct coke oven as the future instrument for converting coal into more economical forms of fuel for producing energy and useful byproducts. It is even hinted that the time is not far distant when it will be illegal to use raw coal in grates or stoves; burned in this way, the byproducts are all wasted. These form by far the most valuable portion of the coal. Conservation and research received an additional impetus during the war and will doubtless continue to be of service in many fields.

ACCORDING TO D. H. DOWNEY, in Pennsylvania the greatest number, at one time, of bituminous mines employing ten men or more underground was 2000. There were in 1918 probably as many as 2000 small temporary workings, but the aggregate production of these small operations was less than 1 per cent. of the whole output.

Legal Department

BUYER'S RIGHT TO BILL OF SALE—Title to personal property passes by delivery, without necessity for a formal bill of sale. The buyer is not entitled to demand execution of such a document by the seller unless the latter has promised to execute one. (Minnesota Supreme Court, J. I. Case Threshing Machine Co. vs. Bargabos, 172 Northwestern Reporter, 882.)

ILLINOIS SAFETY STATUTE—The requirement of the Illinois statutes for the inspection of coal mines imposes no liability excepting for willful violation of such law. Where proper examination is made, and no dangerous condition is detected, the operator is not liable for a fall of slate. On an issue as to whether there has been a violation of the statute, evidence is not admissible to show existing conditions at the place several days before an examination was made by the mine examiner. (Illinois Supreme Court, Eichhorn vs. St. Louis & O'Fallon Coal Co., 123 Northeastern Reporter, 603.)

OPERATOR'S LIABILITY FOR TRAPPER'S NEGLIGENCE—In order that a coal operator may be held liable to a mine motorman for injuries sustained through negligence of an incompetent and inexperienced trapper in throwing a switch wrong, on the ground of negligence in retaining an incompetent employee, it must be proved that the operator actually knew of the trapper's unfitness for the performance of his duties, or should have known of it under the particular circumstances. Notice of the trapper's incompetence was brought home to defendant operator if called to the attention of a representative of the company having authority in the matter. (Texas Court of Civil Appeals, Sherbley vs. Texas & Pacific Coal Co., 212 Southwestern Reporter, 758.)

FORFEITURE OF COAL-MINING LEASES — A coal-mining lease was not subject to forfeiture because the lessee permitted labor liens to attach to his property on which the lessor had a contract lien to secure payment of rentals accruing under the lease, where there was no stipulation in the lease requiring the lessee to keep the property unincumbered and where the labor liens were discharged before suit to forfeit the lease was brought. Nor will a lease be forfeited because of a withholding by the lessee of a comparatively small amount of rent or royalties, where a forfeiture would be inequitable, considering the length of the term of the lease, the value of the lessee's improvements, and the fact that the lessor did not demand the amount in arrears until the day before bringing suit. (Washington Supreme Court, Harlan vs. McGraw, 181 Pacific Reporter, 882.)

ELECTRIC HAULAGE IN GASEOUS PENNSYLVANIA MINES—A section of the Pennsylvania mining laws provides that "electric haulage by locomotives operated from a trolley wire is not permissible in any gaseous portions of mines, except upon intake air, fresh from the outside." Plaintiff's husband was employed in defendant's mine, in which there was a trolley system. The fireboss discovered gas in a dip entry and posted proper notice of danger and barricaded that part of the mine. Later someone removed these warnings and plaintiff's husband and other miners entered the place. Thereafter some one turned on the electric current and an electric locomotive being run into the place caused an explosion resulting in death of plaintiff's husband. Held, that violation of the statute above mentioned subjects a mine owner to liability for resulting injuries not due to contributory negligence of the injured miners. And notice to a mine superintendent of the gaseous condition of a mine is notice to the owner. That negligence of the mine foreman in removing the barricade or in permitting the men to enter the mine may have concurred to bring about the accident will not exonerate the mine owner. "Of course, if decedent had entered the mine knowing of the wrongful removal of the barricade, no matter by whom, he would have taken the chances of an accident." (Pennsylvania Supreme Court, Jaras vs. Wright, 106 Atlantic Reporter, 798.)

The Need of Inland Water Transportation

By W. E. Joyce
Mauch Chunk, Penn.

To transport coal and other commodities by means of canals has been an ever-recurring problem. In the past such enterprises have met with decided hostility from the railroads. It would appear, however, that the time is now ripe for a thorough and careful consideration of the problems involved, to the end that the cost of moving various products, particularly bulk freight, may be reduced and the well being of the country aided.

GENERAL use of the water courses and canals offers one sure means of reducing commodity costs. The late Theodore Roosevelt was an ardent advocate of such a policy. Only certain lines of industry give evidence of appreciating this fact. It remains for the public at large to grasp more fully the importance of extending the usefulness of water transportation and thereby hasten its adoption.

Community spirit, magnificently shown during the past few years, cannot continue where common interest in large enterprises lags; and certainly the transportation problem is one of them. That the country has not reached the stage where Government ownership of railroads is regarded as the better plan of operation seems established. Be that as it may, the fact remains that ideas of community interest, collective bargaining, initiative and referendum decision, and general trade or labor amalgamation are growing.

This shows a definite trend—that individual enterprise, no matter how progressive in providing means to an end, without regard for public interest, must give way eventually to the more important purpose of serving the people as a whole.

The country owes much to its railroads and to those captains of industry whose acumen visualized decades to come, and whose enterprise and determined effort gave substantial aid to national development. The pioneers in railroad building contributed much to the country's greatness, and their followers carried on the work with even greater brilliancy. No other industrial agency aiding in national development can claim greater credit, so that in advocating a broader transportation policy an element of ingratitude would seem to be projected.

Navigable Waterways Would Aid Railroads

This, however, is not to be considered where further advance in the march of progress is imperatively demanded by national growth. On the contrary, the greatest stimulus that railroads of the country could get at this time would be through supplying additional means of transportation by making navigable the various waterways.

The history of our canals has been but partly written, and what records are now available are of a partisan character. The Erie Canal, Morris & Essex, Delaware, Juniata, Lehigh, Schuylkill, Raritan and other artificial waterways have had periods of trial, success and failure—mostly failure. Notwithstanding that this means of transportation was the first to claim attention, it has been superseded by other methods, to be practically discarded later. Even the great Barge Canal, upon which has been built the highest lift lock in the world, and which was designed to carry 20,000,000 tons of freight annually from the Middle West to the Atlantic coast, threatens to become a failure through indifference of the Federal agencies in carrying out agreements.

There can be no doubt that extraordinary effort was applied in the early days of canal building, as witnessed in the work of Josiah White on the Lehigh. Failing to make a contract with the City of Philadelphia to furnish an adequate water supply to the city from the Falls of Schuylkill, he turned his attention to the Lehigh and exhausted his meager fortune in an endeavor to make it navigable. He succeeded, but it was an heroic fight.

Natural laws supplying floods and freshets seemed to be the nemesis of such enterprise. The vicissitudes of the projectors were many. It cannot be said that disaster brought about in this way repeatedly did not excite public sympathy for canal builders, as is shown by the many generous grants made by legislative bodies. An illuminating instance of this generosity is given in the grant now held by the Lehigh Coal and Navigation Co. whereby an ear of corn, upon demand, was the return to be made for invaluable rights.

Many Attempts Made to Develop Canals

On the other hand, time has shown that improvement upon the canal grants could have been made, and in the present day of Panama construction by legislative enactment, the promised boon upon which many of the original grants were made might have been achieved.

Enthusiasm for developing water courses as a means of transportation has had its periods. In each instance there seemed to crop out jealousies of states as well as the element of human cupidity among the individual promoters. New York, Pennsylvania and New Jersey legislators could not combine on any scheme looking toward the improvement of the Morris Canal connecting the Delaware at Easton with New York harbor. Trade from the anthracite region coming down the Lehigh Canal presented arcadian visions for all communities along its route of travel. Recommendations of committees and acts of various legislatures, embracing beautiful plans for promoting human happiness, were presented time and again, but the ogre of private gain in one form or another slipped in to submerge the prospective argosy.

Of the several canal propositions looking with gainful eye upon the coal trade in eastern Pennsylvania (which include the Morris, Delaware & Hudson, Lehigh, Schuylkill and Delaware Division), the Morris was the least favorable for securing adequate return. The Delaware & Hudson handled a large traffic at one time, but railroad interests discouraged its use, and the same was true of the Schuylkill route. The Lehigh and Delaware canals proved, under independent ownership, their ability to handle heavy traffic. The Lehigh at one time operated as many as 4500 boats. There may be 100 in use today.

Fixed charges on canal operation reduced to a tech-

nical problem under the old method were embraced in delay of lockage, repairs and attendance. These have been regarded as the stumbling block to continuance of operation on an average canal of 100 to 150 tons capacity.

A decrease in the number of locks has heretofore been recommended as an offset to this drawback. Modern engineering has been doing much to lift the canal problem from the complex to the simple class. Recommendations for securing a greater height of lift or from 8- or 10-ft. locks to 20- or 25-ft. locks, also to increase the size of barges as a means of securing the decrease in the number of locks and tonnage cost, and consequent decreased cost per ton-mile, have been made. These recommendations were long considered impracticable by experts. These experts are now entirely discredited by the locks in use on the Barge Canal at Little Falls, N. Y., which are over 40 ft. in height.

DELAWARE NAVIGATION

Plan for improvement of the River Delaware submitted to the Pennsylvania legislature in 1823 by Josiah White. It will be noted that the lock system of today embraces the same ideas.

The feasibility of improving the various water courses so as to economically transport freight in quantity has passed the experimental stage. The various state legislatures seem to have recognized this fact, as does also the National Government. The great Barge Canal built across New York at an expense of $160,000,000, designed to open transportation with the Middle West, has already caused apprehension as to its future usefulness by reason of failure of the Federal authorities to carry out plans to which they had agreed. The matter of supplying 75 barges appeared to be the stumbling block, but it is suspected that the real cause of hesitancy lay in fixing freight rates. As in the case of fixing prices on steam sizes of anthracite coal for railroad use, the Federal authorities betray a serious weakness.

While patriotism suggested vast expenditures on road building for the benefit of returning soldiers, also opening public works and farms, to which projects everybody subscribed, the fact remains that nothing is being done either for the returned soldier or the public at large, for whose welfare the citizen made a soldier of himself on the basis of democracy.

The Pennsylvania legislature has fallen into line for opening the waterways and promising extensive canal construction. There has been under consideration a proposition for making the Susquehanna navigable in part, but so far nothing definite has taken place.

The old Lehigh Canal is doing some business. As far as can be seen this practically amounts to an effort on the part of the Lehigh Coal and Navigation Co. to retain its franchise by keeping the channel sufficiently clear to pass a few boats. One or two dredges with scows of obsolete type are employed a few months in the year in dredging, but with each sigh of Jupiter Pluvius the channel overflows and service is discontinued.

Some years ago the canal extended north to White Haven, and considerable coal, lumber and other products were taken down. Mauch Chunk is the northern terminus now. The name of Coalport still clings to the loading point, which is marked by decaying chutes and elevators, but as a port only the Lehigh Coal and Navigation Co. makes any use of it. Apparently the canal pays better for the freight it does not carry as at present operated. Retention of a franchise has a value in itself. At the same time railroad differentials, fixed decades ago, discourage effectually coal operators on canal shipping from Coalport.

By discouraging public use of the canal as a common carrier, the railroads get an advantage supposedly. For the immediate present this would appear to be good business. And yet along the tributaries of canals as well as along the main streams are fabulous quantities of freight lying untouched and which should be going to supply people of the congested communities. This is represented not alone by farm and dairy products, but by lumber, lime, hides, stone, iron ore, etc.

The best interests of the railroads are not served by shutting off this trade, because of the natural tendency of trade to multiply. In addition there is a demand for materials that otherwise go to waste, leaving a void that is productive of higher prices of commodities necessary to the human well being. Arrested development thus provides a loss to the railroads which they are now feeling keenly.

The hard-coal region has always suffered through unjust railroad tariffs which permit of longer hauls of soft coal to tide for less money. What is true of coal is also true of ore. Iron ore is hauled from Buffalo to Bethlehem at the same freight rate as is charged to points 50 miles north of Bethlehem, while from Bethlehem to Philadelphia the tariff is 30 cents less per ton than from the point 50 miles north, making competition impossible.

Such practice does not sustain the principle which induced legislatures to give away valuable franchises. When the Pennsylvania legislature voted away water and land rights along the Lehigh, it was done on the basis of promoting public welfare. Providing transportation for coal offered the means of securing employment for people who were later to develop the territory. The builders came and suffered, as pioneers always suffer. They opened the territory and gave their all to the enterprise that had induced legislative generosity in behalf of the promoters. The question then is, Have the promoters done their part?

Assuming that they did all within their means, since the situation is still far from fulfillment of original ideals, it is evident that assistance either from state or Federal agency is needed to complete the scheme. It is quite plain that without such assistance this great need will never be fulfilled, notwithstanding the imperative demand in behalf of the common weal.

It was largely through the work of the late Theodore Roosevelt that the Barge Canal, 532 miles in length, was completed. Mr. Roosevelt recognized that successful operation of the waterway as a means of transportation would contribute much not only to the State of New York but to the United States as well. On this principle he exerted his influence and the work was carried to a successful completion.

The same holds true of the several other waterways, and particularly of the Schuylkill and Lehigh traversing the anthracite belt. It would appear, however, that to secure the necessary attention from the proper authorities another Roosevelt must arise. In the absence of such a personality, however, public demand can do

much. When the importance of the proposition is grasped by the people a demand for action will develop, and as the question is better understood this demand will become positive and insistent.

By what sinister influence the use of canals is kept from the people is not difficult to fathom At the present time there is felt serious concern for the operation of the Barge Canal as originally intended, despite the 13 years required to build it. It is regarded as one of the country's greatest engineering achievements. Congress having taken a hand in the completion of the work, the country at large will surely note its success or failure. It is significant that the question of freight rates was injected into the contract proposition and made partly responsible for the Government's failure to supply the steel barges as originally agreed.

In the meantime people of Philadelphia and coast cities are no less interested in transportation on the Lehigh and Schulykill than are the people of the coal regions, whose opportunities for increasing trade and the opening of better markets would be thereby greatly improved.

Creek Control at Kingston, W. Va.

By Walter H. Dunlap
Kingston, W. Va.

KINGSTON, W. VA., occupies the valley of Milburn Creek from the head of the hollow for a distance of a mile or more down the stream. Thus, in common with many other coal-mining camps in this and neighboring states, it has a problem of creek regulation. From the rim of the mountain some 1200 to 1500 ft. above the town the slopes of the watershed fall off abruptly at angles of 25 to 35 deg. to the creek, which flows through the town on a grade of from 4 to 3½ per cent. The floor of the valley varies from 50 to 100 yd. in width and is occupied by the creek, railroad, highways, houses and yards, the stream meandering from side to side of the valley as it proceeds through the town. The creek is subject to violent freshets during the course of which it usually overflows its banks at one point or another and selects a new channel for itself, destroying highways, gardens, etc., and doing other damage incidental to the change.

The problem here involved is to decide upon some particular location for the creek and to compel it to stick to that location. The town would be in a more fortunate position now if the creek had been thrown to either one side or the other of the valley at the time the camp was laid out, for in that event there would now be only one side of the creek to revet and the layout for highway crossings, etc., would be simplified.

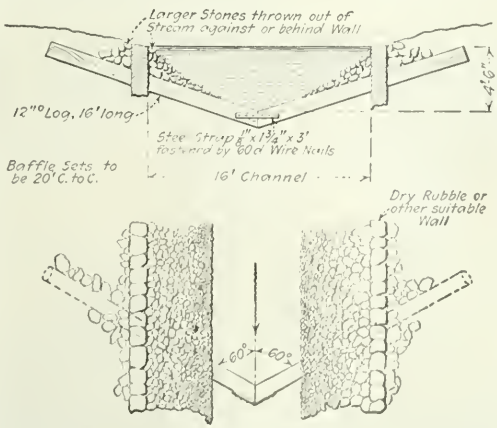
It is estimated that the discharge of the creek during freshets may sometimes reach upward of 600 cu.ft. per second, especially as the slopes of the watershed become more and more denuded of trees in providing mine timbers. After figuring on various cross-sections of channel and types of construction designed to provide waterways for this discharge, the type illustrated has been tentatively selected and a short section constructed as an experiment.

The underlying idea is to continually divert the water away from the sidewalls toward the middle of the channel, thus guarding against undermining of the sidewalls and also aiding the creek in its function of garbage carrier by concentrating the flow at low stages. The poles employed are well embedded in the bank and, like the snags ordinarily found along the banks of streams, should last for a long time. The walls may be constructed of timber cribbing, dry rubble masonry, concrete or any other suitable material that may be available.

The poles will prevent the stream from cutting out locally a channel of steeper gradient than the normal, and the sidewalls, by concentrating the flow, should provide sufficient velocity to keep the water from depositing sediment and filling up the channel. Thus the combination of poles and sidewalls should act to maintain a uniform gradient and cross-section.

Should a large obstacle get into the channel, the decreased cross-section at that point would cause a corresponding increase in the velocity with the result that the obstacle would be rolled along the channel or, by a process of undermining and sinking into the hole thus provided, be partially buried. In the meantime, the water dammed up back of the obstacle would deposit its sediment, possibly to the height of the obstacle, and if the sidewalls were not sufficiently high the stream would overflow its banks. In a channel with a continuous lining, such as concrete or cobble-stone paving, the obstacle would have no chance of burying itself so that the type with the baffle sets has the advantage of greater elasticity, in addition to that of lesser expense. It is hoped that, in the event of overflow, the sidewalls would not give way and that most of the water would continue to follow the regular channel, the excess being insufficient to accomplish much damage.

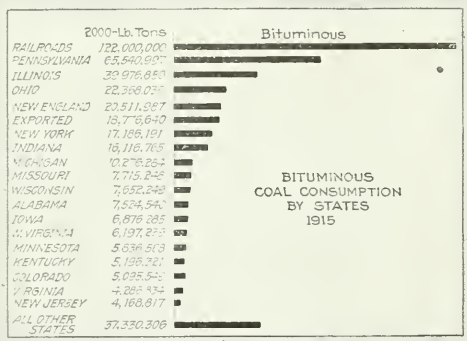
It is believed the solution of the problem lies in watchful maintenance rather than expensive construction in an effort to insure immunity from damage. Obstacles will be periodically removed from the creek.

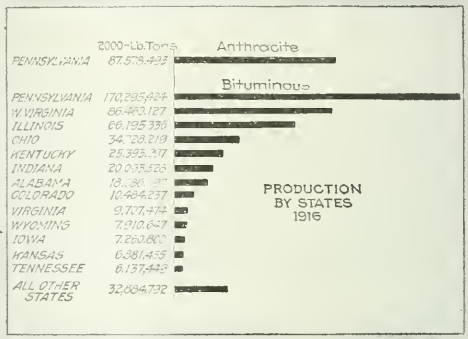

Larger Stones thrown out of Stream against or behind Wall
12"ø Log, 16' long
Steel Strap ⅝"x1¾"x3' fastened by 60d Wire Nails
Baffle Sets to be 20' C. to C.
16' Channel
Dry Rubble or other suitable Wall
60°
60°

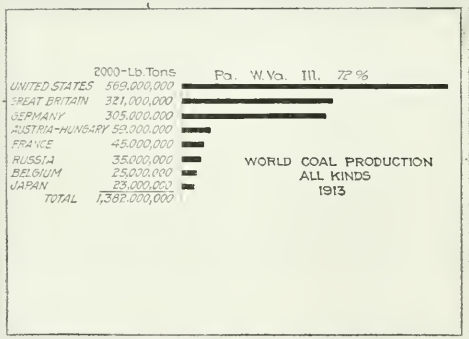
CROSS-SECTION AND PLAN OF CREEK CONTROL PROJECT

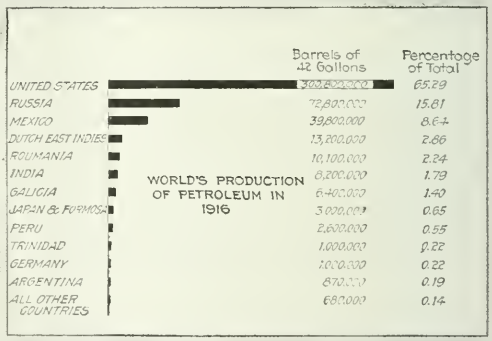
Statistical Sidelights on Our National Fuel Problem

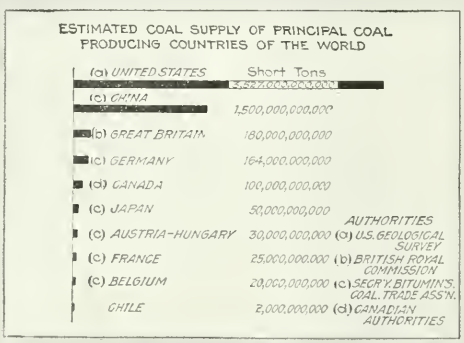
From many sources the Connecticut Committee on Coal Conservation and the Engineering Council Committee on Fuel Conservation, of which C. G. Bill, of Hartford, Conn., and L. P. Breckenridge, of New Haven, Conn., were respectively chairmen, have compiled several tables giving the production and consumption of coal and petroleum for a number of years. To these data some other statistics have been added. Unfortunately, as is usually the case, some statistics are not quite up to date. Nevertheless, in many ways the figures of 1913 and 1914 given in the charts shown on this and the following two pages indicate more nearly present conditions than those of the period during which the war had reached its height. The ultimate source of the tables here reproduced is the Proceedings of the Pan-American Scientific Congress, the U. S. Geological Survey (C. E. Lesher for coal and R. H. Fernald for petroleum) and the Bureau of Mines.

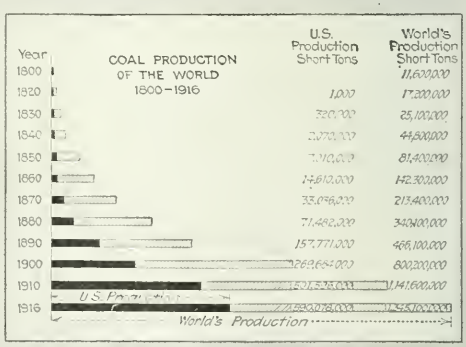


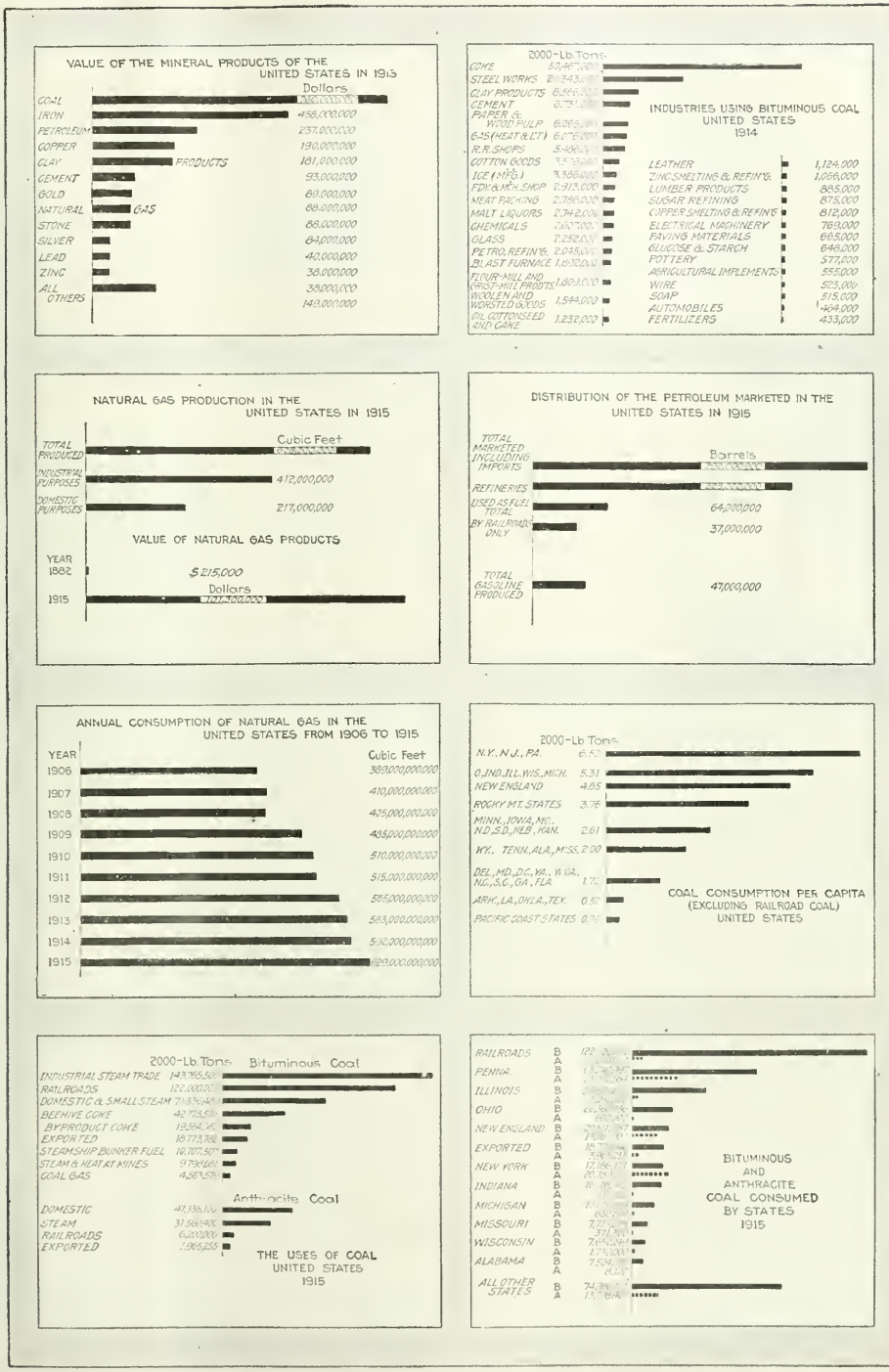




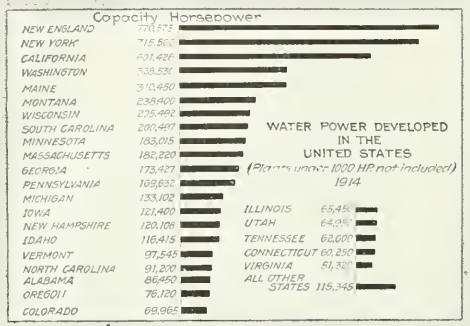


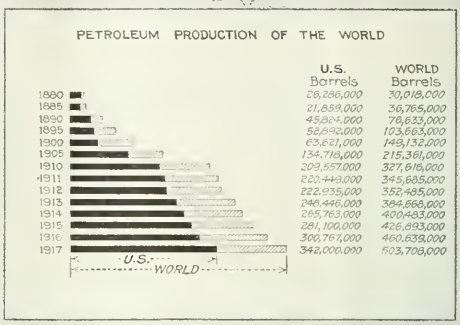


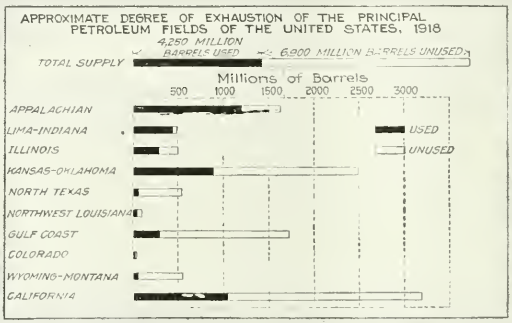


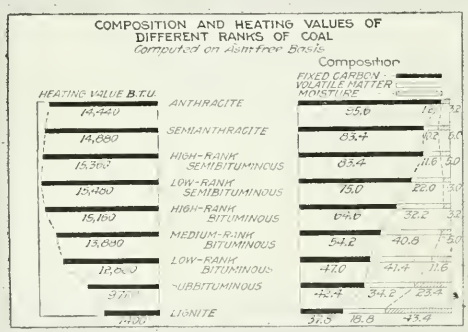


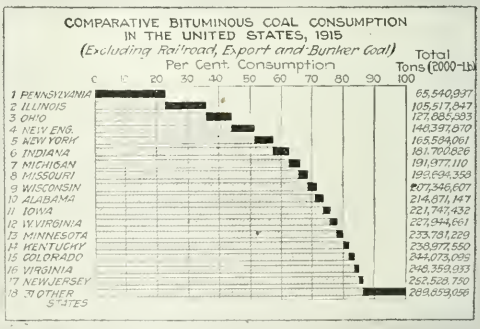
CHARTS SHOWING HOW COAL HEADS ALL MINERALS, WHAT INDUSTRIES USE COAL AND HOW MUCH, THE PRODUCTION OF NATURAL GAS AND PETROLEUM, AND THE CONSUMPTION BY STATES AND BY USES

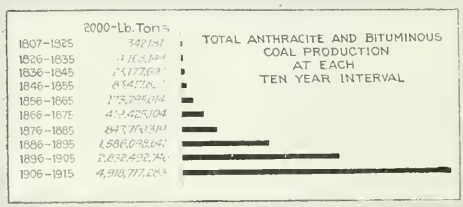


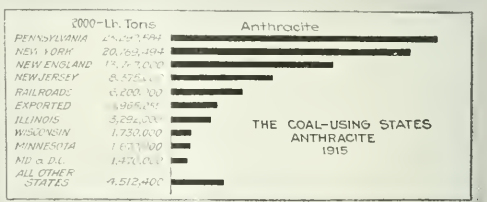





COMPOSITION AND HEATING VALUES OF DIFFERENT RANKS OF COAL
Computed on Ash-free Basis
Composition
FIXED CARBON
VOLATILE MATTER
MOISTURE
HEATING VALUE B.T.U.
14,440 ANTHRACITE 85.0 10.2 4.8
14,880 SEMIANTHRACITE 83.4 10.2 6.4
15,360 HIGH-RANK SEMIBITUMINOUS 83.4 11.6 5.0
15,480 LOW-RANK SEMIBITUMINOUS 75.0 22.0 3.0
15,180 HIGH-RANK BITUMINOUS 64.8 32.2 3.0
13,880 MEDIUM-RANK BITUMINOUS 54.2 40.8 5.0
12,600 LOW-RANK BITUMINOUS 47.0 41.4 11.6
SUBBITUMINOUS 42.4 34.2 23.4
LIGNITE 31.5 18.8 49.7


COMPARATIVE BITUMINOUS COAL CONSUMPTION IN THE UNITED STATES, 1915
(Excluding Railroad, Export and Bunker Coal)
Per Cent. Consumption
0 10 20 30 40 50 60 70 80 90 100
Total Tons (2000-Lb.)
1 PENNSYLVANIA 65,540,937
2 ILLINOIS 105,517,847
3 OHIO 127,085,393
4 NEW ENG. 148,391,870
5 NEW YORK 165,584,061
6 INDIANA 181,700,826
7 MICHIGAN 191,977,110
8 MISSOURI 199,534,359
9 WISCONSIN 207,346,607
10 ALABAMA 214,671,147
11 IOWA 221,747,432
12 W. VIRGINIA 227,944,661
13 MINNESOTA 233,781,229
14 KENTUCKY 238,977,550
15 COLORADO 244,073,095
16 VIRGINIA 248,359,933
17 NEW JERSEY 252,528,750
18 ALL OTHER STATES 269,859,056





CHARTS EXHIBITING THE DEVELOPED WATER POWER OF THE UNITED STATES, THE PRODUCTION OF PETROLEUM, THE DEGREE OF EXHAUSTION OF PETROLEUM, THE HEATING POWER OF DIFFERENT TYPES OF COAL, THE GROWTH OF THE COAL TRADE AND SOME FACTS AS TO THE MANNER OF USE OF THAT FUEL

Anthracite Operators to Bring Test Suit Against United States

Independent anthracite operators of Pennsylvania, consisting of the companies other than those commonly known as the "railroad coal companies," sustained such severe losses during the regime of the United States Fuel Administration that they are now preparing, and will shortly begin in the Court of Claims of the United States, a test suit against the United States to determine whether, under the Lever Act which authorized the Fuel Administration, the United States is not liable to damages.

It will be alleged that the company bringing the suit operated its mine during the entire period of Fuel Administration control, and that, under the restriction of prices maintained by Dr. Garfield, the prices it was permitted to charge for its product were so low that it barely got back its out-of-pocket costs of mining and preparing, making no profit whatever, whereas, if it had not been restricted in such a manner, it would have been able to make a just and reasonable profit.

The act of Aug. 10, 1917 (H. R. 4961), in Section 25, provides: "In fixing maximum prices for producers the commission shall allow the cost of production, including the expense of operation, maintenance, depreciation and depletion, and shall add thereto a just and reasonable profit."

This test suit will determine the liability of the Government to a large number of coal operators, in both anthracite and bituminous fields, who from patriotic principles kept their plants going during the period of Federal control although they knew they were operating at a compulsory loss. The operators maintain that the conditions were fully known to the United States Fuel Administrator, but in spite of this he failed to remedy conditions.

Dr. Garfield Said Prices Were Too Low

It will be remembered that when Dr. Garfield withdrew the maximum price and other restrictions on anthracite as of Feb. 1, 1919, he made a statement in which he said that the cost of mining anthracite had been increased to such an extent "that many of the companies were not receiving a fair return, and that some producers of necessary coal were actually sustaining a loss on the sale of coal at the Government prices." He also said that "had the Fuel Administration's active control over maximum prices on anthracite coal been continued," the maximum prices would have necessarily been raised "possibly as much as fifty cents a ton."

If this test suit is successful, other suits will doubtless be brought as many coal companies suffered severe losses due to heavy increases in wages, authorized or imposed by the Government, and to advanced costs in materials and supplies which had to be purchased at prices fixed by various governmental price-fixing boards, and then had to sell their coal at prices which did not cover these increases in expenses. The Fuel Administration declined to recognize as part of increased costs any royalties which were higher than an established figure fixed by them, and many coal operators had to pay royalties largely in excess of this sum. The prices fixed by the Fuel Administration as permissible for the selling of coal were in many cases based upon the assumption that steam sizes of coal could be sold at certain schedule prices, which as a matter of fact were unobtainable and theoretical, and did not, therefore, yield to the operator the net return upon which the Fuel Administration calculated the intended revenue. The test action will be brought by Henry S. Drinker, Jr., of the firms of Dickson, Beitler & McCouch, of Philadelphia. Associated with Mr. Drinker will be William A. Glasgow, Jr., and Percy C. Madeira, Jr., of Philadelphia, and Douglas M. Moffat, of Cravath & Henderson, of New York, representing coal companies having similar cases.

Many New Cars Will Soon Be Available for Coal Loading

As a result of the discussion before the Senate Investigating Committee concerning the coal car supply, the Director General of Railroads has issued the following statement supplementing his extended statement of Aug. 14:

In connection with the car-supply situation, I believe it will be of interest to give the status as of Aug. 26, 1919, of the open-top cars contracted for by the Railroad Administration.

The details as of Aug. 26 follow. Of the total of 50,000 open-top cars mentioned, 45,000 are available for coal loading.

OPEN-TOP CARS

	55-Ton Hopper	Composite Gondola	70-Ton Hopper	70-Ton Low Side	Total
Number ordered	22,000	20,000	3,000	5,000	50,000
Completed and in service Aug. 26	12,935	8,051	762	2,397	24,145
Completed and in storage Aug. 26 (the numbering and placing of these cars in service is now in progress)	8,186	8,498		794	17,478
To be built	879	3,451	2,238	1,809	8,377

The cars shown as being in storage are being numbered by the car works and placed in service at the rate of 250 to 275 per day. The railroad shops have been called upon to assist in numbering such cars and this will increase the daily number of such cars placed in service hereafter. The cars shown as yet to be built are being built and placed in service at the rate of 75 per day, so that from 325 to 350 cars of this class are being put into service daily.

The composite gondolas are being delayed because two of the large plants have been on strike for the last month and consequently are turning out very few.

Two plants are building 70-ton low side cars. One is now on strike.

Conducting Aluminum—A New Invention

A new invention called conducting aluminum M. 277, which is said to be creating a profound impression, has been made by Dr. Georges Giulini, the most famous expert in the aluminum trade, states Consul Philip Holland, Bazel, Switzerland, in a recent report. This new metal is produced by putting the ordinary aluminum through a special patented process, by which it acquires the same mechanical qualities and capacities as bronze, copper and brass without changing its specific weight.

It is said that the price of the new metal can be kept within very low limits; so that, even at the prewar prices of other metals, it will be able, by reason of its smaller specific weight, to compete with copper and brass very favorably. The fact that the new metal is a conductor will make it especially in demand in the electrical trade.

WHAT THE ENGINEERING SOCIETIES ARE DOING

Eighth Annual Safety Congress of National Safety Council

Some of the most important problems before American industry today, such as the anticipation of labor unrest, increasing plant efficiency and production, decreasing manufacturing costs, and the whole subject of labor management in general, will be discussed in connection with the subject of accident prevention at the eighth annual safety congress of the National Safety Council, to be held at the Hotel Statler in Cleveland, Oct. 1 to 4.

The great bulk of the accident-prevention talent of the country—160 scheduled speakers and approximately 3000 men and women who direct the safety work of the nation's greatest industries—will come together for a four-day exchange of ideas and experiences. The Council has adopted the following slogan for the congress: "We have fought to make the world safe for democracy; let us now work to make industry safe for humanity."

There will be four general sessions, four round tables, and 35 sectional meetings during the congress. As all the general sessions will open at 2 o'clock in the afternoon and the sectional meetings at 9.30 o'clock in the morning, it will be possible for any one to attend all the general sessions and also all the sectional meetings for his particular industry. There will be three meetings each of the metals, mining and steam railway sections, one meeting each of the marine and navigation and textiles, and two meetings of each of the following sections: Automotive, cement, chemical, construction, electric railway, health service, packers, paper and pulp, public safety, public utilities, rubber, woodworking, and women in industry.

The first general session, scheduled for Wednesday afternoon, Oct. 1, at 2 o'clock, will be held in the ballroom of the Hotel Statler, and is to be devoted entirely to a discussion of employees' representation under the following subheads: "Coöperation and Industrial Progress," Cyrus McCormick, Jr., works manager, International Harvester Co., Chicago; "Experience of Wm. Demuth & Co. in Industrial Democracy," F. L. Feuerbach, factory manager, Wm. Demuth & Co., Richmond Hill, N. Y.; "Practical Aspects of Employees' Representation," E. B. Tolsted, Independence Bureau, Philadelphia, Penn.; "Employees' Representation from the Standpoint of Organized Labor"; "Labor Management and Collective Bargaining," W. M. Leiserson. Following the adresses there will be a general discussion.

A good old-fashioned round table, of the sort which has always been a feature of the National Safety Council's annual congresses, will be held Thursday morning, Oct. 2, at 8 o'clock. Dr. Lucian W. Chaney, of the United States Bureau of Labor Statistics, will lead with a paper headed "Is Industrial Death Necessary?" to be followed by L. A. De Blois, of the E. I. du Pont de Nemours & Co., with a paper on "Supervision as a Factor in Accident Prevention." From 8:30 a.m. to 9:30 a.m. there will be a free-for-all discussion.

An ABC session has been arranged primarily for the benefit of the younger safety engineers and others who want to hear of how to put safety across. It will be held Thursday morning, at 9:30 o'clock. Discussion will follow each of the five papers to be presented.

Of particular interest to mining men will be the mining section, which is to hold forth Thursday morning, Oct. 2, at 9:30 o'clock. A. H. Fay, mining engineer, United States Bureau of Mines, will deliver a paper on "Mine Accidents, English Speaking vs. Non-English Speaking Employees," to be followed in order by M. W. Gidley, safety inspector, Copper Queen Consolidated Mining Co., "Training and Handling of Men"; E. E. Bach, chief, Americanization Bureau, State of Pennsylvania, "Labor Turnover and Its Relation to Mine Accidents"; Charles F. Willis, consulting supervisor of industrial relations, Phelps Dodge Corporation, "Industrial Relations in the Mining Industry."

On Friday morning, Oct. 3, at 9:30 o'clock, the mining section will convene for the second time, the papers and authors being as follows: "Fire Prevention in Anthracite Coal Mines and Necessary Equipment for Fighting Mine Fires," M. W. Price, efficiency engineer, G. B. Markle Co.; "Effective Use of Rescue Apparatus in the Fighting of Mine Fires," T. Ryan, Mine Safety Appliance Co., Pittsburgh, Penn.; "The Desirability of Standardizing Mine Rescue Training and a Plan for Standardization," D. J. Parker, mine safety engineer, United States Bureau of Mines Experiment Station, Pittsburgh.

The third and last session of the mining section will be held Saturday morning, Oct. 4, at 9:30 o'clock. Three papers are scheduled, these being "A Compilation of Chute Types for Loading Ore Into Tram Cars in Metal Mines," C. A. Mitke, mining engineer, Phelps Dodge Corporation; "The Importance of Safety Measures to the Miner," Major Arthur S. Dwight, chairman of the Industrial Organization Committee, American Institute of Mining Engineers; "Need for a Definite Technical Service in the Mining Section of the National Safety Council," B. F. Tillson, assistant superintendent, New Jersey Zinc Co., Franklin, N. J.

In connection with the congress there will be a safety exhibit at which practically all of the leading manufacturers of safety devices will be represented. This feature of the congress, under the joint auspices of the National Safety Council and the Safety Institute of America, will be opened at 8 o'clock, Monday evening, Sept. 29, and will be open thereafter between the hours of 11 a.m. and 11 p.m. daily. The exhibit will close Saturday, Oct. 4, at 6 p.m.

Vesta Coal Co. First-Aid Meet

California, Penn., was recently the scene of a first-aid meet held under the direction of the Vesta Coal Co. The event took on something of the nature of a holiday for both the employees and townspeople. Meeting at the first-aid hall in the town, the participants paraded to Normal Field and were later served luncheon. Three teams, the pick of the men at their respective mines, competed with No. 1 team from the California mine, making the best final average of time and percentage, No. 2 team being from W. Brownsville and No. 3 team from Denbo.

The judges were represented by H. D. Mason, Jr., of the Mine Safety Appliances Co., acting as chief; J. W. Bowles, of the Pittsburgh Terminal, Railroad and Coal Co.; J. C. Davies, of the Mine Safety Appliances Co., and Capt. W. J. German. M. J. West and R. D. Hazlett handled the recording of points. D. R. Plower as chief, C. O. Roberts, Joseph Edwards and Eldridge Coopenhaver completed the list of managers.

Using the system of scoring that will be employed in the meet to be held later on in Pittsburgh, two team problems—a one-man problem and a two-man problem—were given the representative teams. The following percentages and time were made:

Event No.	Team No. 1 Time in Minutes	Team No. 1 Per Cent.	Team No. 2 Time in Minutes	Team No. 2 Per Cent	Team No. 3 Time in Minutes	Team No. 3 Per Cent
1	4	100	2	92	4	93
2	12	94	10	91	10	94
3	7	100	6	88	7	97
4	11	100	9	99	12	95

When it is considered that the men in the three teams have worked together for a number of years, in particular those of No. 1 team, the foregoing scores furnish some interesting material for speculation as to the keenness of competition that can be expected at the Bureau of Mines meet in September.

Pond Creek Coal Co. Holds Successful First-Aid Contest in Kentucky

By G. E. Daugherty
Stone, Ky.

The second annual first-aid contest of the Pond Creek Coal Co., held at Stone, Ky., Aug. 10, was so successful that the company intends to start a systematic movement looking toward accident prevention and safety education. Much time and money will be spent in an effort to improve the working and living conditions of the company's employees. An experienced safety and efficiency engineer has been employed, whose efforts will be devoted chiefly to looking after the welfare of the workers. The improvement of conditions where energy is wasted will be given first thought, then healthful surroundings, both inside and out of the mines, will receive attention.

TEAMS THAT PARTICIPATED IN RECENT VESTA COAL CO. MEET

Educational work has been going on for some time among superintendents, foremen and assistants, so that the safety plan will be well understood by all those who hold official positions. It is expected that the best results will be attained only through the coöperation of the officials, who are untiring in their efforts to instil a spirit of trust and consideration among all concerned.

The first-aid contest was the first public test given the

movement. The spirit manifested by the entire organization was so evident that there is no question that the efforts of officials in directing the work assigned to them has proved successful Ten teams took part in this event. Every man held a first-aid certificate and displayed a knowledge of taking care of an injured person that is found only in men of special ability and training. It is evident, therefore, that consistent training brings beneficial results to the community.

Major Dr. L. F. Boland, of the Stone Hospital, acted as chief judge, assisted by Dr. W. T. Smith, of Tierney; Dr. W. T. Flannagan, of McVeigh, and Dr. T. P. Collier, of Hardy. All were so well pleased with the high order of efficiency displayed by the teams, that the lowest percentage given was 96. The following teams received ratings of 100: Stone No. 3, Hardy No. 2, electricians, mechanics, and the team composed of division mining engineers.

Medals and certificates were awarded to the best teams by the American Red Cross and the National Safety Council. A specially designed gold watch fob was presented to each member entering the contest by General Superintendent J. T. Sydnor.

Tenth First-Aid Contest of Susquehanna Collieries Company

The State Armory at Nanticoke, Penn., on the evening of Aug. 26, was the scene of the tenth annual first-aid contests of the Wyoming Division of the Susquehanna Collieries Co. The various events were keenly contested. General C. B. Dougherty, assistant to the general manager of the company, gave an interesting talk. He spoke of the value to be derived from first-aid work and first-aid contests, and paid a merited tribute to the employees of the company who became active in this work.

Dr. J. M. Maurer, chief surgeon of the company, delivered an instructive lecture, in which he said that the first-aid corps of the coal regions were the nucleus of a world-wide movement for first-aid treatment to the injured, and that of the millions wounded in the recent war, 80 to 90 per cent. were able to return to the firing line within two or three months from the time they were wounded, owing to proper and efficient first-aid treatment which they were able to receive upon the battlefield.

During the various first-aid contests music was furnished by an excellent orchestra. After the competitions there was dancing. The result of the different events follows:

One-Man Event, No. 5 Colliery—Winner, No. 4 slope team, composed of Herbert Winfield, captain; Joseph Yankowski, subject, and George O. James.

One-Man Event, No. 6 Colliery—Winner, No. 1 drift team, composed of Evan O. Thomas, captain; Stanley Buber, subject, and Nick Dolinski.

One-Man Event, No. 7 Colliery—Winner, North shaft team, composed of Edgar Clarke, captain; Clemens Schultz, subject, and John J. Kryggor.

Two-Man Event, No. 5 Colliery—Winner, No. 2 shaft, composed of Andrew Dorak, captain; William Howells, subject; John Wadzinski and Andrew Estvanick.

Two-Man Event, No. 6 Colliery—Winner, outside team, composed of Eli J. Thomas, captain; John Skordinski, subject; Peter Kush and Thomas Wright.

Two-Man Event, No. 7 Colliery—Winner, South shaft team, composed of David Lewis, captain; Russell Rowett, subject; Paul Chepolis and John Grout.

Three-Man Event, No. 5 Colliery—Winner, Stearns team, composed of Clarence Duncan, captain; Andrew Fedorchak, subject; John Litchkowski, Andrew Novak and Stanley Rigwalski.

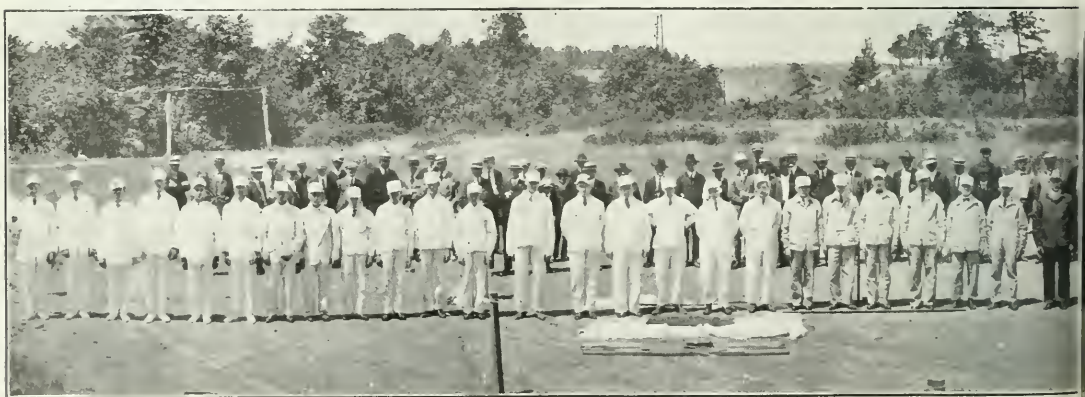
Three-Man Event, No. 6 Colliery—Winner, tie between No. 6 and No. 7 shaft teams, each member of each of these two teams receiving a prize of $2.50. Five teams of this colliery were entered in this event. No. 6 shaft team was composed of Bruno B. Naakja, captain; Steve Rembetski, subject; Marion Olindzinski, Martin Kush and James Gallagher. No. 7 shaft team was composed of Kostic Tekoski, captain; Leon Vaseadny, subject; Elmer Shelhamer, Bolish Terkoski and Andrew Hillan.

Three-Team Event, No. 7 Colliery—Winner, South shaft team, composed of David Lewis, captain; Russell Rowett, subject; Robert Monday, John Grout and John Hudatchek.

Full-Team Event, No. 5 Colliery—Winner, No. 5 outside team, composed of John Hutchko, captain; Fred Poulson, subject; Michael Danilowicz, William Yachimowicz, Otto Schissler and Julius Wolfe.

Full-Team Event, No. 6 Colliery—Winner, No. 6 tunnel team, composed of John Maddy, captain; John Gavrish, subject; William Stevens, Peter Humphrey, Anthony Sawinski and Steven Gotcha.

Full-Team Event, No. 7 Colliery—Winner, No. 7 outside team, composed of Fred Lohman, captain; Ralph Young, subject; Norman Eckerd, William Michelswicz, Albert Keopke and John Turley.



MINE RESCUE AND FIRST AID TEAMS THAT CONTESTED IN THE ELIMIN

CREW WHO WERE INSTRUCTED IN RESCUE WORK AT THE RACHEL MINE OF THE CONSUMERS FUEL CO

Central Pennsylvania First-Aid Meeting

Elimination first-aid contests are now being held in the mining districts all over the country in preparation for the Bureau of Mines national meeting, to be held at Pittsburgh, Penn., Sept. 29, 30 and Oct. 1.

The photograph shown below pictures the mine team that recently contested in a well-handled elimination first-aid meeting held by the Rembrandt Peale coal interests at Sunset Park, near St. Benedict, Penn. These teams were all trained by Messrs. Berry and Nairn, of the United States Bureau of Mines. The team from the Royal Mine, Munson, Penn., captained by John Troup, won first prize with a percentage of 96.75, and the team from Glen Richey Mine, Glen Ridge, Penn., won second prize with an average of 96.25.

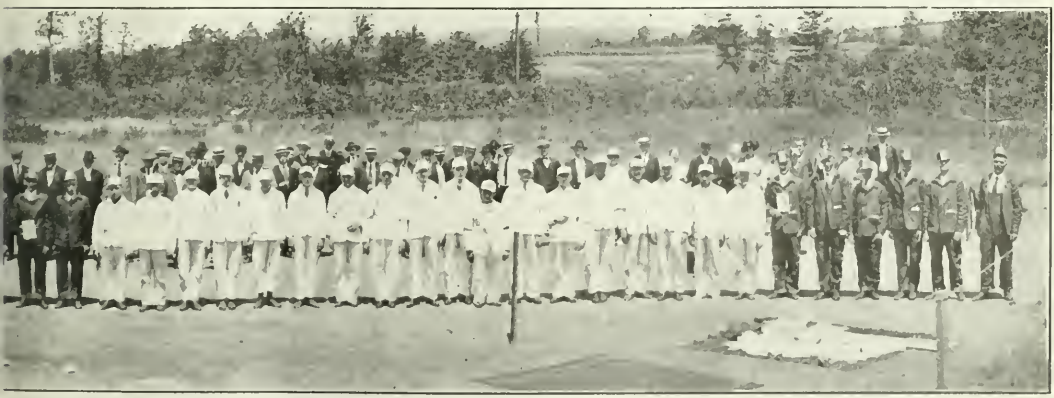
Four full-team events were contested, with H. D. Mason, Jr., acting as chief judge, and J. C. Davies, W. G. Duncan, H. M. Evans, J. W. Boles, R. D. Blair, V. J. Mulverhill and D. R. Ealy assisting. The two winning teams will be sent to the Bureau of Mines contest at Pittsburgh in September.

Mine-Rescue Car in West Virginia

U. S. Mine Rescue Car No. 8, shown in the illustration above, recently completed one of the most satisfactory periods of training in mine-rescue and first-aid work in the West Virginia field, in which interval thirty men were trained in first aid at the Eureka mine of the Consumers Fuel Co., at Randal, W. Va.

Rescue Car No. 8 then moved to Downs, W. Va., where the Rachel Mine of the same company is located. The period of training here covered three weeks' time, in which about 75 men were qualified: 50 in first aid, and 25 in mine-rescue work. William McCoy, Inspector for the Bertha Coal Co., and Charles Wilhelm, mine foreman at the Rachel Mine, had charge of the work.

The work of the U. S. Bureau of Mines is being extended as rapidly as possible in the West Virginia field, and if such interest was displayed at all points of the itinerary as was shown in the case of the Consumers Fuel Co., and Bertha Coal Co., the crew on Car No. 8 would feel greatly gratified and amply repaid for their efforts extend this praiseworthy work.



F THE REMBRANDT PEALE COAL INTERESTS IN PENNSYLVANIA

NEW APPARATUS AND EQUIPMENT

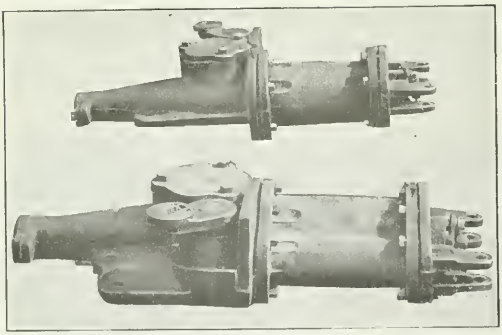
A Fluid-Controlled Check Rail Device

A fluid-controlled check rail for regulating the speed of coasting mine cars has been patented recently by G. M. Johnson, of the G. M. J. Manufacturing Co., of Pittsburgh, Penn. It is intended for use at grades, dips, knuckles and inclines, at the bottom of shaft mines, as well as at the entrance to tipples. That the services of men employed as brakemen and spraggers will no longer be required after the installation of the mechanism, is the assertion of the inventor.

The principal features of the new invention are its regulation of the speed of a car to any desired number of feet per minute, its practical ineffectiveness against a slow-moving car and its simple construction.

The main parts of the device are two angle bars used as friction rails, two adjustable hydraulic controllers employed to function the angle bars, two rear bearings and the necessary intermediate bearings used in conjunction with the friction rails, together with the necessary connecting pins, bolts and screws.

The following arrangement of parts is made: One controller is placed on the track supports, on the inner side and adjacent to each track rail. Five bolts securely fasten each controller to the ties or whatever the track supports may be. A bearing for carrying the end of the angle bar is affixed to the track rail supports on the inner side and adjacent to each rail at a distance from the controller determined by the length of the angle bar used. The bearings are in turn bolted to the

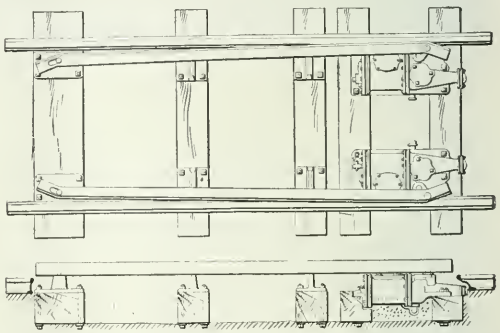


RIGHT AND LEFT HAND HYDRAULIC CONTROLS

ties. The intermediate bearings are bolted to the ties.

One end of each angle bar has a slide mounting on the rear bearing while the opposite end is pivoted to the controller crank by means of a large cap screw. The angle bar known as the friction rail then stands at a slight angle with respect to the track rail, its rear end being inside the gage line while its forward end overlaps the gage of the track rail.

To illustrate the working of the device, it may be assumed that the adjustment hand of the control has been set to pass cars at a speed of 200 ft. per minute. The wheels of a car entering at a speed of, say, 500 ft. per minute engage the faces of the vertical legs of the friction rails and force them inward or toward the center of the track. The fluid within the controller cylinders immediately sets up resistance against the



DIAGRAMMATIC VIEW OF CHECK RAIL INSTALLATION

accompanying movement of the pistons. This results in excessive friction being brought to bear upon the wheels of the car until the speed has been reduced to roughly 200 ft. per minute, at which speed the resistance begins to decrease. By the time the speed has been brought down to 200 ft. per minute, resistance to the motion of the car has vanished, since the area of the controlling part in the valves has been set to allow the fluid to escape freely at this speed. The car then moves out of the friction rails and the recoil springs immediately force back the pistons. This action automatically returns the friction rails to their former position.

New Rivetless Conveyor Chain

A new type of rivetless conveyor chain has recently been invented and patented by J. C. Law. This chain is made of drop-forged steel and malleable iron by the Endicott Forging and Manufacturing Co., of Endicott, N. Y. It will also be manufactured of manganese steel by the Taylor-Wharton Iron and Steel Co., of High Bridge, N. J.

In the accompanying illustrations, Fig. 1 shows the model of two designs of this chain, together with two side, or locking, links. Fig. 2 shows one of the models taken down, revealing the simplicity of parts. Fig. 3 is a detail of the various pins, rollers and links, both plain and carrying attachments.

The simplicity of this chain is perhaps its strongest feature. It will at once be observed how few parts are required, and also how strongly these are constructed.

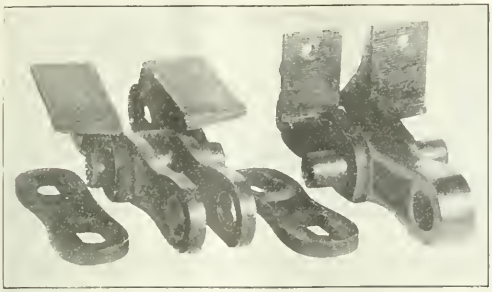


FIG. 1. MODEL OF TWO DESIGNS OF CHAIN

FIG. 2. ONE OF THE MODELS TAKEN DOWN

It will also be noted that the chain may be driven by ordinary single-toothed sprockets, or on the double-outside-drive principle—that is, over a double-flanged sprocket wheel, whereby the outbearings or extensions of the pin engage in depressions or pockets in the flanges or rims of the wheel. The foot wheel in such a case may be an ordinary flanged traction wheel.

The chain may be assembled by hand with the links held at any angle, no tools being required. The various links, rollers, etc., are merely held in proper position, the steel pins inserted and shifted to the locking slots of the outer links.

When a pin becomes worn upon one bearing side, it is simply shifted to the circle of the keyhole slots without disconnecting the links, then reversed and again shifted to locking position. Thus a new wearing surface is presented, the pin giving double wear, while the chain proper is partially restored to original pitch. A notable feature not embodied in other types of rivetless chain is that the pin, being of the same diameter throughout, permits washers to be slipped thereon between the links to take up wear at the joints. The pins are of comparatively large diameter.

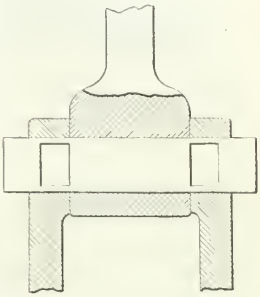


FIG. 4. MODIFIED CROSS-SECTION OF LINK

Conveyor chain used in and about the mine is often subjected to the rapid destructive action of sulphurous water. Such acidulation, as well as ordinary corrosion, attacks any chain rigorously, especially at connecting joints. While the main sections of the links may be in good condition, links wasted at the joints render the chain as a whole unsafe.

In another design of this chain, portrayed in modified cross-section in Fig. 4, the ends of all links are bossed to offset this wasting action. Should the bosses wear completely away, either washers may be inserted between the links to take up wear, or special pins, with the notches cut narrower than originally, may be used. Thus the ordinary life of this chain may be extended for extreme service.

Other improvements over existing types are embodied in the same general design of chain. These are all based upon constructive criticism of various types of conveyor chain employed at mine and industrial plants.

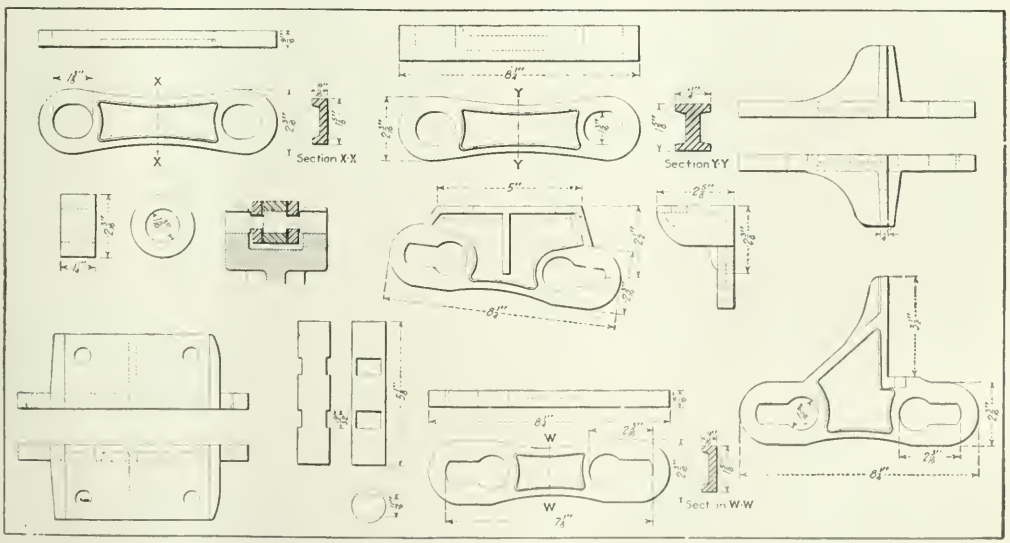


FIG. 3. CONSTRUCTION DETAILS OF A NEW FORM OF RIVETLESS CONVEYOR CHAIN

NEWS FROM THE CAPITOL

BY PAUL WOOTON

Experts Testify in Investigation of Coal Industry

With representatives of coal operators frankly expressing fear of the nationalization of the country's coal mines, the investigation being conducted by the Senate Committee is taking on new importance with each session. The Director General of Railroads, convinced that the coal operators are capable of taking advantage of a favorable opportunity to advance prices, testified at length before the committee. He urged the extension of the Lever Act and asked that the profits of the coal operators be probed. He declared most emphatically that the railroads would be able to handle the situation and that car supply is not an important factor in the situation at present. Francis S. Peabody, of Chicago, the former chairman of the Committee on Coal Production of the Council of National Defense, scored Mr. Hines for his reflections on the honesty of the men engaged in the coal industry and asserted absolutely that the only factor of importance interfering with coal production at this time is the failure of the Railroad Administration to furnish cars and transport them promptly.

Coal Operators Make Good Impression

The committee is more than favorably impressed with the showing made by the coal operators. The members of the committee very apparently are of the opinion that the operators have not exaggerated the shortcomings of the Railroad Administration, but there is a tendency to regard with much significance the failure of the operators to cite any actual instance where coal has been sold below cost to the railroads. It is recalled that operators always have emphasized that the public has been forced to pay a portion of the railroads' fuel bill. There is a feeling that a splendid opportunity existed to substantiate that long-standing claim and that it has not been done.

While Director General Hines had made very positive statements as to the ability of the railroads to handle all the coal that will be needed, he hedged somewhat when Senator Walcott asked this question: "Would you care to say here that the public need not be alarmed for fear that the railroads will not get to the public a sufficient amount of coal to meet their necessary demands?"

In reply Mr. Hines said:

I would not want to say anything to encourage the public in the postponement of the purchase of coal. On account of the concentrated demand in the latter part of this year the transportation difficulties undoubtedly are going to be serious, but my best judgment is that we are going to be able to adopt expedients that will enable us to transport the coal which the public requires. I hope we can accomplish that purpose without going to the extreme of practically cutting off other sorts of traffic.

Mr. Hines stated in justifying his recommendation of the extraordinary remedy of the Lever Act, that the war had created new conditions. He said:

It fixes a Government price for coal which appears to be the starting point for the price after the war. It seems to bring about a closer degree of coöperation among the coal operators than ever before, a greater insistence on their part on maintaining this higher price for coal, and apparently it has brought about a greater disposition than existed before the war to concentrate on transportation difficulties as a thing to cause popular alarm.

Immediately on being put on the stand Mr. Peabody took frank issue with some of Mr. Hines' statements, as follows:

I do not like Mr. Hines' statement, which he very continuously injected into his testimony, that the coal operators are waiting for a pretext to raise prices. There is no coal operator who would not be more than satisfied with the governmental prices provided he could have continuous operating conditions at his mine. Now that the demand begins our situation is very little improved over that before the demand began. Before we had no market. Today we can get no cars.

Mr. Hines also insinuated that if later on prices should go higher the coal man would make that a pretext for breaking contracts at lower figures. What the country needs is more coöperation and less recrimination.

Mr. Hines suggests that we put the Lever Bill into effect. The Lever Bill is in effect. Why doesn't he ask the President to put it into operation again? If he thinks conditions are such that we should be regulated again by the Government, why does he not say so? I do not believe conditions are such as to justify it.

Mr. Peabody also referred to the reduction of railroad stocks of coal to 8,000,000 tons. Said Mr. Peabody:

No sound, well-thinking business man would dare cut his supply of coal to a 16-day margin at the beginning of a period that looks to me as if it might be the most threatening period, and one that starts with the greatest shortage of coal that ever existed. As a result the railroads are going to be forced to confiscate the coal that should go to the public. The railroads instead of cutting down their storage should increase it so that when the heavy demand comes in the middle of the winter they can let up on their demands on the coal operators and let the coal go to the public.

Among the constructive suggestions made to the committee by Mr. Peabody was that Mr. Hines appoint coal men of long experience to act with his regional directors and to act with his administration. He declared that the necessities of the coal industry can be determined only by men of long experience in that industry. He made a plea for friendly coöperation between the Railroad Administration and the coal operators. He said the situation was such that it cannot be reached by legislation.

The operators are not profiteering, Mr. Peabody said. He called attention to the fact that in many places they could get one dollar more per ton for their coal if they were to ask it. He admitted that one reason for that

action was the fear that increases in prices would cause such a public demand as to influence Congress in favor of the nationalization of the coal mines.

John H. Sherburne, of Boston, the chairman of the state committee investigating the cost of living, testified that Massachusetts is short at this time one-third of the bituminous tonnage which should be in the state. Anthracite supplies are 25 per cent. short. These figures were thought to be fairly representative for other sections of New England. Deliveries by water, Mr. Sherburne said, are one-half of normal. His assertions in this regard were denied emphatically before the committee by representatives of the Railroad Administration, who believe that the coal supply in New England is not far from normal and that the only reason for such shortage as exists is the fact that the coal was not ordered in the spring as has been customary in previous years.

Operators generally are perfectly willing that Mr. Hines's suggestion in regard to investigating operators' profits should be acted upon. They point out that the profits in many districts have been made a part of the records of this hearing.

Compares the Coal Prices in Several Districts

After having compiled considerable extra data concerning coal prices and car-supply conditions, J. D. A. Morrow and John Callahan, of the National Coal Association, appeared again before the Senate Investigating committee on Sept. 2. The chairman of the committee explained that the whole object of the extensive questioning is to bring out whether there is any foundation for the numerous complaints to the effect that the coal operators are taking advantage of the situation and are advancing prices arbitrarily. He called particular attention, when examining Mr. Morrow, to an anonymous advertisement which appeared in the *Chicago Tribune* of Aug. 27. The advertisement read as follows, "Coal miners present their demands Sept. 9. Strike or no strike, you face an advance on coal up to $1 per ton after that date. England raised the price of coal $1.50 per ton in a similar crisis. Smokeless coal (Pocahontas or Pennsylvania) is still available in limited quantities, but the time for delivery is short as cars and labor are scarce. Better buy all you can today." Mr. Morrow assured the committee that he had no idea who had inserted it.

Mr. Morrow compared the latest average prices of sales in several districts with the prices fixed by the Fuel Administration. The information as to prices was compiled with the greatest care by local coal associations for presentation at the hearing. In the Pittsburgh District there is an increase of 10c. a ton over the Fuel Administration price. In central Pennsylvania there is a decrease of 9c. a ton. In northwestern Pennsylvania there is an increase of 14c.; in eastern Ohio a decrease of 26c.; in southern Illinois an increase of 3c.; an increase in two districts in Indiana of 8c.; and in the Harlan Field an increase of 48c.; an increase in smokeless of 11c.; an increase in northern Pennsylvania of 25c.

While on the stand, Mr. Morrow found occasion to call attention to an error on the part of the Director General of the United States Employment Service in his recent statement to the effect that there are 1,000,000 men employed in coal mines. The number should be, in Mr. Morrow's opinion, 550,000. "I want to make it clear," said Mr. Morrow, "that from information we have the shortage of men at coal mines is more acute in those fields that are nearer the great industrial districts. The shortage of labor at the mines is spotted." He presented actual figures of the shortage in a number of districts.

Mr. Callahan gave additional information with regard to the car situation. One of the practices of the railroads, he pointed out, which is a factor in keeping open-top cars out of service, is the use of such cars by the railroads to store slag and railroad coal when it is inconvenient to dump or transport these commodities from the point of loading.

Much to the surprise of the committee, the hearing developed that the Geological Survey, because of the refusal of Congress to appropriate the money, had been forced to suspend the collection of statistics as to the amount of coal consumed and to the amount in storage. It also was brought out that even the weekly statistical statement being furnished by the Geological Survey is being got out by funds furnished by the National Coal Association. It was shown that without such data it is impossible to make an accurate estimate of fuel requirements for the current year. The estimate of 500,000,000 tons, it was pointed out, is based on an estimate made by Dr. Garfield about the time that he severed his active connection with the Fuel Administration.

A striking feature of the hearing was the reply of Mr. Morrow to the following statement made by Chairman Frelinghuysen: "I would like to see a situation where we could produce enough coal, not only for ourselves, but let our Allies have as much as they need." Mr. Morrow's reply was: "If we can get the cars at the mines, and if they can be moved, we can produce all the coal that this country will need and still have a large surplus for our Allies."

America Could Secure Foreign Coal Business

On Sept. 3 H. Y. Saint, head of the export coal department of the Shipping Board, appeared before the committee. He stated that the Shipping Board has 929,684 tons of shipping engaged in carrying coal to foreign countries. He said that 100,000 additional tons are about to be allocated to take care of the Italian situation. He told the committee that the time is most opportune to extend our sale of coal to foreign countries. By making time contracts abroad he believes that the United States can secure permanently a considerable portion of the coal business which before the war was done by England. He declared that England had made an effort to take care of former customers in South America, but that she had been practically unable to do it and that South America today is being supplied almost entirely with American coal, although much of it is being carried in foreign ships. Mr. Saint asserted that the shortage of coal abroad this year had been estimated by the Shipping Board to be 62,463,000 tons for the calendar year.

Correction

A correspondent calls our attention to the fact that in our issue of Sept. 4 the address of the Hamilton Manufacturing Co. is given on page 404 as Hamilton, Ohio. It should be 310 Schulz Building, Columbus, Ohio.

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Six Months of Truce

THE exhibit of conscience, boldness, and clear vision in the report of the committee on high cost of living to the New York State Federation of Labor entitles it to a place on the foreword page of this issue. It is the foremost work of the present month. If it is duly heeded, the ills of our idleness since the eleventh day of the eleventh month of last year will be rapidly mended. All the losses of production resulting from lack of faith in the future and from strikes and slacking will be corrected, and prices may come down.

Quite rightly the report leaves a loophole for the oppressed. Some of those whose wages have not been raised since the war began, or whose wage scale has been revised in a wholly inadequate manner, may, without even a strike, have their plight relieved. If that is done quite generally there will be a tendency of prices to rise, but that rise will be balanced by their disposition to fall as a result of the great production that steadily working labor will provide.

The proposition to do a ten-hour day's work in eight hours and the implied purpose not to ask for a shortening of hours are alike gratifying. Labor has boasted that the shorter day was as efficacious as the longer day of our forefathers. The committee would have the New York workingman prove this to be true. Though the state and national federations have not accepted the report, its publication has done not a little already to encourage the moderate majority in the labor ranks and to call a halt to that radical minority which seeks too often not merely more pay but anarchy.

No one but visionaries believed that prices would come down after the war, excepting, however, a somewhat numerous body of deluded men who believed that the end of the war would see wages cut squarely in half.

The Valley of a Thousand Smokes

A VALLEY in which there are many mines much resembles the valley of Katmai, in Alaska, with its thousand smokes. Seen on a foggy morning, the ascending fumes from the many fires in some valleys seem to number no less than one thousand.

There is the fire alongside the boiler house, where half-burned and half-quenched ashes have been dumped and have caught fire to smolder for weeks and months. There is the old bone pile, which has been fired by some tramp who has sought to cook stolen chicken and a few ears of corn by the light of the moon.

The slate dump, barren of coal as it frequently is, often is rich in oil shale. It also perhaps has been set on fire by the smudge ignited by a rock dumper, who sought its genial glow some winter's day, or tried, in the summer, to subdue the plague of gnats. Or the fire has come from the blacksmith's clinkers, thrown out into the loose rock crevices while still red hot. Or, again, the woods may have been fired and the fire encroached on the rock dump. The number of calories in a harmless looking dump of black or even grey shale, and the months it will burn, would be a marvel did we give it a thought.

Then, again, a waste washery dump, or the coal that fell below what is now a disused and decaying tipple, may be burning. The many steel stacks of the boiler house are belching out the blackest of black smoke, which mingles unpleasantly with the fine steam spray from the exhaust of the engine. Then, again, if there are coke ovens, their efforts to blacken the air are even more successful in that task than any of the other agencies.

Most of the offensive smokes have their appropriate cure. The ashes from the boiler house may be efficiently quenched or washed away by a flood of water. A better way is to dump these ashes into a motor truck, and use them for road material, while the most effective of all would be to completely burn out the combustible matter from the fuel before rejecting the ashes. Bone coal may be similarly disposed of. As for the slate dump, at most mines it is too large to distribute. Only where the coal is thick is the rock brought to the surface so small in quantity that it can be wholly used for grading purposes. At every mine with proper equipment for handling it, however, much more mine rock could be utilized.

Washery waste is also obtained in too great bulk for distribution, but the woods can be cleared off around the fringe of such accumulations; the blacksmith can be warned to quench his cinders; the greaser can be told to see that the fire with which he thaws out the oil does not spread over the oil-soaked shales; and the dumper can be supplied, as indeed he should be for other reasons, with a cannon-ball stove wherewith to warm himself in winter and to protect his face and hands from insects in summer, and as for the boiler smoke, it may be said that there is no saving in inefficient boiler equipment. The cure for smoke of this kind is perfect, or at least near-perfect, combustion.

All of these cures ignore the problem of coke-oven smoke, and rightly so, because the beehive oven is being fast ignored by everyone. Its ill behavior, like that of the old-fashioned boiler, has not the excuse of profit or advantage. The old types of ovens must pass with the days. The byproduct retort is none too clean, but it is better than the beehive or the Belgian oven; and surely, in time, its smokiness will be wholly eliminated.

But whatever cause may be behind each of the thousand smokes, let them all be slowly and surely suppressed that our mining communities may be as cleanly as knowledge and skill can make them. Our towns are getting dirtier rather than cleaner, with their larger output and growing use of steam power. They are apt to be less lovely, year by year. Let us try to exorcise the genii of dirt which our methods of operation have unloosed.

Smoke has often been used to typify industry, prosperity and creation, but symbolic as it is of the good, with equal aptness it may be expressive of squalor and discomfort. A little thought, labor and expense devoted to the suppression of smoke will give transforming nature a welcome opportunity to do her perfect work.

Size of Safety as an Industrial Issue

IN THE 19 months of our war with Germany 50,150 men in the American forces were killed in battle or died of wounds received in action. The nation has been stirred about that human sacrifice as perhaps it never was stirred before. We have exercised ourselves over the compensation of the bereaved and of the injured, over life insurance of the soldier and the reconstruction of our mutilated warriors. Our interest in the war losses has been too small rather than too great, but we have given to these losses more attention than we have expended on an evil equally important.

In that same 19 months, in peaceful America, 126,000 men and women were killed or died of wounds, of whom two-thirds were killed in accidents that occurred outside of what we know as industrial plants. It is clear that the safety problem is a large one, overshadowing even our great war problems. If all we could do with it was to deliberate about it, it might be just as well to let it remain undiscussed. But all who are putting safety practices to the test are finding that they certainly save life and limb.

Luckily men are rarely killed without some opportunity for accident being supplied them. The victim contributes only in a degree to the accident. We have been in the unfortunate habit of saying that the killed or injured is to blame if he contributed only 10 per cent., and that he is inexcusably to blame if his contribution was as much as 90 per cent. Thus a man falls into an open ditch and it has been quite generally the rule to find some excuse such as the fact that he had passed that point several times before and so should have known better. Or again, if he had been watching or thinking about what he was doing, he would not have overlooked the presence of the ditch, or perhaps that it was not on the road by which he was supposed to travel. Again we have said that it would certainly have been visible had his light been burning brilliantly or that he had been warned and that there was a danger sign nearby to protect him. And so we went on, finding palliations for the uncomfortable truth that the ditch was not covered. The victim clearly was forgetful, careless, stone blind, stupid, disobedient, neglectful—but it cannot be forgotten that he could have been all these and yet safe, if the open ditch had received the appropriate covering.

The American Rolling Mill Co., at Middleton, Ohio, reduced its compensation per 100 men employed from $412.76 in the first five months of 1918 to $38.29 in the same five months of 1919, a fall of 91.9 per cent. The total number of accidents involving lost time during the same period dropped from 4.2 to 2.3 per 100 men, a decrease of 46 per cent. The number of days lost from accident declined per 100 men from 50.4 to 24.8, a fall of 51 per cent. Clearly then, "safety work" is worthy of its name, for it certainly does save lives and prevent accidents. It also reduces compensation costs, and the company which fails to keep in touch with the developments of the campaigns for safer mines and factories, which the National Safety Council and kindred organizations are fostering and inaugurating, is letting an important aid in safety and life and health economy be overlooked.

Some of their work is inspirational solely, but who can afford to overlook the driving force of safety—inspiration—the very steam of accident prevention? Enthusiasm is more important to safety than the mechanisms of accident prophylaxis. Still the mechanism must be there if you would let in the steam, or nothing will be achieved. Too many have preached safety and left ditches uncovered, roads without safety holes, stairways unsheltered and machinery unguarded, and wondered why steam alone could not do the work.

Col. Arthur Woods, assistant to the Secretary of War, who is conducting a nation-wide drive for reëmployment of service men, stated on Aug. 25 that to date 1700 officers and ex-officers of the American Army, a greater portion of whom have seen service abroad, have registered with the department as applicants for positions. If you are looking for managers, superintendents or engineers, where can they be more fittingly obtained than from the American Expeditionary Force?

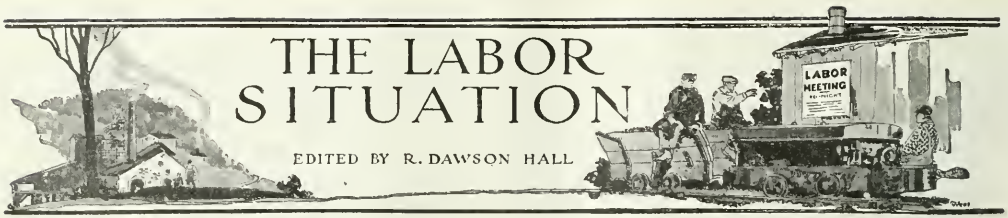
Some Inequities in High Wages

ANYTHING constructed before the war is worth its replacement cost less depreciation and obsolescence. Consequently, factories and the machinery in them are worth, let us say, quite roughly, 70 per cent. more in dollars than they were before the war. These factories are mostly owned by companies which, quite usually, have a large issue of bonds and of preferred stock which pay a limited percentage. Consequently, all the appreciation in value goes to the limited amount of common stock outstanding.

The values of common stocks are therefore bound to go up to levels not known before. If, by undue fear of a charge of profiteering, no advantage is taken of the increased replacement value, then no one paying the present prices of labor will find it profitable to build the new factories or buy the new machinery required. However, it must be said that as far as factories are concerned, most companies have already anticipated their needs for many years during the progress of the late war, and only the cost of adjustment to peace conditions has to be met.

Railroads would show the same advance in value if freed from the practical ownership of the Government and from Government control. If the nation does not allow railroads to make earnings on the basis of the cost of replacement, there will be few betterments and enlargements of service such as electrification. New extensions into noncompetitive territory might be made if rates on such new work were made larger than are granted to traffic along the old lines, but such extensions will not make up for, but only render more trying, the fact that there will be no development at all where old railroads already provide inadequate transportation. The same considerations apply to electric traction lines.

If an undue desire is shown by the public for its own protection, there will be no initiative shown by any corporation. We shall stew in our own juice. If capital invested before the war is not allowed to raise earnings on the basis of replacement values, the nation will stand stockstill. Labor, by being over-reaching, will have checkmated itself. It will have suppressed the progress on which its future depends, unless it is willing that some individuals who have taken all the risks of business earn two depreciated dollars in place of one good one; and others who are fortunate enough to have bonded indebtedness receive three, four and five of the new and shrunken dollars in place of the good ones they expended.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Rarely ever have labor affairs in the coal-mining fields been more stirring than today. Two processions of mine workers have been touring the coal fields trying to bring out the men who are working. Both processions are in violation of the orders of the union and one is being conducted more in anger at the United Mine Workers of America than at the coal operators while the other is of men who are not complaining about their own working conditions or wage scales, but who are faring forth to compass the unionization of the men in another district.

It is a bad condition of affairs for the union leaders. The mine workers are insurgent at the very moment when their representatives and counsellors are called to meet in convention. The meeting may have to be called off while the leaders go back home to keep their following from getting into serious trouble. In the anthracite field the Hudson Coal Co. mine workers are all out on strike and the Missouri and Kansas mine workers are having extensive suspensions. On Tuesday, Sept. 9, the convention of the United Mine Workers of America met in Gray's Armory, Cleveland, Ohio, to formulate a wage scale which is to come into effect, if what they ask is granted, on Nov. 1. The plan seems to be to have a nation-wide strike to cover all the unionized area, if the terms proposed are not met, except the New River and Kanawha fields, which have a contract that forbids a strike. The only other working sections will be the Connellsville region and its surroundings and the Pocahontas and Thacker fields. No one knows but what these exceptions will fail when the time comes.

STRIKES IN GERMANY MAKE COAL SHORTAGE

German people with hand carts besieging the freight station for a modicum of coal

At the convention William Green, international secretary-treasurer, announced that the treasury had never in its history found itself bulging with more money. The balance on July 31 was $1,728,906.12. The paid up membership for July, 1919, was 409,392 with 43,648 men exonerated, a total of 453,040 or $3.82 per capita. Should a strike come it might be necessary to take on many more men for some nonunion workers would find themselves in destitute circumstances and it would be obligatory to pay them strike pay so as to strengthen the union against the possibility of these men returning to work.

This international fund, as can easily be calculated, could pay every underground day laborer for just 6 hours of labor according to the present wage scale. According to the projected wage, a 60-per-cent. increase and a 6-hour day, it would cover the earnings for from 3 to 4 hours, being much nearer the shorter period of time.

Still the bulk of the funds of the union are by no means international. Most of the districts have funds of their own which in proportion to membership are somewhat more plethoric. Four years ago, said Mr. Green, the International Union owed $877,860, which had been borrowed from the various district funds, for supplying food and clothing to the members of the union and their families when the mine workers were on strike in Colorado and eastern Ohio. Since then all this money and $200,000 lent by the Illinois district to that of Ohio has been paid by the international union.

He ascribed the better financial condition to the increase in the per-capita tax, at the last international convention, from 25c. to 50c. per month per member. The union has $57,581.35 in the Louisville Bank, Louisville, Col., the Lafayette Bank, Lafayette, Col., and the Erie Bank, Erie, Col., while District No. 12 has a total of $50,000 in the three banks named and in the Interstate Bank of Denver, Col. District No. 27, Montana, has $8000 in the last-named bank. For the $58,000 deposited the international fund gave its pledge to the district unions promising to repay the money if the unions failed to get the money from the banks. These sums of money were loaned to the American Fuel Co., who agreed to employ only union labor, and the districts agreed that they would not hold the banks responsible unless the fuel company repaid the banks the money that had been lent to it. Three of the banks, those at Louisville, Lafayette and Erie, became insolvent and the court has refused to order the money repaid to the district treasuries. Of course, the $57,581.35 will be only in part recovered. Thus $115,581.35 is not now available.

Mr. Green stated that he sent a questionnaire, relating to the number of union men in the United States forces and the number of men killed and wounded, to all the local unions, 3237 in all. Answers were obtained from 2372. These incomplete reports show that 53,812 members of the union left the mines to engage in the military and naval services of the union or an average of 16 to each local union. Of these 3033 were killed or died of disease.

Local unions of the United Mine Workers purchased, as far as ascertained, $5,433,170.25 of Liberty Loan Bonds and $1,418,828.32 of War Savings Stamps. The International Union and the affiliated district organizations purchased $2,954,050 and $6993 of War Savings Stamps. This makes a grand total of $8,387,220.25 of bonds and $1,425,828.32 of War Saving Stamps.

These figures do not include the bonds and War Savings Stamps purchased by individuals who were and are members of the organization nor do the figures include the amount of Victory Loan Bonds purchased by districts, subdistricts or local organizations.

It does not include either the patriotic efforts of District 18—the only Canadian district in existence during the progress of the war. In this section 266 union members served. 88 men being killed or dying of disease. They purchased $26,743 in Canadian bonds and the International Union bought $100,000. This, Mr. Green adds, is a remarkable showing for the local unions as in District No. 18 they number only 42.

The report of Acting-President John L. Lewis was largely a review of facts already published, but it may be stated that legislative action was recommended in the matter of the menace to the mine worker of cheap Mexican fuel oil.

The Hudson Coal Co.'s men have found or advanced so many causes of complaint that it is hard to know on what basis the present strike started. It was doubtless the foreordained outcome of countless irritations and of the character of the Hudson Coal Co.'s employees. The trouble which was the immediate cause of the suspension was the use of the mechanical coal loader at Powderly colliery in Carbondale. On Friday, Aug. 29, the 1500 men of the Powderly and No. 1 collieries in Carbondale and the 800 men of the Jermyn colliery went on strike.

On the Tuesday following they voted to call on the general grievance committee of the Hudson Coal Co. to declare a general strike of all the employees of the company from Plymouth to Forest City. The committee was to hold a meeting Friday, Sept. 5, and it was asked to take the action requested provided the mechanical loader was not removed by that time. The men decided that if the grievance committee failed to act as requested they would go back to work and thresh out the matter later.

It is alleged that the company on Wednesday, Sept. 3, laid off all the engineers, pumpmen, firemen and like employees about the Powderly, Coalbrook and Wilson Creek collieries. The places of these men were taken by mine foremen, breaker bosses, mine clerks and other lower officials. On Sept. 5 the grievance committee had a meeting with the Hudson Coal Co. officials without securing concessions and ordered a general suspension at all the mines of the company in the Lackawanna and Wyoming valleys.

On Sept. 8 it was reported that 30 mining plants were idle, there being 20,000 employees refraining from work. Apparently there has been another cause for disagreement. Some roof fell in the Archbald mine, and the men, refusing to remove it at laborers' wages, were discharged. They demanded the consideration rate of pay. Each mine combines its protest to that against the mechanical loader. Thus Wilson Creek presents a protest against what it terms excessive dockage.

It is feared that as a result of a vote on Sept. 8, the result of which was not known on going to press, another 20,000 men will join the strike. On Sept. 8 six mines of the Hudson company in the Wyoming valley were still working with decreased forces but 10 others in that same section were idle.

The strike is regarded by the company and the union alike as an unauthorized suspension. It is a violation of the contract. Jack Dempsey, the district president, is returning from Cleveland to try to end the strike which the grievance committee has called largely to prove the strength of the insurgent forces in District No. 1.

EVERYWHERE HIGH WAGES WENT THE RAM WAS SURE TO GO

HOW UNCLE SAM'S NEW DOUBLE-ACTING HAMMER GETS THE UNIFORMED AND SALARIED MAN

One thousand men employed at Nottingham No. 15 colliery of the Lehigh and Wilkes-Barre Coal Co. at Plymouth went out on strike during the past week because of a refusal of an acting inside mine foreman to listen to their grievances. The men say that the acting inside foreman took the company men from their regular work and put them at objectionable labor. The men took their grievance to the acting foreman but they say he ignored their request to leave the company men at their usual occupations.

In western Pennsylvania the mine workers are far more peaceful than in other parts of the country. There is, however, at least one strike. The Allegheny Coal and Coke Co. has not yet acknowledged the union, and the strike at that mine continues. President Wilson on Aug. 30 directed Secretary of Labor Wilson to send an investigator to Breckenridge, Penn., to probe the killing of Mrs. Fannie Sellins and of the man who was killed at the same time.

The increase in the rate of pay became effective on Sept. 1, and while the public was not informed as to the percentage of increase it is said to have been of a substantial nature and sufficient to equalize the wages with those paid in other districts. The resolution authorizing the increase recited that such action was taken in order to assist employees in meeting increased living costs.

In West Virginia the troubles have amounted to open civil war, but before narrating them it is necessary to go back to recent events. Following the increase in wage in the Pocahontas and Thacker, or Williamson, fields, already related, the Winding Gulf Operators' Association decided upon an increase in the wages of their employees, the advance applying to practically all mines in the field.

The advance in wage of the Kenova-Thacker, or Williamson, field is arranged to cover the Pond Creek field also. The operators' association of the Williamson field met at Williamson, Aug. 21, and again canvassed the situation, confirming the tentative action of Aug. 14. All employees will participate in the wage readjustment, the salaried men and company men; in fact, all classes of employees.

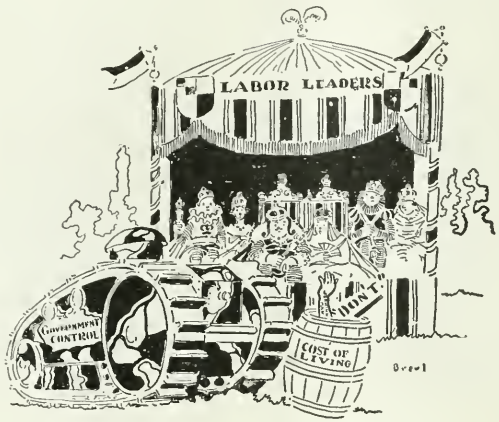
All these wage increases would seem to promise a short respite in the labor disputes, but unfortunately this is not so. On Saturday morning, Sept. 6, the miners at the larger operations on the Kanawha & Michigan R.R. on the north side of the Kanawha River as well as on Coal River not only refused to work but many of them, or at least so many of them as were armed, started from various points, having in view an invasion of the Guyan Valley. The miners from Cabin Creek and other points east of Charleston reached Peytona in Boone County at noon and started toward Danville, another point in the same county. Another gang had Clothier in Logan County as its objective, a number of the miners in the vicinity of Clothier, including six of the Boone County Coal Corporation plants, having taken part in a strike of the mine workers.

As soon as Governor Cornwell learned that the miners had started on their march toward the Logan County line he called in F. C. Keeney, president of District 17, and showed to him a copy of a telegram he had supplied to Secretary Baker inquiring if federal troops would be sent if it became necessary to send for them. Placing a copy of that telegram in Keeney's hands he instructed him not only in his official capacity as president of the United Mine Workers but as the personal representative of the Governor to meet the Kanawha miners before they reached Boone County and to tell them that unless they abandoned their intention of invading Logan County he would call on the federal troops. The Governor made Madison, the county seat of Boone County, the deadline and that line the marchers never passed. If they had, he would have requested two regiments of federal soldiers.

Keeney intercepted approximately 1,000 miners before they reached Danville and prevailed upon them to camp at that place over night, informing Governor Cornwell that the men would proceed no further. Sunday morning the miners in camp at Danville voted to return to their homes.

Miners further up Coal River, however, more radically inclined, were busy Sunday morning organizing a meeting for Sunday afternoon at which it was proposed to determine upon the future course of action with reference to the invasion of the Logan field. As soon as Governor Cornwell learned of the proposed meeting he directed President Keeney to go to Clothier and tell the miners there that the meeting must not be held and that if it were he would feel under the necessity of asking for federal troops.

In the meantime the Governor had directed Chesapeake & Ohio Ry. officials at Huntington to make up a special train for the purpose of bringing the striking miners back to their homes on Cabin Creek and elsewhere. Three special trains were made up without delay and the first one was ready to leave Clothier at 12:30. It did not leave there until nearly 4 o'clock, waiting for the adjournment of the meeting of the miners; which was late in being convened, as the arrival of President Keeney had to be awaited. When that official arrived he took charge of the assemblage.



ROYAL SPORT OF BARREL BUSTING

LABOR (victim in the tub): Turn aside. What's in the barrel is mostly ME

A resolution was offered that the Governor be allowed 15 days in which to aid the Kanawha miners in organizing the Logan field. The president refused to entertain the motion as well as other radical motions, and in fact to entertain any motion except to adjourn, which was put and carried. Immediately following adjournment, 500 miners boarded the special train.

At 5 o'clock the same train picked up about 1,000 miners at Danville, part of whom were sent to their respective homes up Big Coal River on another special, the main body of strikers passing through Charleston before nine o'clock en route to Cabin Creek and other points east of Charleston, ending what had proved to be a serious situation bordering on civil war and which would have ended in civil war itself but for the firmness of the action of the Governor of the State. He made it quite plain that he proposed to meet force with force if after having made a vain appeal to them they did not desist from the folly they had proposed.

On Monday morning most of the miners in the Kanawha field had returned to work, for the time being at least, some of the more radical among them still threatening that they would yet invade the Guyan Valley, unless they were permitted to organize the Guyan field mines, either forcibly or peaceably.

Late Saturday night, Sept. 6, in response to certain inquiries, Governor Cornwell issued the following statement: "Frank Keeney, president of the United Mine Workers of this district, left here at noon to-day for Coal River to head off the men who marched across from Marmet. He went at my request and as my representative as well as in his official capacity as president of the United Mine Workers. Before he left I told him I had appealed to the marchers personally, had reasoned with and warned them, that if they now persisted in invading the Logan field they would do so at their peril, and I showed him a wire I had sent Secretary Baker preparatory to a request for two regiments of federal soldiers. I authorized him to tell the men what my next step would be.

"I later talked with Secretary Baker and communicated with General Leonard Wood, commander of this military district, and all was in readiness to move two regiments of regular troops into the area threatened. For five hours I have held on my desk the telegram requesting their movement. I have just talked to Keeney, who was at Danville, Boone County. He advises that the main body of men, 1500 in number, are in camp there, and gives me absolute assurance that they will go no further, but arrangements will be made to bring them out on a special train tomorrow.

"He left there immediately after the conversation to head off another party of men some 12 miles above Danville, but I am accepting his assurance in good faith and will not order the troops unless there should be another outbreak, which I do not have any reason to fear. I believe that the men will all be back at work Monday, regretful that they have been imposed upon and ready to help discover and punish those responsible for the wild stories that aroused them."

On Sept. 8 most of the men were back at work except about 25 per cent who were resting up after their march.

In Illinois the rebellion of radical members of the United Mine Workers has about been stamped out by the revocation of the charters of 24 locals with a membership of 5500. The Belleville and Collinsville miners, who started the trouble, died hard, continuing their revolt after they had been expelled and after their own State policy committee had advised submission, but they finally surrendered.

Last week State President Frank Farrington gave the strikers, who were trying to enlist the entire State in the mutiny and overthrow the state administration of their organization, until Saturday to return to work. Most of the Belleville and Collinsville men and scattered locals over the State defied Farrington to expel them and continued their strike. The Belleville men, hoping to increase their following by spectacular methods, put an "army" of about 200 men into the field Sunday and started it on a march toward the southern Illinois field, where the miners are loyal to the organization. Farrington's reply was a revocation of the charters of the striking locals.

The "army" met encouragement and received assistance as it marched through St. Clair County, but had a cool reception in Randolph and Perry Counties. When it reached Coulterville, in Randolph County, word came that the State Policy Committee had met at Gillespie, following the revocation of the charters, and had come to the conclusion that further opposition was useless and had advised the strikers to return to work. This news caused about half of the army, which had been swelled to 350 men, to turn back.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Child Labor in Mines

Leter No. 1—Referring to the child-labor question, I quite agree with the opinion expressed by the editor *Coal Age*, July 3, p. 24, who regards it as "unfortunate for the country at large that a difference should be made between the age at which children can be employed in factories and mines." The reference, here, is to a bill before the Illinois legislature imposing a tax of $2 on children under 14 years of age employed in factories, and under 16 years of age when employed in mines or quarries.

While I am a great believer in the education of children, there are many things to be considered if we would be fair to the parents who rear them. Incidentally, I fail to see the reason for the distinction that the Illinois law makes between boys employed in factories and in mines, the age limit being 14 years in the former case and 16 years in the latter.

Like many other miners of my age, I entered the mines for work (Apr. 2, 1891) two months and twelve days short of 10 years of age. While I believe that this is too young for boys to start to work, I am fully convinced that all boys should know what it is to do a fair day's work, before they reach 16 years of age. The reason why I started so young was that I had a natural dislike for books.

My father, thinking to change my mind and give me a desire to go to school, took me with him into the mine. The result was, however, the opposite of what my father intended. There were many other boys of my age in the same mine, although the law prescribed an age limit of 12 years; but it is needless to say that this portion of the law was not enforced then as it is today.

The Boy, the School and the Father

Speaking of boys, there are two classes. First, the boys that have a desire to go to school and get all the education they can. Second, there are the boys who have a strong dislike for study and would far rather go to work than to attend school. Now, while every encouragement should be given to boys of the first class to permit them to get the education they want, it would be a waste of time to force boys of the second class through the same course of study. As we all know, the world is made up of different kinds of people; some are students and it is natural for them to study out a problem; but it is just as natural for others to work out the same problem in practice. Boys of the latter class often develop into self-made men.

In regard to the father of the family, there are four conditions of life: (1) The man who is able and has the desire to educate his children. (2) The man who is able but has no such inclination. (3) The man who, though desiring to educate his children, has not the means to carry out that purpose. (4) The man who neither has the desire nor the means to educate his children.

Child-labor laws apply more particularly to the indifferent class of parents and children, the aim being to make education compulsory, to the end that every man and woman shall possess at least a common-school education. Personally, I have nothing but contempt for a parent who is indifferent to the education of his children; but I have always been taught the maxim, "Of two evils choose the least." In line with this maxim, let me say that where a father needs the help of his boy at the age of 14, there should be a provision in the law that would enable him to put his boy to work; and this would often prove more beneficial to the boy as well as to the family.

Finally, then, while favoring the age limit of 16 years for boys in mines, I feel that many working men, particularly those of the laboring classes, have not the means to support their families without the help of their boys between the ages of 14 and 16 years. In any case, I can see no reason why boys under the age limit should not be permitted to work both in factories and in mines, during the months when schools are closed or what is termed the "vacation months" of the year.

Wilkinsburg, Penn. A. A. ALLEN.

Problem In Coal Extraction

Letter No. 2—The problem presented in *Coal Age*, Aug. 7, p. 234, regarding the extraction of coal from a seam whose thickness varies from 8½ to 11 ft. and which lies at a depth ranging from 450 to 600 ft., is an interesting one. It is there stated that the top and bottom layers of the seam are hard coal, while the middle layer is softer and rashes easily.

The proposition presents many difficulties, some of which are met and overcome by the methods adopted. One of these difficulties, for example, is the nature of the "siliceous shale" that disintegrates readily when exposed to the air and which has been overcome by leaving up the top coal, in the first mining. This plan should certainly be carried out in all future operations, as the top coal thus left can be readily recovered in the robbing.

Another difficulty arising from the cleavage planes that exist in the top coal and overlying shale and extend approximately north and south, has been overcome by driving the rooms east and west, which avoids the risk of roof falls that would prove dangerous in the rooms.

After a close study of the conditions described in this article, it appears to me that the chief problem presented is one of insufficient pillar support during the first working when the width of pillars should be such as to give the strength required to carry the overburden and yet allow of the rapid extraction of the pillars in the work of robbing.

The statement is made that a modified panel system is used, by driving cross-entries off the main headings, at a distance of 1565 ft. apart. The room headings are said to be turned off the cross-entries far enough apart to leave a block of coal 520 ft. wide, which is worked out by rooms driven on 45-ft. centers.

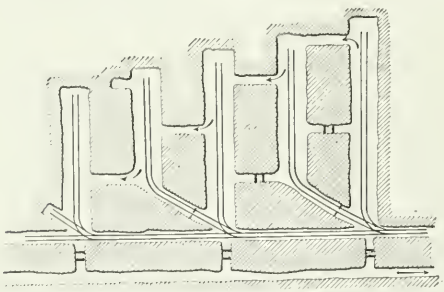
The rooms are necked 18 ft. wide to avoid yardage and are driven the first 100 ft. at a width of from 18 to 21 ft., after which they are widened to 28 or 30 ft. Seemingly in contradiction of his first statement, the writer adds, "All the rooms on a panel are started at the same time, when the entry is finished, and are widened to the full width of 24 ft., in four machine cuts." I assume, however, that this last statement is in error and that the rooms were driven 30 ft. in width, as first described.

Conditions Must Be Studied on the Ground

Before making suggestions of improving the present plan of mining, let me say that it is seldom possible to sit in an office and decide questions of this kind from the data presented in an article. There are always details and indications that the practical man on the job can interpret and which, many times, will completely alter a plan suggested by someone who is not entirely familiar with the actual conditions existing in the mine, but who must judge from the facts as they are narrated. I am, therefore, presenting a possible solution of this problem with the full knowledge that if I had an opportunity to go to the mine in question, my suggestions would be materially altered.

According to the data given, the total distance that the rooms must be driven is 260 ft., or half the distance between the room headings. For 100 ft. the rooms are driven at a width of 18 to 21 ft. Then, for the remaining 160 ft., I assume that they are widened to 30 ft., which leaves but 15 ft. of pillars between them, for that distance. Under these conditions, I wonder that the amount of coal recovered reaches even 50 per cent.

Instead of this arrangement, allow me to suggest driving the rooms on 60-ft. centers, 24 ft. wide, after



OPENING TWO ROOMS OFF A SINGLE NECK

necking is completed. If it would cause no labor trouble, my preference would be 75 ft. centers with rooms 30 ft. wide, opening two rooms off one neck, as shown in the accompanying sketch. This would, of course, mean longer crosscuts between the rooms and there is a possibility of labor troubles growing out of the plan. That can probably be avoided, however, by driving all cross-cuts 18 ft. in width, the same as the roomnecks, which should meet with no objection.

If a greater extraction of the coal can be secured it might be possible to increase the rates, allowing it would not disturb existing agreements in the district, regarding which I am not familiar. It appears to me, however, that an increase of rates would not be necessary, as the suggestion I have made would give to each miner a wider face and a better chance to increase his daily output of coal.

The present system of paneling seems to me to be all right. If the room centers are to be increased as I have suggested, it would be necessary either to increase the distance between the cross-entries or to drive a less number of rooms. This is a question that must be decided on the ground, however, as it depends entirely on the number of rooms that can be undercut in a shift.

Let me say, in closing, that it is quite doubtful, in my mind, whether rooms can be driven at a width of 30 ft. under the conditions named. I would fear the occurrence of local falls, possible squeezes and the heaving of the bottom, which is described as fireclay varying from a few inches to several feet in thickness. On this account, I would prefer the first plan mentioned of driving the rooms on 60-ft. centers and 24 ft. wide, which I believe would enable a much larger extraction of coal.

SUPERINTENDENT.

Scranton, Penn.

Letter No. 3—Referring to the article published in *Coal Age*, Aug. 7, p. 234, describing and illustrating a method of extracting coal in a certain mine, where only about 50 per cent. of the coal was recoverd, allow me to say that this is certainly a great loss and one that should be avoided, if possible.

It seems to me that a change of system that will provide larger pillars, would make it possible to prevent such a terrible waste of coal in mining. Attention is frequently called to the need of conserving all natural resources, particularly coal, and that every effort should be made to do this at the present time is of the utmost importance.

Greater Width of Room Pillars Required for This Depth and Thickness of Coal

In the first place, judging from the description of the conditions governing the extraction of coal in this mine, it seems to me that the pillars are quite too small for the height of seam and depth of cover, it being stated that the coal ranges from 8½ to 11 ft. in thickness and is overlaid with from 450 to 600 ft. of cover, a depth that should call for a far greater width of pillar than is shown to be possible from the data given in the article.

The 15-ft. pillars left between the rooms, in this case, might be well enough in a 4-ft. seam, under ordinary conditions. But, it must be remembered that the higher the coal the thicker must be the pillar and the greater the diameter of the posts required for its support. For example, while a 4-in. post is commonly used in a 4-ft. seam, we all know that a greater diameter is required when posting a 10-ft. seam, at the same depth. Naturally, the same rule applies in determining the size of pillars required when working seams of varying thickness, under the same cover.

Again, I would suggest turning the rooms 12 ft. wide, instead of 18 ft., even at the expense of yardage, and this width should be maintained until the point has

been reached where it would be safe to widen out to the full width of the room. The length of the roomnecks should always be such as to leave good entry stumps for the protection of the entry. I would recommend driving these rooms 25 ft. wide, on 60-ft. centers, so as to leave 35-ft. pillars between them.

In drawing back the pillars, it would be my plan when the rooms have been driven up, to break them all through on an even line at the face, and take special care to keep the pillarwork on a straight line so that no undue pressure or weight will come on any one or more of the pillars. I believe this plan would eliminate the tendency to squeeze, by inducing the rock to break and thus relieve the pressure on the pillars. The practice should be continued until the pillars have been robbed back the proper distance. In the meantime, the fireclay bottom should be kept dry.

If these precautions do not avoid the occurrence of a squeeze, the only remedy to apply is to use still larger pillars than what I have suggested. More than once I have had an experience of this kind and, in each case, been able to obtain the desired results by increasing the width of pillars in the room and pulling everything out clean when drawing back. Any small stumps of coal or posts left standing in the waste act to prevent the fall of roof and invite a squeeze.

At no time should water be permitted to stand or be allowed to accumulate on a fireclay bottom. Sumps should always be dug and kept pumped or bailed out at regular intervals. This will generally provide good drainage and keep the bottom dry. It is my belief that if these precautions are adopted and followed closely, there will result a decided increase in the percentage of coal recovered and pay for the extra trouble.

Prestonsburg, Ky. OSCAR STUART.

Preservation of Mine Timber

Letter No. 2—In addition to what is said in the reply to the inquiry regarding the preservation of mine timber, *Coal Age*, July 24, p. 164, let me offer a few suggestions and comments. A good description of the treatment of mine timber to prolong its life is given in Chap. 2, pp. 8-15, of a book entitled "Timbering and Mining," by W. H. Storms.

As stated in the reply to this inqury, it is important that timber should be cut in the winter season when the sap has left the wood. Much timber, today, is cut during the summer, because of the ready market, both in the United States and in Canada. Much of it is left lying on the ground or piled, in any old way, exposed to the rain and the sun. Such timber when taken into the mine develops dry rot in a short time and breaks under light pressure.

Timber cut in the winter can be peeled the followin summer quite readily. The bark of hemlock is valuable and could be sold at a good profit to tanning manufacturers. Hemlock is about the only timber that has a bark of any value. Most timber can be peeled if not permitted to become too dry, but when dry the bark is often difficult to remove. As soon as the bark has been stripped off, the timber should be stacked in an open shed where it will have the air and be protected from rain.

It is a good plan to pile mine timber on skids. For 12-ft. timber, the skids should be laid three feet from each end, which gives a more even bearing. For 18-ft. sticks three skids should be used. When timber is peeled, the work should be done in the woods where it is cut. This will save freight charges and make the timber lighter to handle, besides avoiding the refuse bark accumulating in the yards.

There are many causes that shorten the life of mine timber. Poor ventilation and foul, damp air invite decay, dry rot and fungus growth. Bad jointing of timber frames causes undue pressure on the timbers and they are destroyed more quickly than when the joints are properly made. Also, driving a wedge in the center of a crossbar brings the pressure at the weakest point and the bar is soon broken.

The treatment of timber for its preservation may be done by the brush method when the job is a small one. However, where much timber is used in a mine, it is far better to employ the tank method. The timber is then immersed in a solution of creosote or carbolineum. Immersion in brine is also said to prolong the life of timber, but it should be continued for three days. Timber must always be quite dry when immersed so that it may absorb more of the preservative.

Qualities of Timber Used in Mines

A few remarks in regard to the qualities of mine timber may not be out of place here. Pine makes a good timber, particularly Norway pine, which is found in some parts of the United States, but is more abundant in British Columbia. The wood is tough and strong, but is apt to break quickly like hemlock.

Spruce is stronger than any pine but rots more quickly, except red spruce, which is noted for its smooth red bark and small limbs. White spruce is of no value; neither are cottonwood, balsam and poplar, which will stand little pressure and rot in less than a year when taken into the mine.

Hickory is a strong heavy timber, weighing 53 lb. per cu. ft. It makes a good timber for roof work, but cannot be used on roads and air-courses, as it rots too quickly. Maple is much the same as hickory, but should be well dried and peeled, as it is liable to be destroyed by insects.

Oak is the best timber for lining shafts or timbering airways and haulage roads. It is strong and resists decay under the wet conditions in mining longer than any other timber. It is said that oak timber will show no signs of decay in 30 years. Tamarack, if stripped of the bark, is excellent timber to resist decay, especially if the timber is well dried before being used. Young trees of this timber are better than the old growth.

Rawdon, Quebec, Canada. C. MCMANIMAN.

Prime Producer in a Coal Mine

Letter No. 3—Some time ago there appeared in *Coal Age* an inquiry asking the question, Who is the prime producer in a coal mine? In answer to this question, in the issue of June 19, p. 1137, W. H. Luxton made the statement, "The coal is not actually produced, until it has been placed where it can be utilized or, in other words, put on the market." I had thought that this question would be more fully discussed, and if not too late I would like to offer a few comments.

While I fully agree with Mr. Luxton in the statement just quoted, I cannot second his idea that the foreman is the prime producer in a coal mine. I am frank to

admit that the foreman is a necessary official in the mine, and an important factor in producing the coal and putting it on the surface. But, to my mind, he is only one of the larger wheels of the entire organized operation and is not the head or chief.

While a foreman, acting in his official capacity, may and does direct the work in the mine in his charge; or, in other words, is the large wheel that sets in motion all the smaller wheels concerned in the operation, he is himself dependent on or set in motion by a still larger wheel, the superintendent or manager; and these officials are again animated and controlled by the owners, operators, or board of directors and stockholders, who represent the dynamo or power that moves and directs the whole operation.

Let me say, just here, that wheels are not in the habit of turning themselves; they must be set in motion by some force or power. While one great wheel, if set in motion, may turn hundreds of smaller wheels, everything stops dead when the power that turns the big wheel ceases to act. It seems to me that the owner or operator of a mine, with his capital, is the force or power that moves the entire operation. As he is the one to take the first step that makes the production of coal possible and completes the cycle of operations by putting it on the market where it can be utilized, he is, in my opinion, the prime producer.

It will be argued no doubt, that capital cannot produce coal without labor; but, on the other hand, it is safe to say that labor could not produce much coal if capital did not furnish the means required to open and equip the mine. As far as this argument is concerned, there is no advantage to either party, as each are equally dependent on the other, and each are equally helpless without the other.

In the reply to this inquiry, Apr. 3, p. 637, it is stated, "The farmer[1] produces crops by tilling the land." Now, many of our farmers never think of holding the plow themselves, any more than the coal operator thinks of going into the mine and digging the coal. The farmer hires his men, as the operator hires the miner; and these hired men and miners are the actual workers. Then, if the farmer could be regarded as the prime producer of corn and wheat when the soil is tilled by hired help, it follows that the coal operator would justly be the prime producer of coal dug by the miner.

In conclusion, allow me to illustrate the situation presented, by assuming that a certain tract of land contains a valuable seam of coal, which cannot be utilized, however, until the property is developed and the coal brought to the surface. Suppose, now, a man with the necessary capital purchases the land and develops the property, through the employment of men for that purpose, and the coal is placed on the market. It appears to me that this man is the primary cause of putting the coal where it can be utilized and, consequently, must be considered the prime producer. JOHN ROSE.

Dayton, Tenn.

[1]The word "farmer" is here used in its primary sense as one who cultivates the soil, and does not contemplate in its meaning the employment of labor. In the same general sense, the coal operator would be a prime producer of coal were it not that the question submitted suggests a whole line of operatives concerned in the production.—Editor

Origin of Coal

Letter No. 1—Reading the excellent article of C. W. Hippard, *Coal Age*, July 17, p. 104, giving a brief résumé on the theories, regarding the origin of coal, suggested to me the thought that to the seven wonders of the ancient world and those of modern civilization should be added the wonderful process, or processes combined, that have resulted in the formation of our coal deposits.

Eminent geologists advance two theories to explain the origin of coal. These are known as the "*In Situ*," and the "Drift" theories. Dana informs us that in the early ages when coal was being formed, the atmosphere surrounding the earth contained an excess of carbon dioxide, making the air denser and warmer, these conditions being particularly favorable to plant growth. He states that "plants live mainly by means of the carbonic acid (carbon dioxide) they receive through their leaves. The carbon they contain comes principally from the air." Through the process of decomposition and decay, much of this carbon has been deposited in the soil and later converted into peat and coal of varying grades and hardness.

Arguments Advanced in Support of the Drift Theory of the Formation of Coal

Of the two theories mentioned, it seems to me the drift theory is supported by many facts observed in the coal measures. For example, while the trunks of trees are occasionally found in an upright or normal position in a coal bed, it is more common to find them lying flat in the seam, as driftwood would appear. Moreover, seldom, if ever, are there any signs of the roots of the tree, as would be the case had the tree grown or fallen where it was found in the coal bed.

To my mind, the sulphur balls found on the floor of coal seams are evidence of drift deposits, as are also boulders, rocks and other impurities found in the seam. Again, the fish deposits of the Devonian strata, which underlie the coal measures, would seem to indicate an inundation that would be favorable to the later deposits of the carbonaceous drift of the coal formations. It seems only natural to suppose that the fish of the Devonian were buried in the sediment deposited from the waters covering the surface at that time.

It must be admitted that both the *in situ* and the drift theories are supported by many observed facts, and each of these theories contributes its share in explaining what took place when coal was forming. The presence of the fossils of land animals in the coal measures would indicate that those animals lived in the forests whose growth has furnished the material from which the coal was formed.

Anthracite a Later Stage in Development

It is not clear to me how both anthracite and bituminous coal are often found at the same depth and, at times, are in close proximity to each other and the fossils in the two beds are identical. Mr. Hippard speaks of the anthracite as being "the last stage in the production of coal."[1]

The stratification of the coal formation appears to me to favor the drift theory, as the sediment deposited from the overflowing waters would naturally be stratified. This theory would also explain the gradual thinning out of the coal in the edges of large basins, which would naturally result in shallow waters, while the thicker deposits would form in the deeper waters of the basin, as is commonly found to be true.

[1]Anthracite is the result of the later metamorphosis of bituminous coal, through the agencies of heat and pressure resulting from movements in the earth's crust.

I can only explain the formation of two or more benches of coal, on the *in situ* theory, by assuming that a movement of the earth's crust took place after the lower bench was formed, and a second inundation produced the second bench of coal. It is not uncommon, however, to see these bench formations underlying a perfectly level surface that extends for acres around.

The study of conditions affecting the formation and character of coal cannot but be of great interest to mining men, because of the assistance it gives them in explaining the facts observed in coal-bearing strata and enabling them to tell the probable results of the faulting and pinching out of coal beds. With this information at hand, it is possible to plan the workings of a mine more intelligently and systematically.

West Pittston, Penn. RICHARD BOWEN.

Efficiency of Mine Workers

Letter No. 9—In discussing the efficiency of workers in coal mines, we must not forget the many difficulties and perplexities of that hazardous occupation. One worker may be thoroughly competent in a certain line of employment and yet be a source of danger to himself and others, unless he is carefully watched.

Before American mining experienced the great influx of foreign labor that has found its way into our mines, the coal miner was practically in a school while pursuing his work in the mine. At that time, every man could talk with another and receive the benefit of the other's judgment and experience by that means. Today, many of the men working in our mines speak different languages and are unable to converse intelligently with each other on matters of common interest to each of them.

Many of the men now employed have never seen a coal mine before in their life and know nothing of the dangers that surround them in the mine. They have been put to work because of the profits resulting to their employers by reason of the cheapness of their labor. Little regard has been had for the fact that human lives are being jeopardized by the employment of such labor.

Mine Disasters Caused by Low Efficiency

In the early days of coal mining, there was little talk of efficiency and great disasters and loss of life were often the result. Such occurrences did not escape the public notice, and it was clear that something had to be done to prevent the recurrence of mine disasters and make the work of mining coal more safe.

It is but a short time ago, comparatively, that the great safety-first movement was launched, having for its main object the reduction of the accident list, in mines, through the education of the great mass of foreign workers employed underground. One of the most effective means of accomplishing this work was by a series of pictures illustrating how accidents occur and the right and the wrong way of performing work in the mines. "Safety first" became the watchword, then "Efficiency," and afterward, "Economy."

Good results were accomplished by this campaign; but it did not eradicate from the mind of the mine worker the spirit of discontent engendered by this influx of ignorant foreigners, who were sent into the mines in such large numbers.

The newcomers were rugged and strong and well adapted to rough work. In time, no doubt, they would make good practical miners; but the work of instructing them has fallen to the lot of the American miners who have been compelled to act as tutors and give the necessary instruction as to the best and safest methods of performing work in the mine.

These conditions have proved a great drawback to efficiency, since the English-speaking miner has realized that the purpose of coal operators was to disrupt the organization of miners by the employment of this class of labor, whom they were compelled to instruct. In most cases, an experienced man was placed in charge of these raw recruits.

It is not strange that the failure to make a distinction between the skilled and experienced miner and the man who had to be instructed has been resented as "unjust." To these old and experienced miners, it appeared that the operator regarded Jack just as good as his master; and, because there was no recognition of ability and skill in the performance of work, a job has often been slighted and the work performed in a shoddy manner by men who were able to do far better.

Times have changed and, with the growth of the industry, many causes of complaints have arisen. A few years ago, a mine putting out 800 tons a day was a large mine, but the men could go and come at pleasure. No contracts or agreements between the operator and the men compelled the latter to remain in the mine after their day's work was done.

Contrast of Present and Former Conditions

Contrast the employment of 100 men in a mine at that time, with the conditions under which the 600, 800 or 1000 men labor who constitute the working force in a large mine, today. At times, a miner will now be kept underground 10 and even 11 hours a day.

Looking the facts squarely in the face, it must be admitted that these conditions obstruct the efficiency of mine workers. The ability of the management to keep pace with the handling of the coal from the face to the tipple should not be permitted to work a hardship on the miner who can produce his share of the day's output in less time than is required to put his coal on the dump.

In many of our large mines, it is claimed that a good miner can load 8 and 10 tons of coal in less than 8 hr., if he did not have to wait for his turn because no cars had been sent into his place, or because his coal has not been cut. If the nation's demand for coal can be supplied by the miner in a shorter time, why should he not be allowed to spend a few hours in the sunshine on the surface, instead of waiting in idleness in the darkness of the mine.

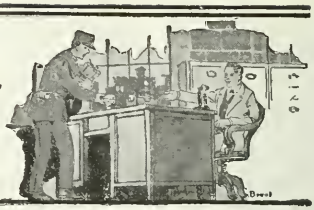
Apparently, there is a lack of efficient arrangement in the supply of cars to the miners in a manner that would avoid the necessity of his spending many idle hours in the mine awaiting his turn. As long as such conditions prevail, there is bound to be a spirit of unrest among mine workers; and where there is unrest and discontent, there can be no real efficiency.

Let us remember that the miner is human and needs good working conditions, good air to breathe and just treatment in the performance of his work. Efficiency does not mean merely a greater output of coal, but requires a regulation of the entire system of mining in a way that will conserve human energy and insure the good-will and contentment of mine workers.

Staunton, Ill. WILLIAM M. CHAMBERS.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Finding a Mine Door Set Open

In a certain mining textbook that I have appears this question:

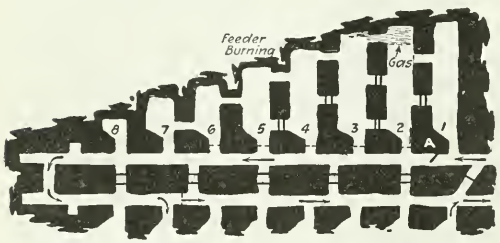
Ques.—Suppose, just before making your regular inspection of the mine, you discovered that a door had accidentally been left open, thus destroying the ventilation of the mine, say how you would proceed to make your inspection.

The answer to this question reads as follows:

Ans.—It would be necessary to close the door and wait a proper time for the circulation to be restored in the mine workings. As usual, the fireman should proceed only after ascertaining that the proper ventilating current is passing in the intake. If practicable, the circulation of the mine may be increased by increasing the speed of the ventilator. He should follow the intake current into the mine, examining with more than usual care each place where the accumulation of gas might be expected. After the inspection of the mine, the fact that the door was left open should be noted upon the daily report.

While this answer is along the line usually advocated in mining textbooks, it involves two features that I would like to see discussed in *Coal Age*, as I believe the answer given to the question does not apply to the conditions that frequently prevail in a gassy mine.

In the first place, we will assume that the fireboss starts the examination of his section of a gassy mine at the intake end of the section, or at the point indicated by *A* in the accompanying figure. At this point,



ASSUMED GASSY SECTION TO BE EXAMINED

we will say he finds the door on the gangway set open and the current short-circuited, the air passing along the gangway instead of being directed to the faces of the chambers. The door was probably set open and left by a careless driver, but the fireboss has no means of telling how long it has been standing open.

Now, according to the answer just quoted, the fireboss should close the door and wait awhile for the circulation to be restored in the chambers. But, we will assume that gas has accumulated, say at the face of chamber 2 as indicated in the figure. Also, let us say that a blast fired the night before, at the face of chamber 5, ignited a small feeder that is still burning quietly, being located in the roof.

The fireboss does not know that the feeder is burning at the face of Chamber 5, but assumes that gas may have accumulated in any or all of the chambers in that section. Should he now close the door, under the conditions mentioned, it is easy to imagine what would take place. The current would then pass up Chamber 1 and through the crosscut into Chamber 2 where it would sweep away the gas and carry it through Chambers 3 and 4 and into Chamber 5, where it would be ignited by the burning feeder and cause an explosion of greater or less violence, depending on the conditions in the mine. This is one of the features that I would like to see discussed by readers.

The second feature to which I would call attention is the statement that the fireboss "should follow the intake current into the mine." This advice is commonly given in all textbooks, and it is safe to say that if the question was put to firebosses, 70 per cent. of them would answer that they had always started to make their rounds at the intake end of their section and followed the air current until the examination was completed. In my experience as fireboss, it has been my practice to be guided by the geological formation of the section to be examined. If I found it easier to travel by starting at the return end I have done so, regardless of the well-known formula, "Follow the intake current."

Now, in regard to a possible feeder burning in one of the chambers, it may be one of the chambers nearest to the intake, or one close to the return end of the section. Assuming that it takes a fireboss three hours to make the rounds in his section, he will be just as apt to reach the burning feeder, by starting at the return end, as by starting on the intake, since he does not know where the feeder is located. The only advantage, in favor of starting at the return end, is that he might smell the burnt air carried on the current and hasten to find where the trouble was located.

On the other hand, starting on the intake, one would not be apprised of the trouble until he reached the chamber where the feeder was burning, which might be the last chamber in his section. In the meantime, he may have found a small body of gas and erected a brattice to sweep it from its lodging place, which would involve the danger of its ignition when the gas reached the burning feeder. These possibilities have inclined me to favor starting the examination at the return end of a section.

It will, of course, oe argued that when a man starts at the intake end he is traveling in fresh air and can always tell if the air has been short-circuited. But, suppose he can, he dare not close the door and restore the circulation until he has completed his inspection of the section. In my own experience as a fireboss, in many large gaseous operations, it has been my invariable custom to leave all doors and brattices the way I have found them, until I had ascertained the actual conditions of each working place in my section. I hope to see these two features broadly discussed.

West Pittston, Penn. RICHARD BOWEN.

This is an important question and *Coal Age* is glad to present it to its practical readers, for discussion, as there are arguments on both sides that are worthy of consideration.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Miscellaneous Questions

(Answered by Request)

Ques.—How many gallons of water will a tank hold, the tank being 53 in. in diameter and 9 ft. 11 in. high?

Ans.—The tank has the form of a cylinder and the area of its base is $0.7854 \times 53^2 = 2206$ sq.in. The height of the tank being 9 ft. 11 in., or 119 in., its cubical contents is $2206 \times 119 = 262{,}514$ cu.in. The capacity of this tank is therefore, $262{,}514 \div 231 = 1136+$ gal.

Ques.—State how you would proceed to rescue men, in a certain district of a mine, if a fire was to take place in the intake airway.

Ans.—It is difficult to give a wholly satisfactory answer to this question without knowing the exact plan of ventilation and arrangement of the rooms and entries in the mine and the district in question. However, it can be stated, in a general way, that the men working in the district should be notified, promptly on the discovery of the fire, to withdraw at once by the return air-course.

At the same time, also send word to the surface to slow down the ventilating fan, provided this can be done without danger to men working in other sections of the mine, who should be warned by messengers and instructed to withdraw at once to the shaft bottom or by any other means of exit available.

Immediate steps should be taken to start the pumps and get water on the fire. If the men working in the district where the fire is located have any other way out than by passing through the return airway, the air should be short-circuited and conducted at once into the return, by setting open a door or breaking down a stopping at the nearest practical point inby from the fire, so as to prevent as far as possible, the smoke and gases of the fire being carried into the workings. If the return airway is the only way out for the men working in that district, however, the air must not be short-circuited as that would cut off their only chance to escape smoke and gases of the fire.

Ques.—(a) What is the manometrical efficiency of a ventilating fan? (b) Work the following: If the mine resistance produces a 2½-in. water gage and the depression at the port of entry of the fan is 2 lb. per sq.ft., the area of the port of entry being 90 sq.ft. and the area of the port of discharge 65 sq.ft., what is the manometrical efficiency of the fan?

Ans.—(a) The term, "manometrical efficiency," in fan ventilation, refers to the ratio of the effective pressure to the theoretical pressure due to the fan's action. The effective pressure is the pressure in the fan drift and is the measure of the mine resistance.

(b) Since the mine resistance produces a water gage of 2½ in., the effective pressure due to the fan is $2\frac{1}{2} \times 5.2 = 11.7$ lb. per sq.ft. Now, since the pressure producing a circulation varies as the square of the velocity, and the velocity varies inversely as the area, the pressure varies inversely as the square of the area. Therefore, for the pressure at the port of discharge of this fan, we have

$$\frac{x}{2} = \left(\frac{90}{65}\right)^2 = 1.38^2 = 1.9$$

$$x = 2 \times 1.9 = 3.8 \textit{ lb. per sq.ft.}$$

The pressure lost in the fan is the sum of the two pressures, at the point of entry and the port of discharge, respectively, or $2 + 3.8 = 5.8$ lb. per sq.ft. Adding this to the effective pressure gives, for the total pressure due to the fan's action, $5.8 + 11.7 = 17.5$ lb. per sq.ft.

Finally, taking this as the theoretical pressure due to the fan's action, the manometric efficiency of the fan is $(100 \times 11.7) \div 17.5 = 67$ per cent., nearly.

Ques.—With a 3 hp., we are producing 20,000 cu.ft. of air per min., how many horsepower will be required to produce 40,000 cu.ft. of air per min. in the same airway?

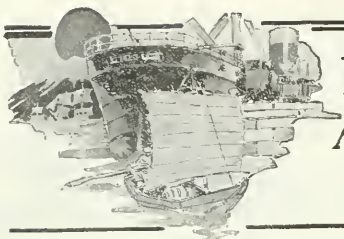
Ans.—In the ventilation of mines, the power producing a circulation varies as the cube of the quantity of air circulated. In this case, the quantity of air is doubled and the power required to do this must be increased as the cube of two or eight times. It will therefore require $8 \times 3 = 24$ hp. to double the circulation in this mine.

Ques.—(a) What is a water gage and where and why is it applied? (b) If the pressure producing ventilation is 10.4 lb. per sq.ft., what is the water-gage reading?

Ans.—(a) As shown in the accompanying figure, a water gage consists of a glass tube bent in the shape of the letter U. One leg of this tube is extended and turned over at a right angle to permit of its being inserted through a hole in a brattice or partition dividing the main intake and return airways in a mine. The tube contains water and when placed in this position in a brattice at the foot of a shaft, the reading of the water gage, in inches, indicates the difference of pressure between the intake and return airways, which is the pressure producing the circulation in the mine.

When the water gage is placed on the side of the fan drift, its reading indicates the difference of pressure between the fan drift and the outside atmosphere, which is the ventilating pressure producing the circulation in the mine and the two shafts.

(b) The water-gage reading corresponding to a pressure of 10.4 lb. per sq.ft. is $10.4 \div 5.2 = 2$ in.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Coal Mining in Germany

In the Ruhr district the time has not yet arrived when an increase in coal production can be expected. [*Handelsberichten*, The Hague, July 17, 1919.] Unrest still prevails here, though no strikes have occurred lately. The standard of living has been raised heretofore without a change in the level of wages. When the mine workers insisted on an increase of wages and the operators granted the increase; the members of the coal syndicate decided to increase the price of coal 10 marks and the price of coke 15 marks per metric ton.

The Government was unwilling to approve the increase, but it was considered that with a daily output of only 0.56 ton per man an increase in wages of 2 marks per man per shift made necessary an increase of 5 marks per ton in the price of coal. The Minister of Economics, supported by the whole cabinet in this matter, would like to put an end to the increase of both wages and prices. An order has been issued that the wage scale in the mining industry may not be changed without the Minister's approval. In order to obviate any further wage increases it is proposed to supply the miners with foodstuffs and clothing at low prices; overtime work is paid for in foodstuffs, chiefly butter and fat.

Increases Based on Maximum Prices

The Government consented to the smaller increase of prices as noted above, but the syndicate was not satisfied; maximum prices were, therefore, introduced, averaging about 5 marks for coal and 7 marks for coke higher per ton than the previous selling prices, exclusive of the coal tax and the tax on turnover. In these increases no account was taken of the higher operating expenses. It was also difficult to prescribe fixed prices for briquets, as those prices depend on the prices of tar.

On the basis of the maximum prices the coal syndicate has now determined to raise the selling prices, in accounts between the mines and the syndicate, by the following amounts over the prices established in May: Coal in general, 6.10 marks; nut coal, 6.70; poorer sorts, 1.70; coke in general, 8.50; small coke (1 to 3 millimeters), 10.20 marks. All these increases are per metric ton and include tax on coal and tax on turnover. They went into effect June 16, 1919.

For briquets a graduated increase of prices was chosen, beginning with 2.45 marks per ton on June 1 and rising to 7.35 marks on June 16, and 9.10 marks on July 1, 1919, as the prices of tar are constantly changing.

Of these new increases, 2 marks per ton is placed in an indemnity fund, which now receives a total of 12 marks per ton. Out of this fund indemnities are to be paid to mines whose financial situation is not favorable. The maximum prices for coal briquets have now been repealed.

Concerning production it may be said that with the present number of workers 250,000 tons ought to be produced, but in reality only 140,000 tons of coal are mined. This disappointing figure is the result partly of underfeeding, but for the most part of the diminished willingness to work and the shorter work day.

Lack of cars is another important factor. At present the railways furnish only about 14,000 cars per shift, so that the shortage amounts to 2000 or 6000 cars per day. The result is that the mines have to store up large quantities of coal. In the summer the consumers usually obtain their supplies for the winter, but this time the outlook for the winter is rather dark as the demand can not be satisfied. In the North Sea ports there is not enough coal for the shipping, and the industries can be supplied only to a limited extent. It may be expected that for the Netherlands no more will be available for the coming winter than the quantities already contracted for, if the syndicate will really be able to fill orders. The ports of Duisburg and Ruhrort are shipping 12,000 tons a day on the average, and the ports on the Rhine-Herne canal about 25,000 tons a day. Just now there is a shortage of ship space.

The mining industry in the Ruhr district is in an unfavorable situation just now. Besides, the political atmosphere has not cleared sufficiently as yet, and disorders and strikes may break out any day. [The normal exchange value of the mark is 23.8 cents U. S. currency; it is now quoted at a fraction over 5 cents.]

Russian Fuel Imports

During the first three months of this year fuel composed about 17 per cent. of the total importation to Vladivostok. The chief article of this group was coal, of which 852,000 poods were shipped. All this coal is of Japanese origin. The Far East has considerable quantities of its own coal in Souchan Mine and Sakhaline Island, and the considerable amount of coal imported from Japan is due chiefly to the difficulties of ocean transportation from Sakhaline Island. Many people in the Russian Far East, says a report received here, consider this importation from Japan as abnormal.

Coal Production in Venezuela

The production of coal in Venezuela in 1918 was 25,332 tons against 20,165 tons in 1917. All came from two mines operated by the Venezuelan Government. The mine at Coro was worked only from January to May, and the manager reports that no expansion can take place until a steam pumping system is provided. Considerable improvements have been made at the Naricual mines, and their development to an output of 500 tons daily is contemplated. The plan involves the installation of briqueting machines to make 3500 tons of briquets per month out of the dust of this very friable coal. The electrification of these mines, using the falls of the River Neveri as a power source, is also suggested. The present cost of coal at the pit mouth is 13 bolivares ($4.51) per metric ton, and 25 bolivares ($4.83) per ton f.o.b. Guanta. For next year it is figured that the latter cost will be only 23 bolivares ($4.44). Coal is sold to private parties at 40 bolivares ($7.72) per ton.

The output of the coal mines of Japan increased from 21,083,000 tons in 1913 to 22,801,000 tons in 1916 and 27,500,000 in 1918. The growth of the industries is shown by the increase in industrial consumption from 7,530,000 tons in 1914 to 10,426,000 tons in 1916 and 16,020,000 tons in 1918. As 15 new mining companies were established in Hokkaido, Kyushu, and other islands, it is expected that the production will be considerably increased this year. The total consumption of coal in Japan was 18,055,000 tons in 1913, 20,440,000 tons in 1916, and 25,980,000 tons in 1918, thus leaving relatively little margin for exports.

New Coal Mines in Colombia

Vice Consul S. J. Fletcher reports from Cartagena, under date of June 26, that the first shipment of coal from the San Jorge River district arrived at Barranquilla by the steamer Magangué on June 3, 1919.

At Playa Rica, on the San Jorge, there are immense deposits of coal practically on the surface, and for six leagues along the bank of the river the coal seams can be clearly seen. Up to the present time the difficulty has been lack of transportation. The Magangué's trip to this region was made possible only by the extremely high waters of the San Jorge at this time, and to the use of dynamite in clearing the passage. It is estimated that an expenditure of from $10,000 to $15,000 would place the stream in navigable condition for river steamers.

Should the projected railroad from Cartagena to Ayapel, traversing the length of the Department of Bolivar, become a reality, it would furnish a direct means of transportation for this coal, which it is estimated could then be supplied to the market in Cartagena for $5 a ton.

Siamese Coal Market and Imports

Siam is dependent upon foreign countries for its supply of coal, as up to the present time only brown coal or lignite has been found within the limits of the Kingdom, states Vice Consul Carl C. Hansen, of Bangkok, in a recent *Commerce Reports*. Large seams of these lignite deposits have been discovered in several parts of the Siamese Malay, but so far no satisfactory workings have been reported. The various manufacturing and other concerns in Bangkok use paddy (rice) husk and wood for fuel, and on the railways wood is burned, the imported coal being too expensive for fuel in both instances. For the same reason ships calling at this port usually bunker coal at Singapore or Hongkong.

The total quantity and declared invoice value of Siam's coal imports from foreign countries amounted to 10,841 metric tons (metric ton equals 2204.6 lb.), value $62,623, in the fiscal year ended Mar. 31, 1913; 19,722 tons, value $134,785 in 1914; 25,026 tons, value $148,869 in 1915; 15,478 tons, value $88,400 in 1916; 30,752 tons, value $324,909 in 1917; and 26,356 tons, value $494,460 in 1918.

Coal imports by countries of origin through the port of Bangkok are as shown below for the fiscal years 1913-1918, inclusive (kilo equals 2204.6 lb.).

According to the declared import values the price of coal had gradually advanced from about $5.50 gold per metric ton in 1913 to $18.50 in 1918, while the present (June 25, 1919) market rate is $25 per ton.

[A list of Bangkok importers of coal may be obtained from the Bureau of Foreign and Domestic Commerce or its district and coöperative offices by referring to file No. 122127a.]

Countries of Origin	1912–13 Kilos	1913–14 Kilos	1914–15 Kilos	1915–16 Kilos	1916–17 Kilos	1917–18 Kilos
Australia	202,212	121,927	.....	.....	.....	.....
China ...	138,293	1,131,888	3,303,698	2,502,596	3,942,302	7,660,000
Hongkong	972,266	360,718	1,592,062	4,685,795	10,926,775	10,109,000
India	3,400,286	3,303,055	3,139,342	1,153,102	6,047,190	.....
Indo-China	54,900	60,963	461,289	.....	.....	3,119,000
Japan	2,563,512	7,392,596	11,299,062	5,991,936	8,564,129	4,126,000
Netherlands, India	1,015,045	.....	.....	.....	.....	.....
Singapore	1,199,965	3,014,185	315,382	1,144,215	1,272,201	1,342,000
South Africa	492,788	.....	.....	.....	.....	.....
United Kingdom	801,367	4,336,437	4,914,974	.....	.....	.....
Total ..	10,840,633	19,721,769	25,025,809	15,477,644	30,752,597	26,356,000

Italy to Get Fuel Supply

The danger that Italy would soon be averted, according to reports coming from that country. The Italian delegation in Paris has obtained from France, it is reported, a daily concession of 1200 tons of coal from the mines of the Saar Valley. It has also been arranged that France will furnish Italy approximately 4,300,000 tons of the 5,500,000 tons of coal due Italy from Germany, according to information reaching the Department of Commerce.

British Investments in Argentina

Referring to news reports alleging friction between Great Britain and Argentina due to extensive English investments in the latter country, the National Bank of Commerce in New York says that $2,000,000,000 has been considered a conservative estimate of the amount of such investments.

"Owing to the newness of the country and the character of its industries," the bank says, "Argentina has always been a heavy importer of foreign capital. A report recently issued by the Director General of Commerce and Industries of Argentina clearly shows the predominance of British capital in the industrial organization of the republic. The total amount of British investment there is not known, but two million dollars has been considered a conservative estimate. The figures given below include only the realized capital of limited liability companies.

	National	British	Other Countries	Total
Railways and other commercial enterprises	$314,810,931	$1,324,902,683	$112,581,830	$1,752,295,444
Industrial enterprises	128,879,242	78,793,248	15,041,120	222,713,610
Total	$443,690,173	$1,403,695,931	$127,622,950	$1,975,009,054

"It is known that British capital in railways alone amounts to $1,138,756,484. This represents about ten times the railway investments of any other foreign country in the Argentina. The distribution of British capital by industries shows how thoroughly the British lender has penetrated into the economic life of the country:

Tramways	$133,434,262
Forestal products	31,239,952
Gas	29,661,644
Mortgage companies	28,408,685
Tobacco, sugar, wine and beer	28,062,336
Meat freezing and preserving	27,241,081
Docks, warehouses and waterworks	27,097,519
Farms and ranches	24,662,999
General stores	21,067,079
Telephones and telegraphs	15,537,840
Electric light and power	13,239,411
Metallurgical and mineral	5,429,837

"The close trade relations between Argentina and the United Kingdom are shown by the fact that for a long period almost one-third of the total imports into Argentina were received from Great Britain, to which one-third of Argentina's total exports are sent. The war has resulted in a small reduction in the amount of imports from Great Britain but exports to her show a tendency to increase."

With such a hold on the economic and industrial life of the Argentine, it can readily be understood why it will be hard for American coal exporters to retain the bulk of the Argentine trade in fuel when England's coal mines resume normal operation.

Coal Situation in New Zealand

At the present time there is a serious shortage of coal throughout New Zealand, owing to the decreased production in the mines, the increased consumption because of the opening up of business in general, and the difficulty in obtaining sufficient shipments from Australia. The position is so serious that the New Zealand Government has appointed a committee to investigate the coal problem and to advise as to the best way to increase the Dominion output. Recently the Government purchased two more state mines, one near Huntly in the North Island, and the other in the vicinity of Westport in the South Island.

The increased demand for coal is partly due to the increased consumption of the railroads and industry in general. Some of the largest demands for coal in New Zealand per annum are: Railways, 300,000 tons; bunkering requirements, 440,000 tons; freezing works, 130,000 tons; gas works, 240,000 tons; electric light and power, 70,000 tons. The industries and services mentioned require almost exclusively hard coal. The total consumption of coal in New Zealand for 1918 was 12,078,626 tons, which, compared with the total consumption for 1914 showed a shortage of 715,000 tons, of which 529,000 tons represented New Zealand coal.

It is well understood that there is plenty of coal in New Zealand, but the great difficulty the Government has to face is the securing of labor to mine it. The following table has been prepared by the Director of the Geological Survey of the New Zealand Government, and gives a good idea of the amount of coal in workable seams in New Zealand:

Class of Coal	Tons Proved	Tons Probable
Anthracite	Very little	Very little
Bituminous	187,000,000	477,000,000
Semi-bituminous	68,000,000	196,000,000
Brown	195,000,000	728,000,000
Lignite	161,000,000	420,000,000
Total	611,000,000	1,821,000,000

Several shipments of American coal have lately been made to New Zealand, which coal is being used for railways, freezing works and for domestic purposes. The Government arranged the importation of this coal to relieve the present acute shortage.

Much of the coal mined in the Dominion, especially in the North Island, is soft. In mining there is a loss of 30 per cent., and by the time the coal reaches the consumer there is approximately 50 per cent. slack, which makes the fuel unsuitable for railroad use. There is much talk and search for practical methods of utilizing the slack, especially along the line of briqueting. A New Zealand business man is proceeding to the United States to investigate American methods of utilizing fine coal and in search of a practical method for briqueting New Zealand coal. One great difficulty is that there is 14 per cent. of moisture in this stack, which it is thought must be extracted before the slack can be satisfactorily manufactured into briquets that will stand the weather.

If shipping rates are reduced and coal can be exported to New Zealand at a low cost, certain grades of American coal should find a fair market there.

Foreign Coal Trade Opportunities

The purchase by a manufacturer in Spain is desired, among other things, of coal in briquets for railway, forge and metal work. Quotations should be given c.i.f. Spanish port. Correspondence may be in English. File No. 30496.

A company in Italy desires to act as agents for steamship lines, looking after steamers arriving in ports of that country, having branches in four of the Italian ports. It wishes to manage steamers on time charter, and is also in the market as coal importers. Correspondence may be in English. References. Further information may be obtained by addressing the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its branches, and referring to File No. 30505.

I. C. C. Decisions

Ex-Parte No. 68. Coal Rates to the Northwest. Submitted June 26, 1919. Decided July 5, 1919.

A controversy concerning the relationship of rail-lake-and-rail rates on bituminous coal to the northwest from mines in Ohio and West Virginia to all-rail rates from Illinois and Indiana mines, reported upon at the request of the Director General of Railroads.

No. 10,234. Virginia Iron, Coal and Coke Co. et al. Director General, Southern Railway Co., et al. Submitted May 14, 1919. Decided June 27, 1919.

1. Increased rates on iron ore to Middlesboro, Ky., from points in Tennessee, Georgia, North Carolina, and Virginia on the Southern Railway and the Rome & Northern and Louisville & Nashville railroads found justified.

2. Practice of stating rates on iron ore in terms of net tons instead of long tons not shown to be unreasonable or otherwise unlawful. Complaint dismissed.

Investigation and Suspension Docket No. 196. Advances on Coal Within Chicago Switching District. Submitted May 2, 1918. Decided June 9, 1919.

Upon rehearing in the matter of divisions of through rates on coal and coke to Chicago, Ill.; Held, That the record justifies a conclusion that from and after July 1, 1917, the Chicago, Milwaukee & St. Paul Railway Co. should receive 20c. per ton as its division of the through rates on coal and coke for deliveries within the so-called inner zone of the Chicago switching district, and increased divisions upon the present relative basis for deliveries at other points within that district.

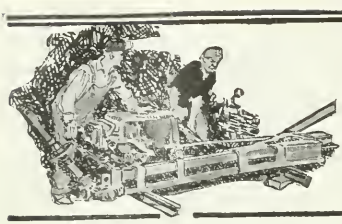
New Shipping Rates on Coal to European Ports

New shipping rates on coal and coke from United States North Atlantic ports and Charleston, S. C., to various foreign ports, have been ordered and put into effect by the United States Shipping Board. The new rates are as follows:

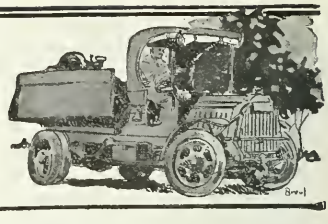
To:	Coal per Ton of 2,240 Lb.	Guaranteed Tons Daily Discharge Steel	Guaranteed Tons Daily Discharge Wood	Coke per Ton of 2,240 Lb.	Guaranteed Tons Daily Discharge
Bordeaux, Havre, St. Nazaire	$22.50	700	525	$33.75	600
Cherbourg, Dunkirk	22.50	700	525	33.75	600
Rouen	23.00	1,000	750	34.50	600
Antwerp, Rotterdam, Terneuzeog	22.50	1,000	750	33.75	600
Gothenburg	24.00	1,000	750	36.00	600
Landskrona, Malmo	25.00	800	600	37.50	600
Oxelosund	24.00	1,500	1,125	36.00	600
Stockholm	26.00	800	600	39.00	600
Helsingfors, Sundsvall	28.00	800	600	42.00	600
Bergen, Christiania, Copenhagen	25.00	1,000	750	37.50	600
Korsor, Rouue	26.00	1,000	750	39.00	600
Trondhjem	27.00	1,000	750	40.50	600
Lisbon	22.50	1,000	750	33.75	600
Bilboa, Cadiz	23.50	1,000	750	35.25	600
Barcelona, Cartagena	26.00	1,000	750	39.00	600
Cette, Marseilles, Naples	26.00	1,000	750	39.00	600
Civitavecchia	26.00	1,000	750	39.00	600
Nice, Genoa, Leghorn, Spezia, Savona	26.50	1,000	750	39.75	600
Piraeus	28.50	1,000	750	42.75	600
Venice, Tricste, Fiume	31.00	800	600	46.50	600
Salonica	31.00	1,000	750	46.50	600
Bari	30.00	1,000	750	45.00	600
Constantinople, Constanza, Smyrna	31.00	1,000	750	46.50	600
Algiers, Oran	26.00	800	600	39.00	600
Tunis	26.50	1,000	750	39.75	600
Sfax	27.50	1,000	750	41.25	600
Alexandria, Port Said	31.00	1,000	750	46.50	600

Conditions—Discharge as above indicated, with time counting 24 hours after arrival, whether in berth or not, Sundays and holidays only excepted. If discharge is not completed within the time specified, demurrage to be paid at the rate of $1 (50c. wooden vessels) per ton, payable day by day.

Coke—Subject to condition that vessel have option of carrying not over 25 per cent. on deck at owner's risk.



COAL AND COKE NEWS



Harrisburg, Penn.

Workmen's compensation insurance state fund differential may be done away with. Commissioner Donaldson long opposed to its continuance. Stock companies always have resented state entering insurance field. State fund great success, with annual income of $2,500,000. Whole matter threshed out at hearing called by Donaldson.

Agents of stock companies writing workmen's compensation insurance are already announcing to prospective clients that when the time comes to close on business for the coming year, the state fund ten per cent. differential will be a thing of the past. Insurance Commissioner Donaldson has not yet authorized any such statement. However, he has long been on record as being opposed to the state fund differential, and has recently been setting the stage with a view to giving the differential the knockout blow and making it appear that its elimination has long been a move mutually agreed upon.

The state workmen's insurance fund has been permitted ever since it was started to write compensation insurance at rates ten per cent. below all competitors. The stock companies, from the first, have bitterly resented this alleged advantage. When the fund was organized the companies started to kill the idea that the state had a right to go into insurance. It was the stock companies' theory that the state, having passed a law compelling all employers to take out compensation insurance, should keep out of the field and permit the stock companies to reap a golden harvest.

The stock companies poured a multitude of agents into the field when the state fund started. The principal business of the agents at the time—in many sections of the state—was to maintain, on every possible occasion, that the state fund would fail; that the politicians would plunder it; that the state fund scheme was socialistic and that the money spent in establishing it was a woeful waste of funds belonging to the people.

The state fund, however, has not failed. It now has an annual premium income of approximately $2,500,000. Its assets are in excess of $3,600,000. It has a surplus fund of $1,800,000, and has more than 24,000 policies on its books, a great many of these being coal companies at one time held by stock companies. The state fund showing is the answer to the initial statements regarding it made by the stock companies and their representatives.

When the state fund was launched, the state board insisted, that as it would not have a horde of agents and was designed as an agency that would serve as an insurance rate regulator, the state's venture should be given the benefit of a ten per cent. differential. At present the board is composed of State Treasurer Harmon Kephart, Insurance Commissioner Charles Donaldson and Commissioner of Labor and Industry C. B. Connolley. The disposition of the differential, however, is in the hands of Mr. Donaldson, as insurance commissioner. As insurance commissioner, Mr. Donaldson can veto any position regarding rates that the board may take. Messrs. Connolley and Kephart could petition, suggest and advise, but Mr. Donaldson can do as he pleases as far as continuing the differential is concerned.

At a hearing recently called by Mr. Donaldson, representatives of the stock companies were given a chance to demand that the differential be abolished. An attempt was made at that meeting to prove that former State Commissioner of Labor and Industry Jackson and the late State Treasurer Young had agreed, that as soon as the state fund's premium income was in excess of $1,000,000 a year, not only would the state fund differential be abolished, but the fund would cease seeking business.

The representatives of the stock companies did not attempt to deny that the 10 per cent. differential was an advantage. That was the burden of their plea. The thing they were condeming throughout the hearing was the idea of cheap insurance. Moreover, their idea of fairness contemplated placing a fund with virtually no field force, on a level with concerns that overrun the state with agents. The state fund has been a thorn in the side of the stock companies ever since it was started. They believe that now is the time to make a drive. If the companies can buck up against a fund minus its differential they believe they will be able to prove their original contention that state insurance is a failure.

Commissioner Donaldson believes the differential is unscientific; that insurance should be written on a level basis; that instead of a differential the state fund should make its return to the policy holders in the form of increased dividends. At times during the hearing, Mr. Donaldson intimated that the very idea of a state fund was perhaps a mistake and there was no real reason why the insurance business should not be left entirely to the insurance companies.

The insurance commissioner, however, apparently disagrees with the representatives of the stock companies in one particular. The stock company crowd is not at all certain that the state fund will survive without its differential. Mr. Donaldson says the fund can maintain itself without any advantage whatsoever in the matter of rates. If the differential is abolished, it seems to him that the responsibility of making good on that proposition will devolve upon him.

The whole state fund matter narrows down to the proposition that it is not popular with the stock companies, which want to hamstring it, their reasons being that if all employers in the state, now carrying compensation insurance, were insured in the state fund then the estimated annual saving would be in excess of $2,500,000. The abolition of the state fund differential involves a change in policy that the management of the state fund, prior to the advent of Insurance Commissioner Donaldson, had not expected.

Charleston, W. Va.

Poor transportation handicaps both New River and Kanawha fields. Little improvement expected. Cars held in the West. Labor Day cuts down production in union fields. Production 60 per cent. in C. & O. territory in final week of August.

"Transportation disabilities"—to quote a recently coined phrase—made themselves felt throughout central southern West Virginia coal fields during the last week of August to such an extent that the output was even lower than during the previous week, the Kanawha and New River districts suffering alike in that respect. The effect of such a car shortage was to restrict mines in Chesapeake & Ohio territory to about a 60 per cent. production. While mines in this territory got away with a flying start, the supply of cars was of short duration and before the week had advanced very far, operations were extremely irregular at a good many mines. It was apparent that there had not been a complete recovery from the shopmen's strike; another factor in the shortage of cars was the failure of western connections to return open top cars to eastern lines.

Railroad officials advance the opinion that little improvement can be expected in the car supply, owing to the fact that regional managers of western roads are holding cars for use in the West instead of returning them for circulation in the eastern Car Pool, and hence are contributing to the prospects of a coal shortage when winter sets in. Vessels were also said to be scarce at tidewater, thus tieing up equipment at eastern terminals. Because of the continued car shortage throughout August, West Virginia mines were unable to regain any lost ground—in fact further ground was lost.

Observance of Sept. 1 as Labor Day of course cut down production in the union fields but in the non-union fields there was said to have been almost a record production, although cars were not plentiful by any means. A large production, however, was not anticipated for the first week of September. That widely circulated rumors of strikes in some of the non-union fields were without foundation, was shown in the fact that in one non-union field there was a production of 900 cars on Labor Day.

While market conditions, as reflected in the Kanawha region, were auspicious for a large production during the final week of August, a most pronounced car shortage checked production during that period to such an extent that the output was somewhat lower than for the week ended Aug. 23, a car shortage on the Kanawha & Michigan still further lowering the production for the week. On that road, during a part of the week at least, it was said that the car supply was sufficient only to make half time operation of mines possible. There was also an inadequate supply of cars on the Chesapeake & Ohio system, the shortage making it impossible to produce up to more than 60 per cent., as nearly as can be estimated.

A large proportion of the tonnage produced in the Kanawha region was flowing to tidewater and to inland western markets. The movement of byproduct coals to the Lakes was apparently on the increase. There was also a better demand for steam coal in evidence, producers claimed. Mines whose output is confined to run-of-mine coal are nearly all in operation now as far as the car supply will permit. Unauthorized strikes in the Kanawha region also served to cut down production.

Production fell behind in the New River field during the final week of August, as compared with the previous week, to the extent of about 15,000 tons, the output being only about 60 per cent. of the possible production. The supply of cars during the early part of the week gave promise of stimulating production, but the large car supply only lasted for a day; during the other five days of the week, mines were forced to put up with quite irregular transportation. On Labor Day all mines in the New River field were shut down and there was, therefore, little chance of a large production during the first week of September. When miners went to work on Sept. 2, it was under the new-wage contract just adopted by the miners and operators of the field. Little spot smokless was available as far as the New River territory was concerned. In fact producers were finding it difficult to meet the requirements of the export and coastwise trade as well as the needs of the Navy and the merchant marine.

Fairmont, W. Va.

Relapse in northern West Virginia after partial recovery from car trouble. Embargo interferes with shipments to tide. Tonnage to Lakes small. Car-shortage statistics wired to Senate committee investigating coal situation.

There was in northern West Virginia regions at the wind-up of August what might be called a relapse after the mines had had a partial recovery from car trouble, lack of circulation of empties making inroads on the output of northern fields, as compared with the week ended Aug. 23. The car shortage existed virtually throughout the entire week and was in strong contrast to the excellent car supply of the week of the twenty-third; the Monongalia field also being handicapped by insufficient transportation facilities. Even on such days as the cars were more plentiful, late placements handicapped

mines in getting their full quota of coal loaded, and it is estimated that in the Fairmont region alone 2000 less cars were loaded during the last week of August than was true of the previous week. On the Monongahela Ry., for instance, toward the latter part of the week, there was not more than a 30 or 40 per cent. placement.

Many producers in the northern part of the state have been shipping to tidewater for export, and an embargo, which became effective as to Curtis Bay shipments toward the latter part of the week, interfered with the plans of operators to a very material extent. Shipments to the Lakes during the week were also discouragingly small. There seemed to be little variation in the shipment of railroad fuel as compared with previous weeks. Slack was in growing demand in northern West Virginia regions, and a heavier demand for run-of-mine has had the effect of causing a resumption of operations at a number of small mines.

The car shortage was deemed of sufficient importance to warrant officials of the Northern West Virginia Association telegraphing figures to officials of the National Coal Association, at Washington, for the purpose of having them read into the record of the hearings held by the Senate committee investigating the coal situation. At the same time a warning was given operators not to ask for more empties than they could load on any one day, as has been the practice in some cases, because of the effect it would have on region rating.

Bluefield, W. Va.

Paradoxical increase of output in Pocahontas field in face of car shortage. Working-time loss decreased. Car shortage alone holds down production.

By what amounts to almost a paradox, the mines of the Pocahontas region, during the week ended Aug. 30, increased their output by 34,000 tons, in the face of a slightly increased car shortage and with an increase in working time of only 35 hours. In other words, though the working time was practically the same, the output was materially increased, the production jumping from 98 tons per hour to 106 tons per hour. Total production was 329,621 tons as against 295,000 tons for the previous week. One hundred hours of working time was lost during the week.

The tonnage lost, because of the car shortage, was increased from 137,000 to 139,000 tons, but, strange to say, the working time lost was decreased from 1238 hours to 1189 hours. Aside from time lost by car shortage, only 110 hours were lost from other causes, showing absolutely beyond controversy that a car shortage and a car shortage alone is holding down production. Labor conditions show much improvement following the recent increase in wages in the Pocahontas field. There appears to be a somewhat better demand for coke, 1200 more tons of coal having been coked during the week ended Aug. 30 than was the case during the previous week.

Loading of coal on the Norfolk & Western R.R. during the week ended Aug. 30 exceeded that for any other week in August. During that period, a total of 1133 50-ton cars, or 566,500 tons of coal, were loaded and hauled according to figures supplied by the general superintendent of transportation.

Huntington, W. Va.

Logan field loads 900 cars on Labor Day. Operates as usual, thus disposing of strike report. Car shortage holds production down to 50 per cent. of capacity. Shipments large to tide, but embargo possible later. C. & O. handles 2,000,000 tons in August, shortage of 1,000,000 tons due to shopmen's strike.

Despite the fact that it was Labor Day, mines in the Logan field on Sept. 1 managed to load in excess of 900 cars of coal, almost equaling the loading record in the district. In other fields operations were suspended but the Logan district, being an unorganized field, operations were continued as usual and production speeded up. So large a production on a holiday effectively disposed of the reports that the miners of the Logan field had gone on strike or intended to go on strike. During the week ended Aug. 30, the total production was 199,217 tons, or 50 per cent. of full time capacity; there was a production loss during the same period of 198,000 tons, 177,000 tons of which was directly attributable to a shortage of cars. The increase in the car-shortage loss for the week was 10,000 tons, a scarcity of cars causing a loss of 2772 hours of working time.

The strike at Monitor, which was so greatly magnified by mine workers officials, caused a loss of only 27 hours or 1700 tons. A special effort was made to give the Logan field a sufficient car supply at the outset of September and the indications early in the week were for a substantial gain in the output. Shipments were large to tidewater points, although there was no assurance that such shipments would be continued to the seaboard, owing to the probability of an embargo. As far as could be learned, Lake shipments were increased in volume.

The volume of coal handled by the Chesapeake & Ohio R.R., during the last week of August, was somewhat under that for the week ended Aug. 23, the total number of cars loaded and handled being 11,798. Although official figures have not been made public, yet it is believed from semi-official estimates, that the total tonnage handled by the C. & O during the month of August will be almost 1,000,000 tons short of the tonnage handled during August, 1918. In other words tonnage handled during August, 1919, amounted to only about 2,000,000 tons. A large part of the reduction was due, of course, to the strike of shopmen on the C. & O. lasting a period of two weeks, during which time little or no coal was hauled by the C. & O. An earnest effort was made to overcome the losses resulting from the strike but a shortage of cars checked the effort to regain lost ground.

Columbus, Ohio

Coal production statistics of Ohio for 1918. Great headway in machine mining in the state. Counties making best showing in production noted. Fatal accident statistics analyzed. Comparisons of interest to coal men.

In 1918 the state of Ohio produced 47,894,226 tons of coal, the largest in the history of the commonwealth, according to the statistical report of the Ohio Industrial Commission made public recently. Of this tonnage, 4,996,192 tons were produced by the use of the pick, 40,122,379 tons by machine mining, and 2,730,655 tons by stripping. Lake shipments during the year totaled 29,388,242 tons. Machine mining has made great headway in this state as in the year 1918, about 84 per cent. of all coal mined here was undercut by machines. A little over 16 per cent. was mined by hand and nearly 6 per cent. was recovered from strippings. In some cases where crop coal is stripped, the tonnage from this source is clear gain as the coal would probably largely be wasted otherwise.

By further analysis of this report, it develops that Belmont County, as has been the case for the past decade, was the largest producer with 12,165,253 tons to its credit; this is an increase of 1,008,627 tons over the previous year. Jefferson County produced 7,266,314 tons, an increase of 1,481,074 tons over the previous year. Athens County produced 6,654,862 tons, an increase of 341,063 tons. Other large producing counties were: Guernsey, 4,493,718 tons; Perry, 3,452,338 tons; Hocking, 2,347,657 tons. The report showed a heavy decrease in production during the last half of the year, owing to labor shortage and military service.

There were 135 fatal accidents in the coal mines of Ohio during the year, of which 92 were caused by falling slate and rock and 27 by mine cars; of the total number 48 fatal accidents occurred in Belmont County alone. Several points stand out in connection with these fatal accident statistics. There was one death for every 355,000 tons of coal produced; the production per death for the whole country was about 266,000. The number of deaths caused by falling rock and slate constitutes a large proportion of the fatal accidents from all causes—about 68 per cent. The average in the coal fields of the country from this cause has been around 50 per cent. for years. Furthermore, Belmont County produced about 25½ per cent. of the tonnage of the state, and about 35½ per cent. of the fatalities in the mines of Ohio are credited to this county for the year 1918; the fatalities are out of proportion to the tonnage in Belmont County, compared with the rest of the state.

Louisville, Ky.

Opinion affecting 60,000 acres of coal and timber lands in eastern Kentucky. Important case decided in Letcher County. Other suits pending in adjoining counties. Salient features of Letcher County suit. Prominent coal corporation involved.

Escheat proceedings under which title to 60 000 acres of coal, oil and timber lands in Letcher County, Ky., was involved, were quashed in the Letcher Circuit Court, Whitesburg, Ky., on Sept. 3, when Judge Joel E. Childress, presiding, dismissed the action brought in the name of the Commonwealth, rendering the opinion that Blakey & Blakey, attorneys, did not have sufficient authority to enter the suits.

According to Attorney General Morris, Eli H. Brown, of Louisville, first proposed to institute such proceedings, but his offer was declined. Clayton B. Blakey, made a similar proposal which was accepted, a contract being made whereby former Governor A. O. Stanley and Attorney General Morris agreed to allow Blakey a 30 per cent. fee out of the proceeds of lands escheated to the state, under the five-year limitation statute, under which all corporations must make out lists of lands in their possession within that period. Names or locations of corporations were not divulged by the attorneys, and later blanket suits were filed involving thousands of acres of coal, oil and timber properties valued at millions of dollars, in Pike, Letcher, Lee, Estill, Christian and Muhlenburg counties, under the allegation that the lands being held by corporations, had not been used by them for a period of five years in the operation of their business (as provided by law) and should revert to the state.

Later on Attorney General Morris endeavored to get into communication with Blakey, who was in the West, and with Brown (who he figured was a silent partner) with the intention of reviewing the cases as to merit, as they had been filed without his being consulted. He could not get in touch with the attorneys. He next issued instructions that pipe line companies could take oil from producing companies, regardless of proceedings.

The case decided in Letcher County is the first to be disposed of, and others will follow rapidly. In Floyd County similar cases will be disposed of within a few days and also in Perry County, at Hazard. Corporations were disposed to show conclusively that a considerable part of the properties were in a rapid state of development. The Flahaven Land Co., recently filed a $100,000 damage suit against Blakey & Blakey, as a result of the suit filed against that company.

The first four suits filed in Lee County were against the Flahaven Land Co., Huntington Land Co., Eureka Coal and Mineral Co., First National Bank, of Jackson, and the Lee County Land Co.; these suits were followed by suits against Brandenburg Mineral Co. and Beattyville Town Co. These suits affected large tracts under lease, and upon which operations of one sort or another were in progress, including any number of oil companies.

The principal companies figuring in the suits in Letcher County were the following: The Virginia Iron, Coal and Coke Co.; Roberts Coal Co., a Virginia corporation; The Mineral Development Co., Philadelphia; Swift Coal and Timber Co., Lake Charles, La.; and the Vizard Improvement Co.

During the time that the title to these lands was clouded development was severely interfered with. Final action was taken in the Letcher Court after the cases had been called three times, and delayed

Nanaimo, B. C.

Canadian Western Fuel Co. advances wages 25c. a day. Statement by the company. Dominion Department of Labor investigates wage increases of Nanaimo district and explains whole situation. Canadian company will meet all wage increases of other companies in excess of its own.

The employees of the Canadian Western Fuel Co. have received an advance of 25c a day in their wages from Sept. 1. This was announced officially as follows:

"The request of your committee for an increase for the employees of the company on account of the increased cost of living has been given due consideration. To assist in meeting this condition the management will put in effect on Sept 1 an additional bonus of 25c. a day. This bonus will remain in effect until such time as the cost of living shall be reduced a like amount

In this connection attention is called to the fact that the basic scale for both tonnage and shift rates is higher at Nanaimo than in the competitive districts. The management hopes that it will continue to have the co-operation of the employees in its efforts to increase production and in maintaining the high standard of Nanaimo coal."

In this connection, D. T. Bulger, of the Dominion Department of Labor, has just concluded an inquiry into allegations by some of the miners of Nanaimo district that the Canadian Western Fuel Co. was not paying wage increases granted by the Cost of Living Commission as compensation for the fluctuations in the cost of living prices since Sept., 1918

Mr. Bulger learned that the men who made this charge misunderstood the situation and explains it as follows: "For the quarter ended Mar. 31, 1918, the increase was 22c. a day; for the quarter ended Mar. 31, 1919, 22c. a day; and for the quarter ended June 30, 1919, 14½c., making a total increase since Sept. 30, 1918, of 193c. a day. Through erroneous statements the impression was gaining headway among the miners that they were entitled to 193 per cent. increase on their base rate instead of a day basis and consequently many believed that they were being victimized by the companies out of increases to which they were justly entitled."

Neither the Canadian Western Fuel Co. nor its employes are parties to the arrangement made last year between the Island operators and the mines committees of the various districts for the adjustment of wages by the Cost of Living Commission based on the fluctuations in the cost of living prices. For this reason, together with the fact that the company's rates in many instances are higher than those paid in other localities, the Canadian company does not think it should be penalized by paying the increases awarded by the commission until the rates being paid by other companies are on a par with its own

Assurance has been received by Mr. Bulger from the Canadian Western Fuel Co. that any increase in wages by other companies in excess of its own will be met promptly.

PENNSYLVANIA

Anthracite

Plymouth—An explosion of a pocket of gas in No. 1 colliery of the Delaware & Hudson Co., on Aug. 29, instantly killed Joseph Dobre, 51 years old; Edward Flynn, John Marshko and Alexander Materka were seriously burned.

Drifton—After improvements now under way are completed, the Sandy Run colliery, of M. S. Kemmerer & Co., near here, will resume operations. The plant has been idle since Nov., 1918, and men suspended are being reinstated.

Hazleton—Production at the Hazleton Shaft colliery of the Lehigh Valley Coal Co., has been curtailed on account of a squeeze, which has developed in the workings of this mine.

Eight hundred persons attended the Annual first-aid and mine-rescue contests of the Wentz allied companies at Hazle Park recently. Maryd, Midvalley, Hazle Brook, Upper Lehigh and Raven Run, had teams (outside and inside), and in addition, two breaker-boy teams, took part. Maryd No. 1 team won first prize and $50 in gold; Maryd No. 2 won second prize and $10 in gold; Midvalley was third. All teams showed fine training and were warmly commended by the examining doctors.

Harrisburg—It is stated that the Workmen's Insurance Fund of Pennsylvania has assets of over $3,000,000 and a surplus of $1,800,000. William J. Roney, of Philadelphia, is the manager of the fund. It is announced that Albert L. Allen, the assistant manager, has resigned to take effect on Sept. 15, to go into the insurance business. There have been reports of friction between the manager and his assistant, and one of the points of contention has been the abolishment of the differential in favor of the state fund. This proposition is now before Commissioner Thomas R. Donaldson. It is understood that experts consider that it would be bad policy to abolish this differential. Most of the coal companies of the commonwealth are said to have placed their insurance with the state fund.

Bituminous

Greensburg—Recently fire, which is believed to be of incendiary origin, damaged the plant of the Derry Coal Co., located a short distance west of here. Local people are owners of the plant, George Mowry being one of the principal stockholders.

Blossburg—The Bloss Vein Coal Co., recently incorporated with a capital of $235,000, has acquired about 1200 acres of coal lands in Tioga County, near here, and is planning for the construction of a plant. The principal office will be at Geneva, N. Y., and a branch office will be located at Blossburg, Penn. G. M. B. Hawley is president, and H. L. Coleman treasurer. Mr. Coleman was formerly general manager of the Empire Gas and Electric Company.

Washington.—The Washington Gas Coal Co. has awarded the contract for sinking a shaft at this place to the R. G. Johnson Co., of Pittsburgh, Penn.; the work is to begin at once and is expected to be completed in six months. The shaft will be 280 ft. deep and is to be timber lined. When completed, this mine will give the city a modern colliery within the borough limits. As noted on page 176 in the July 24, 1919, issue of *Coal Age*, this plant will deliver coal direct from mine to consumer by means of trucks; there will be no railroad haulage of coal from the plant.

Indiana.—Through a deal just consummated, Vernon O. Taylor, formerly an operator of the Toby Valley field, disposed of his coal holdings at Idamar (also in Indiana County) to the Empire Coal Mining Co., of Philadelphia. The purchase price was not announced, and the Philadelphia interests assume control at once. The operation, which is known as the Dixon Mine No 1, of the Idamar Coal Co., was purchased by Mr. Taylor three years ago; at the time of purchase the property was in a general state of disrepair but it was soon placed in shape for operation and at present is shipping at the rate of 125,000 tons a year. With the transfer of the Idamar mine, Mr. Taylor has disposed of all of his coal operations in Indiana County. His only coal plant at present is the mines at Valier in Jefferson County.

WEST VIRGINIA

Big Chimney—New equipemnt has been installed at the plant of the Davenport Coal Co. operating on the Coal and Coke Ry., at this place in Kanawha County. The company has begun the production of 2- and 4-in. lump from the Winifrede seam. M. H. Blandford is manager.

Morgantown—A party of Cumberland men, headed by Howard Cross, is said to have purchased the plant and holdings of the Knob Coal Co., at Beechwood, Monongalia County, W. Va., on the Morgantown & Wheeling R.R., near here. Mr. Cross is president of the Knob Coal Co., his latest acquisition. He is general manager of the Carroll Cross Coal Co., Emoryville, W. Va.; vice president of the Elk Garden Big Vein Coal Co.; general manager of the Emory Run Coal Company, in Mineral County, W. Va.; general manager of the Hartman Run Coal Co., near Morgantown, and president of the Ino Coal Co., Morgantown.

Charleston—A large area of smokeless coal will become accessible for development with the building by the Chesapeake & Ohio R. R., of 16 miles of branch line into the coal regions of Nicholas and Greenbrier counties starting from Rockcverte. The coal lands referred to are in the region of which Rainelle is the center.

Assignment has been made of those engaged in West Virginia University Mining Extension work as follows: Prof. R. Z. Virgin, in the Fairmont district; H. E. Gray, to the Elkins district; J. A. Graft, to the Winding Gulf district, at Beckley; C. K. Brown, to the Tug Handle section, with headquarters at Wellsburg.

The New River Coal Operators' Association held a meeting here recently when general industrial conditions were brought up; the association gave some time to the discussion of the new wage scale recently agreed upon by scale committees representing the operators and the miners. Most of the companies operating in the New River field have ratified in writing the new contract. The discussion, therefore, had to do with a request from mine workers officials for further conferences in connection with the new wage contract. The operators did not seem to favor any further wage conference.

OHIO

Columbus—Formal complaint has been made by W. D. McKinney, secretary of the Southern Ohio Coal Exchange, through Senator Pomerene against the Railroad Administration because of lack of cars. Mr. McKinney claims that the mines in the southern Ohio fields are losing more than 50,000 tons weekly because of car shortage. The largest percentage of loss in the field is along the Toledo & Ohio Central, Zanesville & Western and Kanawha & Michigan roads, which have been uncommonly short of equipment. It is estimated that the weekly loss of wages to the miners is in excess of $75,000.

Officials of the Lorain Coal and Dock Co., of Columbus, which concern operates five large mines in the eastern Ohio field, with a daily capacity of 7500 tons, report that between July 21 and Aug. 21 there was a shortage of 1733 cars which cut the production about 86,000 tons. The same thing is true of other eastern Ohio operators.

The Sunday Creek Coal Co. has the same story to tell as well as the Maynard Coal Co., the Hisylvania Coal Co., and others which have headquarters in Columbus.

INDIANA

Brazil—The Crawford Coal Co., of this city is sinking a new mine in the block coal field northwest of here, which will be ready for operation about Nov. 1, 1919. Work will be given to 150 miners.

Vincennes—The Oliphant-Johnson Coal Co. mine, located near Bruceville, Knox County, broke its record a few days ago for hoisting coal in eight hours when 3115 tons were brought to the surface. This is said to be the third largest mine in Indiana, the leader being the plant of the American Coal Mining Co., at Bicknell, also in Knox County.

Terre Haute—Richard Lieber, director of the Indiana Conservation Commission, is looking into the right of the state to claim coal under the Wabash River in southern Indiana coal fields. A division of the commission has estimated that at least 9,000,000 tons of coal lie under the river. Some of the coal may have been taken by coal companies and the state may mine a portion of it for the state institutions. If the state has a right to the coal then companies that have taken coal from under the river may be required to reimburse the state treasury; such action was recently taken in the case of an Indianapolis gravel company which had taken gravel from the White River. Ele Stansburg, attorney-general of Indiana, has pointed out that at places where the Wabash River is navigable, the state has the right to the coal; on the other hand, if the river is not navigable, the adjacent property owners have the right to the mineral. The question of whether the river is navigable is still unsettled by the courts

ILLINOIS

Litchfield—Fire was recently discovered in the "Kortkamp" mine near here, and the workings have now been sealed in an effort to smother the fire. The miners working at this plant went on strike recently in sympathy with the insurgent striking miners of the Belleville and Springfield districts.

Athens—The old No. 2 mine, at this place (in Menard County, north of Sangamon County), which was abandoned seven years ago, is to be reopened. The water is being pumped out and Joseph Hands, the manager, announces that coal will be hoisted in a short time. The coal rights underlying a considerable adjoining acreage have been purchased. When the mine was abandoned it was on fire but it later burned out. Athens has one other mine, that of the Athens Mining Company.

Herrin—The U. S. Reduction and Atomizing Co. is rushing the completion of its factory for the treatment of the slack coal from the mines around here. The company plans to spend over $100,000 in the erection of the plant which will give employment to several hundred men and provide a source of income from a product of the mines which was formerly difficult of disposal. The new plant will somewhat resemble a grain elevator, being three stories high at one end, to house the large hopper where the pulverized or atomized carbon will be stored. The remainder of the building will be one story in height; here will be located the machinery for the pulverizing of coal. The main building will be 40 x 120 ft. with a boiler house 40 x 40 feet.

Pana—Fire destroyed the surface plant of the Springside mine, owned by the Smith-Lohr Coal Mining Co., on Aug 30. The loss is placed at $300,000. A hot box in the mechanism of the tipple is said to have set the framework ablaze. The power

house explosion, caused the flames to spread rapidly, imperiling the 300 men at work 700 ft. below in the mine. The miners escaped through an opening into the Penwell mine, but not until after a battle with smoke and gas in which the younger and stronger men assisted the older ones. The tipple, coal washer, engine and boiler houses, storage house, powder house and trackage were destroyed. The mine recently was equipped with new machinery. The property was partly covered by insurance. The company announces that reconstruction work will start soon.

ALABAMA

Birmingham.—The federal grand jury empanelled for the regular term of court in this district has entered upon the investigation of the alleged combine of coal operators of Alabama for maintaining prices, and is hearing a large number of witnesses daily. Congressman Huddleston, of this district, at whose instigation the investigation is being undertaken, was subpoenaed for Sept. 3 to offer testimony, but failed to appear, but it is understood he will be present at a later date. Witnesses have been summoned from among operators, retailers, sales agents, jobbers, miners, and the general public, and much statistical data on cost and profits has been submitted. Coal men are confident of full vindication of all charges.

TEXAS

El Paso—A municipal coal yard and cooperative buying of fuel was proposed by the Central Labor Union of this place, Texas, as a means for reducing the cost of living to the laboring men.

Thorndale—The opening of a new coal field fifteen miles southeast of here in Milam County, Texas, is reported by W. C. Phillips. A branch road has been built from the main line of the International & Great Northern Ry. to the fields so that shipping of the fuel will begin shortly.

Rusk—The iron furnaces here of the Texas Steel Co. are idle, owing to the fact that shipments of coke from the company's coke ovens at Howe, Okla., are being held up by the litigation between the Railroad Administration and the steel company, according to L. P. Featherstone, president of the company. Colonel Featherstone said that the suit filed by his company was still pending and that no relief in the matter of rates complained of had been granted. It is said that the only obstacle to the success of the Texas Steel Co. is the inability to get fuel from the Oklahoma coke ovens on account of excessive interstate rates. Rusk is in Cherokee County in the eastern part of the state.

UTAH

Price—The mines in Carbon County have recently been inspected by the State Board of Equalization and Assessment in order to obtain a correct idea of the value of the various properties before assessing the corporations. "Knowledge which the board obtained," said Secretary William Bailey, "was in a measure technical, but it was valuable. All such matters have to be taken into consideration in the assessment of coal mines, and now that we have had an ocular demonstration we shall be able to handle the problem better than ever before."

The largest and commercially most important coal field of Utah is that of the Great Uinta basin; its coal beds underlie large portions of Carbon County and counties to the north and east of it. By far the most important field lies in Carbon County from which 85 to 90 per cent. of the state's production is mined. The coal is mostly a high grade bituminous. Much of the mining here is done under heavy cover—in few localities less than 1000 feet.

OKLAHOMA

Oklahoma City—Inefficiency in the Federal Railroad Administration is blamed by D. B. Withers, of the McAlester Fuel Co., for the lack of coal cars which is holding back coal production in the Oklahoma and Texas coal fields. Failure to keep rolling stock in repair and to build sufficient cars is resulting now in shortage, Mr. Withers said, which has curtailed working time at the mines to at least one-half of what it should be. The mines so far this summer have been working only part time and the winter rush is just starting. The shortage of cars is expected to aggravate a situation already acute insofar as the supply of domestic coal is concerned.

Foreign News

Brussels, Belgium—The total Belgian output of coal during July amounted to very nearly 87 per cent. of the average monthly production during 1913. In the Mons and Central districts the coal output in July reached practically the prewar output. In the Charleroi, the output amounted to 85 per cent. and in the Liege district 77 per cent.

Edmonton, Alberta.—O. S. Finnie, inspecting engineer of the Mining Lands branch of the Canadian Department of the Interior, who has been on an exploring expedition, in the district west of Edmonton, reports the occurrence of 12 or more seams of high-grade bituminous coal of great thickness at the junction of the Smoky and Musket rivers north of the Canadian National Ry. He considers it also possible that anthracite coal may exist in this neighborhood in large quantities.

Sydney, N. S.—Three of the vessels of the Dominion Steel Corporation, taken over by the British Admiralty for war purposes have been released. They are the "Wabana," "Kamouraska" and "Lord Strathcona" having an aggregate tonnage of 26,000 tons. They are again being used in the St. Lawrence coal carrying trade. Two other ships with a combined tonnage of 22,000 tons are yet to be released and will shortly be available for coal shipments. While the company is rather late in getting into the Montreal coal market this season, it is believed that a fair amount of business will be done before the close of navigation and that the volume of next year's trade will be not far from normal

Personals

L. S. Bovee has temporarily assumed control of the interests of the Pittsburgh & Erie Coal Co.

Edward Soppitt, president of the Erie Coal Mining Co., is on his way to Europe for an extended vacation.

George Watkin Evans, of Seattle, Wash., returned recently from a professional visit to the Behring River coal field of Alaska

George E. Steele, of Brownsville, Penn., who recently returned from overseas service as corporal of engineers, has resumed his position as engineer for the Hector Coal and Coke Co., and engineer and assistant general manager for the Snowdon Coke Company.

Edward Brewer, inspector in the Eighth West Virginia mining district, with headquarters at Charleston, has resigned to become manager of the operations of the Wet Branch Coal Co., at Dry Branch, in the Kanawha field. Mr. Brewer has been connected with the state Department of Mines for the last two years.

George H. Ashley has been selected as the state geologist of Pennsylvania. He has been connected with the work of the U. S. Geological Survey in the East and is an authority on coal. Mr. Ashley has done considerable work in Pennsylvania and other coal producing states. He will be the chief of the new bureau created by a recent act of assembly.

C. H. Constantine, who has been superintendent at the Coalbrook colliery of the Delaware & Hudson Co. for the last few years, is to be transferred to Vandling. **H. Davison,** superintendent at the Powderly colliery of the D. & H. Co. is to take Mr. Constantine's place. **Richard Beer,** present superintendent at the Vandling, is to be transferred to the Powderly colliery.

Howard J. Thomas has been appointed superintendent of mines for the Sloss Sheffield Steel and Iron Co., filling the vacancy caused by the resignation of J. E. Strong, who left the service of the company Aug. 1. Mr. Thomas has been assistant general superintendent of mines for several years, and, while a young man, he has been connected with mining interests in an executive capacity for some time

M. E. Peltier, president and general manager of the Monarch Coal Mining Co., of Monarch, Wyo., moved his office to Chicago, Ill., on Sept. 1. Mr. Peltier has assumed the duties of a vice president of the Peabody Coal Co., of Chicago, but will still retain his connection and position with the Monarch company. R. E. Fitch, at present engineer and superintendent, will be in charge of all operations at the Monarch mine, Mr. Fitch recently increased his popularity with the men at the mine by his proficiency in baseball; in 31 games in which he played on the local team, his batting average was 450 and fielding average was 1000.

Obituary

Robert W. Caldwell, of Clearfield, Penn., and **James F. Stott** of Philipsburg, Penn., —coal operators—met their death recently in an old coal mine at Pine Run, Clearfield County, Penn. The former had interested Mr. Stott in the property and they were examining the mine, accompanied by a chauffeur. They had not penetrated more than 50 ft. into the mine when they encountered "white damp" which caused them to fall to the ground. The chauffeur, who was nearest the outside, managed to escape; he was not able to bring help in time to rescue the men alive.

Industrial News

Indiana, Penn.—The Clearfield Bituminous Coal Corporation offices will be moved from Clearfield to Indiana about Sept. 15.

Buffalo, N. Y.—The Lawsonham coal mine at its namesaketown in Clarion Co., Penn., has been sold to capitalists at St. Mary's, Penn.; it will be controlled by members of the Elk Fire Brick Co. there—price about $100,000.

Jellico, Tenn.—The Pioneer Jellico Coal Co. is having plans prepared looking to the extension of its present operations; a total of about 1800 acres is to be developed. The company recently increased its capital from $25,000 to $75,000, to provide for the proposed expansion.

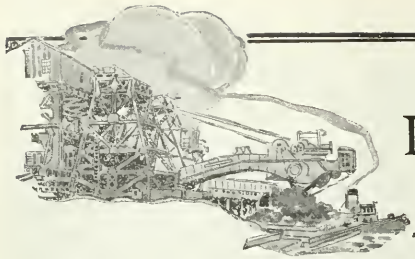
Davy, W. Va.—George Wolfe, Davy; Forest Early, Mullens; and R. F. Wysong, Princeton, are perfecting plans for the organization of a new company to be capitalized at $150,000. It is proposed to develop approximately 2100 acres of coal properties in the Davy section.

Charleston, W. Va.—A deal is reported in which over $300,000 changed hands. The property sold was 2,029 acres of coal lands on the Norfolk & Western R.R., to the Camp Creek Coal Co. Its seam of 6½ to 8 ft. of clean coal is tipple height above the railroad. The following are the officers of the company: L. A. Tinder, president; J. Walter Webb and Reed Bigley, vice presidents; L. C. Massey, treasurer; and L. W. Hamilton, secretary. The corporation will spend $200,000 in developing these coal lands, and the work will begin at once.

Cleveland, Ohio—The Lakewood Engineering Co., with headquarters here, has issued the first number of its Lakewood Aerial Bulletin (the 7 o'clock final) with a circulation—"guaranteed highest in the world." These bulletins were dropped by aviators in a flight from Dayton to Cleveland who are engaged to regularly distribute such literature from an airplane. In the technical field, this is a novel method of exploiting equipment and the Manufacturers' Publicity Bureau considers that it is destined to be a big part of the advertising world in the days to come.

Princeton, W. Va.—A company is being organized here with a capital of $150,000 for the purpose of acquiring and developing about 2100 acres of coal near the plant of the Superior-Pocahontas Coal Co., at Davy. The tract is said to be underlaid by the Davy-Sewell seam. The company plans to start construction work in the near future and to begin the mining and shipping of coal early in the year. Among those active in organizing the new company are George Wolfe, superintendent of the Winding Gulf Collieries Co., and general manager of the Superior-Pocahontas Coal Co., at Davy; Forest Early, of Mullens and A. F. Wysong, of Princeton.

Milwaukee, Wis.—The Richardson Phenix Co., of this place, announces that L. E. Strothman has become the vice president and general manager of this firm in which he has acquired a financial interest. Mr. Strothman was formerly manager of the Steam Turbine and Pumping Engine Departments of the Allis-Chalmers Manufacturing Co.; he had been connected with this concern since 1902, and prior to that with the Files & Stowell Co. and the Nordberg Manufacturing Co. Mr. Strothman is a member of several engineering societies; in 1916 he was appointed associate member of the Naval Consulting Board. In 1918 he was made a member of the Committee on Power Test Codes and elected chairman of the Sub-Committee of Displacement Pump Tests



MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Large Volume of Soft Coal Moving from the Mines—Buying Is Slow—May Have to Offer Inducements to Move Coal—Anthracite Situation Offers No Cause for Worry—Hard Coal Operators to Sue United States Government

THE output of bituminous coal is at the present time well beyond expectations. In spite of all talk of short car supply and inadequate labor, the volume of coal moving from the mining regions reaches a total that would be considered high in normal times. However, there is little reduction in prices of the good grades of fuel. These are quickly absorbed as soon as they reach the market.

It is evident that the production of soft coal has caught up with the demand, and that until real cold weather sets in the market will be easier. It is hard to forecast conditions, for labor troubles are liable to occur at any time.

In the Pocahontas and New River districts, as well as in the Pittsburgh and Westmoreland fields, there is now consistent mining and a steady flow of coal. Mines in Illinois are still running on short time because of labor troubles. So many producers have purposely refrained from making contracts for season delivery that it would occasion no great surprise to hear of inducements being made to move coal in the near future, quite possibly before October.

Export and bunker demand is strong, though the lack of bottoms precludes heavier shipments to foreign ports. Many vessels sailing from the United States carry with them sufficient fuel for the round trip, while vessels reaching here from foreign countries complain of the lack of coal across the seas, some of the officers saying that they had been held up for several days pending the arrival of fuel.

As with the soft coal industry, unless labor troubles interfere unduly with mining all fears of a shortage of anthracite this winter may be set aside. Of interest this week is the news that the strike of the Reading fleet of tugs, which had been in effect since the latter part of July, has been settled. The resumption of movement means a great deal to points along the Atlantic Coast which depend upon this fleet for the towing of their coal supply.

Interesting, too, is the announcement that the "independent" anthracite operators of Pennsylvania (as distinguished from the so-called "railroad coal companies") are preparing to institute a test suit against the Government to determine whether the United States is not liable for a loss in profits suffered by them because of Fuel Administration control. It will be alleged that the company bringing the suit operated its mine during the entire régime of Dr. Garfield, and that, under the restriction of prices maintained by the Fuel Administrator, the prices it was permitted to charge for its product were so low that it barely got back the cost of mining and preparing, thereby denying it the "just and reasonable profit" to which it is entitled by law.

WEEKLY COAL PRODUCTION

A slight decrease marked the production of bituminous coal during the week ended Aug. 30, the output being estimated at 10,197,000 net tons as compared with 10,662,000 tons during the preceding week. The week's performance has been exceeded but two other times during the year, in January and early July.

The current weekly production is still, however, 2,500,000 tons below that of a year ago. The total output during the first eight months of 1919 is thus 96,000,000 tons, or nearly 25 per cent. less than during the same period of 1918.

Anthracite production during the week ended Aug. 30 was the highest attained this year. The output is estimated at 1,946,000 tons, a figure 4.2 per cent. above the week of Aug. 23 but 14 per cent. below that of the corresponding week last year. In spite of quickening demand, production since the beginning of the coal year is still 6,200,000 tons, or 14 per cent. less than during the corresponding period of 1918, but 9 per cent. above 1916.

The marked improvement in production which occurred during the week of Aug. 23 is shown by the operators' reports to be due to a partial cessation of the labor disturbances in Illinois and to the recovery of the railroads from the shopmen's strikes.

Aside from slight losses of time ascribed to labor shortage in Ohio, Pennsylvania and the Southwest, labor conditions were satisfactory during the week, except in Illinois. In that state losses due to labor amounted to one-fifth of the full-time capacity. This, however, was a marked improvement over the preceding week when Illinois mines lost a third of their full working time because of labor troubles.

The steady quickening of the demand for coal is shown in Indiana, where losses of output are attributed to lack of market were 1.1 per cent. of capacity as compared with 14.9 per cent. during the preceding week. Only in Illinois, Iowa, southern Ohio, Alabama, the Southwest, and the Far West, does a dull market now seriously retard production.

Car shortage became less acute as the railroads partially recovered from the effects of the shopmen's strikes of early August. Southern Ohio and western Kentucky were the only districts which failed to report relief. In spite of the improvement, however, the mines of the country as a whole lost a sixth of their full working time through railway disability. Shortage of cars remained the principal factor limiting production.

The gradual increase in the production of beehive coke, which has been apparent since the depression of last May, continues. The output during the week ended Aug. 30—the greatest since Mar. 15—is estimated at 417,609 net tons, or 0.7 per cent. higher than that of the preceding week.

In comparison with the corresponding week of last 1918, however, the production is small. The country enters the ninth month of 1918 37 per cent. behind the production of last year.

For the two week period ended Aug. 24 dumpings of bituminous coal at lower Lake Erie ports were less than half those of a year ago—1,129,489 tons as compared with 2,307,697 tons during the corresponding period of 1918. In consequence, total dumpings since Jan. 1 are now 220,000 tons, or 1.4 per cent. behind last year.

BUSINESS OPINIONS

Marshall Field & Co.—Current wholesale distribution of dry goods was well in excess of the same week a year ago. Orders from road salesmen, both for immediate and future delivery, showed a considerable increase over the same period of 1918. Customers have been in the house in much larger numbers. Collections are very satisfactory.

Dry Goods Economist—In the primary markets trade has slowed down, although in retail stores throughout the country business has continued to move at a rapid gait. There are good authorities who are impressed with the possibility of reaction in the country's business as a whole, but such a change in general conditions they do not regard as being near at hand.

Atlantic Seaboard

BOSTON

Market continues inactive, but with little recession in prices. Output keeps up beyond expectation. Some shippers are even "padding" orders. Low volatiles still have the call. Tonnage at piers readily absorbed. Hampton Roads prices firm. Sales confined to export and bunker trade. Reading barge movement resumed. More cheerful outlook for domestic sizes.

Bituminous—In spite of many predictions the market for steam coal in this territory is nothing short of dull. There is an utter lack of snap to current demand. Inquiries are only scattering and for very small tonnages, so little interest is there on the part of buyers. It has been a season of quiet buying, with very few spurts, and as a result the great majority of steam-users find themselves with ample stocks for months ahead. They are again showing discrimination between coals, and in more cases than few they are complaining of the quality of shipments that they were eager to buy a month or more ago. A reaction has set in we are obliged to admit. Notwithstanding all the tales of short car-supply, lack of men, etc., the volume of coal moving forward keeps up to what in normal times would be considered a high figure. At the same time, there is very little easing up of prices. A few of the low volatiles

that advanced rapidly a few weeks ago to a range of $3.30@3.50 have now settled back on a $3.10@3.25 basis, although there are specialities that still command the higher price level. The medium grades from Clearfield and Cambria have dropped to less than $3, and most of the high volatiles have followed suit. A demand from other directions is still maintaining prices, for if the market were left to current buying in New England the price reaction would probably be pronounced.

In all the districts the output is well beyond expectation. More and more men are available for the mines, and although there is uneasiness here and there over car-supply the trouble from that factor seems now pretty well discounted. In the Pocahontas and New River districts, as well as in Pittsburgh and Westmoreland fields, there is now consistent mining and a steady flow of coal. So many producers have purposely refrained from taking contracts for season delivery that it would not be at all surprising to see inducements made for moving coal, quite possibly before September is over. There are scores of operations, especially those where the coal is not favorably regarded, that have orders in hand only for a few weeks, at best, and from present indications an effort will have to be made to place them before long.

In the current market the outstanding feature is the strength of buying at the Philadelphia and New York piers. Apparently there are several shippers who have commitments enough ahead to keep them picking up coal to load foreign cargoes, and as a result prices at the loading ports continue reasonably firm. In most cases receipts at the piers are readily absorbed although the poorer grades sell only with difficulty. Coastwise business is very light and now that freights on Long Island Sound and to Boston have advanced because of the prevailing bad weather it is assumed there will be even less of this coal placed than was the case in August.

At Hampton Roads there is almost no softening in prices. The export and bunker demand is still strong and the volume of coal taken by the Government on the spring contract basis makes operators all the more anxious to secure remunerative prices offshore. For shipment in this direction there are practically no sales, receipts here being almost wholly confined to contract deliveries. While the tonnage received is light and the stocks in the hands of rehandling factors are small, there are no reports anywhere of anxiety on this account. There were some indications when the shopmen's walkout was threatening, but barring interruptions to transportation there is now a feeling of easiness over the situation

Current quotations of bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F. o. b. mines, net tons...	$2.60@3.00	$3.00@3.50
F. o. b. Philadelphia, gross tons.....	4.79@5.25	5.20@5.70
F. o. b. New York, gross tons.....	5.10@5.60	5 50@6.00
Alongside Boston (water coal), gross tons.....	6.85@7 85	7.10@7.85

Georges Creek is quoted at $3.70 per net ton, f. o. b. mines.

Pocahontas and New River are quoted at $6.00 @6.50 per gross ton f. o. b. Norfolk and Newport News, Va., in response to export demand. There continue practically no sales for coastwise shipment.

Anthracite—The big news in the hard coal trade this week is the settlement of the strike on Reading tugs. The fleet which has been tied up since the latter part of July resumed movement on Sept. 3 and by the end of the week all nine tugs were bound east with tows. This will be of great assistance all along the coast where there are retailers dependent upon this fleet for their supply. The situation has been especially serious to up-river points like Bangor and Augusta, Maine, where a season's supply ought to be accumulated by Dec. 1. At such points the dealers now have almost no coal on hand and things were rapidly approaching a crisis.

Tonnage figures that are published are as misleading in anthracite as in bituminous. All the comparisons are with 1918, and during that season a very large tonnage, somewhat in excess of a round million gross tons, was received of buckwheat, silt and culm, all of which was classified as "anthracite" and continues to be held up to the public as "anthracite," such as they use in their homes. The fact is that this market will not today begin to absorb its proportion of pea coal let alone the three sizes of buckwheat and the river culm and other products reclaimed last year during a time when there was real apprehension.

NEW YORK

Dealers feel that danger of shortage of coal has passed. Demand for egg and stove slackens and market is easier. Line trade wants chestnut. Demand from New England and Canada remains heavy. Pea coal moves easily. Call for bituminous slows down and coal accumulates at piers. Prices remain firm. Big demand for export and bunker coals.

Anthracite—The continued delivery of a fair tonnage of the domestic coals has had a wholesome effect upon the local market, and unless the unexpected occurs the danger of anything resembling a shortage of those sizes here is small. While some retail dealers have orders remaining unfilled that they received in April last, they have delivered so many orders not usually received until later in the year that they feel themselves secure.

The feeling in wholesale circles is much easier. The pressure is not so noticeable, and the anxiety at one time so manifest that there would be a lack of coal is not so apparent. Conditions are much improved, and although the report of dumpings at the railroad docks does not show as many cars dumped, the trade was well taken care of.

While egg and stove sizes are short here among the line trade the call for chestnut is strong and some shippers complain of its scarcity. Chestnut and pea coals have picked up in the tidewater market and the surplus tonnage is not heavy.

The call of dealers in the New England States and in Canada continues strong, but the situation is much improved. Canadian consumers, as did many here, became frightened early in the year and placed their winter orders far ahead of the usual time, with the result that retail dealers began their rush of deliveries earlier than usual. Nothing serious is looked for in the Canadian situation unless it is an unexceptionally cold winter bringing with it transportation difficulties. Buyers in Canada appear so well fortified that they are now reported to be holding off rather than meet the premiums said to be asked by some shippers of independent coals.

In this market dealers are not placing orders as freely as heretofore. They have a better feeling, and some independent coals which frequently brought the offer of a premium are now being turned down unless they can be secured at near the regular company schedule.

Some pea coal is being moved here in conjunction with shipments of egg and stove, but this is not as frequent as a few weeks ago.

Buckwheat is moving the best in the list of the steam coals. While the demand is good here, salesmen find inland dealers willing to take larger shipments. Rice and barley are in larger supply than buckwheat.

During the week ended Sept. 5 there were 4886 cars of anthracite dumped at the local railroad piers as compared with 6668 cars the week previous, a decrease of 1582 cars, due in most part to Sunday and Labor Day.

Quotations for company, white ash coals, per gross tons at the mines and f.o.b. New York tidewater lower ports, follows:

	Mine	Tidewater
Broken	$5.95	$7 80
Egg	6.35	8.20
Stove	6.60	8.45
Chestnut	6.70	8.55
Pea	5 30	7.05
Buckwheat	3 40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—Lack of demand with increased shipments and no orders to meet the tonnage has resulted in the local docks being overrun with coal and the placing of embargoes on many shippers as well as some of the docks. The surprising feature of the situation was the maintaining of prices, some of which for certain grades show an increase over the previous week.

The high-grade coals, which have been hard to get, are again making their appearance but do not remain long as they are quickly absorbed and buyers are willing to pay good prices.

Reports received here from Canada indicate that there is little cause for nervousness over the situation there. With the present stocks on hand and the regular movement of coal the trade there feels there is no reason for any anxiety.

There is a growing demand for coal from New England. Supplies are said to be smaller than is generally realized and a serious shortage would mean considerable to manufacturers.

That there is not a larger supply of coal on the local docks is due to the large number of vessels leaving this port and the heavy demand for coal for export. The lack of vessels continues to delay heavier shipments of coal to foreign countries. Many vessels sailing from this port carry with them sufficient fuel for the round trip, while vessels coming into the port from foreign countries complain of the lack of fuel across the seas, some of the officers saying they had been held up for several days pending the arrival of coal.

Car supply is said to be improving on the Baltimore & Ohio.

Quotations on pool coals show some changes from last week's figures. Pools 1, 9 and 71 range from $5.85 to $6.10 per ton; No. 10, $5.75 to $5.85; No. 11, $5.30 to $5.40, and No. 18 from $5 to $5.15.

Quotations on various grades of coal at the mine for spot delivery range about as follows:

	Spot
South Fork (best)	$3.25@$3.50
Cambria (best)	3.00@3 25
Cambria (ordinary)	2.70@ 2.90
Clearfield (best)	3.00@ 3.25
Clearfield (ordinary)	2.70@ 2 90
Reynoldsville	2.85@ 2.90
Quemahoning	3.25@ 3.50
Somerset (medium)	3.10@ 3.25
Somerset (poor)	2.65@ 2.75
Western Maryland	2.65@ 2.75
Fairmont	2.50@ 2.65
Fairmont ¾ in.	3.10@ 3 25
Latrobe	2.75@ 2 90
Greensburg	2.75@ 3 00
Westmoreland, ¾ in.	3.50@ 3 75
Westmoreland run-of-mine	3.20@ 3.35

PHILADELPHIA

Anthracite demand unabated. Consumers anxious for deliveries. Dealers receive new business. Careful as to price quotation. Chestnut stocks going down. Pea demand improving. Stove and egg still short. Individual pea price up. Retail price schedule well maintained with little cutting. Manufactured coal coming on market. Steam market shows little activity. Some cutting on buckwheat. Bituminous demand good. Some easing off account of tide embargo. Prices firm.

Anthracite—As was to be expected, the cool spell prevailing last week was only a flurry and more seasonable conditions now obtain. Nevertheless it served to impress upon coal buyers the desirability of providing for their coal supply. The retailers received quite an influx of new business, and most of them in accepting it have exercised much care as to promise of delivery as well as price. While there have been rumors that the large companies might ask more than the previously announced increase, it is not at all certain yet that they will not increase the present winter schedule.

As to supplies in the local yards, the receipts lately have been quite meager and coal has been going out about as fast as it came in. Many dealers who had been storing a fair quantity of chestnut are now finding their piles being rapidly reduced, while other dealers find chestnut about as scarce as any size. Egg and stove are still short, and the latter size will no doubt be in that position for months yet. The dealers still have hopes of receiving sufficient egg to fill the orders they have on their books, although in many instances there will be a reduction in profit on account of accepting this business early in the season when they had every reason to believe they would receive sufficient quantity of this size to fill their orders.

The report is almost general that the high priced coal is usually promptly shipped—that is, coal from the individual shippers—and the dealers say the higher the price the quicker it comes. It is reported that dealers handling a heavy percentage of individual coal are simply adding the extra cost to the price and delivering this coal on new orders. This at times has caused them to be criticized by customers who have had orders in since spring. It would appear that the dealers in order to protect themselves are using the plan of holding all orders taken at a price until such a time as they get company coal to fill them and thus minimize their losses.

Pea coal continues to be the only size that is in plentiful supply and the buying by the consumers appears to be increasing now with the approach of fall. In the meantime the dealers continue to increase their stocks of this size, endeavoring to keep them at a maximum, and at the same time moving out as much as possible.

Considering retail prices it can be said that the general public seems to be convinced that higher prices are likely by the first of the year, and this is a factor in urging them to place orders at this time. With the September price schedules issued by all the operating companies the retailers

have been able to announce their prices, and the standard retail figures run about as follows: Egg, $11.15; stove, $11.55; nut, $11.50; pea, $9.55. Of course, with the dealers handling independent coal these prices run as much as 50c. more. There are only a few cut price men asking a lower figure than the above list, and usually this is not more than 25c. less. To all of these prices there is an addition of 40c. a ton for hauling.

In the steam grades there is no noticeable activity. Buckwheat is in fair demand and some plants are stocking up heavily on this size. However, the demand is not yet sufficient to take up the entire production, and individual shippers at times find themselves caught with numerous cars of this size that must be moved, which is usually done at prices around $3.15@3.25 as compared with the company figure of $3.40. Rice is in fair demand for the time of year, but a heavy tonnage is still going into the company storage yards. To even a greater degree the same is true of barley.

Bituminous—Soft coal has been sort of jumpy lately, and while prices have been fairly well maintained there has at times been a softening tendency in this direction. Much of this has been due to an embargo which was placed against certain coals at tide and for a time pushed a good tonnage on the open market which had to be moved to avoid demurrage. Many consumers took this as an indication of a general break and were inclined to dicker with shippers as to price, which in some instances became quite favorable to the buyer. It is believed that it is purely a local condition and will soon right itself. That coal is not actually plentiful is proved by the fact that one of the railroads finding itself quite short of fuel confiscated a number of shipments en route to local consumers. With all the gateways to the east and west now open to receive shipments, it is not at all unlikely that the market will stiffen shortly; in fact signs of this are already in evidence. Due to the holiday the first of the week operators are reporting a short production and are finding it difficult to fill orders promptly, inasmuch as the car supply shows no particular signs of permanent improvement, although the railroad officials are promising that there will soon be ample cars to meet all calls.

The prices per net ton in effect at this time are as follows:

Georges Creek Big Vein	$3.40@3.55
South Fork Miller Vein	3.40@3.55
Clearfield (ordinary)	3.10@3.20
Somerset (ordinary)	3.00@3.15
Fairmont lump	3.25@3.35
Fairmont mine-run	3.10@3.20
Fairmont slack	2.50@2.65
Fairmont lump (ordinary)	2.90@3.00
Fairmont mine-run	2.70@2.80
Fairmont slack	2.50@2.65

BALTIMORE

Export trade the greatest in history of port, and jam over two piers such that embargo was ordered. Rush of coals from mines does not bring down prices. Hard coal prices to remain same for September as for August.

Bituminous—The export coal movement from Baltimore, covering both gas and low-volatile coals, the latter a new feature of the foreign trading from this point, in the past three months has been the heaviest in the history of the trade. The period of June, July and August covers the term wherein the over-growing demand for export coal has figured, and during the three months there was loaded here on foreign coal carriers a total of 748,328 tons. August was the greatest month, and next to the largest single month in the history of the business here, a total of 275,177 tons having been dummed into foreign carriers

The rush of coal to tide from the mines under the vastly improved car supply has exceeded both the vessel supply and the ability of the pier terminals to handle, and during the past week the Curtis Bay pier trackage became so jammed that it was necessary to route the Western Maryland Ry. trackage at Port Covington for storage, although the Railroad Administration has refused to reopen either that pier, or the Locust Point pier of the Baltimore & Ohio, on the ground of economy. The jam at the Canton pier of the Pennsylvania was also great at times last week, and there has been a period of intermittent embargoes ranging from covering of particular pools to complete shutdown of shipments to tide.

More ships have been promised the port, and there is a feeling of confidence that the present congestion is due for early lifting. This is reflected in the price of coals, which holds firm at relatively high figures in the face of the improved movement. Better grade coals are the more readily absorbed on the strictly domestic market, and there is more discrimination in buying just now. The best grade steam coals are still firm at from $3.50 to $3.75 to the trade, mine basis, with intermediate grades ranging all the way from $2.75 to $3.25. The less desirable coals are offering at from $2.40 to $2.50. The gas coal market too is firm, low sulphur three-quarter demanding $3.50; medium sulphur three-quarter $2.75 and run-of-mine $2.40.

Anthracite—While the discussion of prices of hard coal at retail has been rather warm here at times, and many coal men claim that the margin of profit as being made here at present, under a large part of the incoming coal-carrying premiums, is entirely too low, it seems probable that no advance will take place here for September. At present many dealers are paying premiums of from 75c. to $1 on probably two-thirds of the coal they receive, and the claim is made that there must be a retail jump Oct. 1 or thereabout, when the real fall demand begins, unless there is a decided improvement in the proportion of company coal being received. Much complaint is heard of the scarcity of stove coal, known in this locality as No. 3, and this covers both white ash and Sunbury. Nut coal, too, is short in some yards. There seems to be a much more liberal supply of pea coal running this September as compared with the same period of last year.

Lake Markets

PITTSBURGH

Production stationary. Car shortage pronounced. Mr. Hines Criticized. Some prices a shade higher.

Coal production in the Pittsburgh district has been practically at a stationary rate since about July 1, there having been a steady increase for several months up to that date. Prior to that time orders represented the limiting factor in production. For several weeks past car supply has been clearly the limiting factor, and the car shortage has grown worse in the past week or two. Coal men who attended the hearings of the Frelinghuysen committee of the Senate declare that the daily press reports did not correctly state the position of Director General Hines when the reports intimated he did not admit that there has been a coal car shortage, as the coal men heard Mr. Hines admit the shortage. Pittsburgh district coal operators resent Mr. Hines disposition at the hearing to refer so frequently to coal prices. They maintain, first, that coal prices have nothing to do with the duty of the railroads to furnish cars for moving coal, and second, that the Pittsburgh district operators at any rate are not charging unreasonable prices for coal. The market has advanced only slightly in the past few weeks.

On some divisions in the district car shortages run as high as 50 per cent. A general estimate is that production is at between 55 and 60 per cent. of potential capacity of mines and that the output attained is about 75 per cent. of the outputhat the men on the payrolls could produce if they worked full time, so that such output would be between 75 and 80 per cent. of potential capacity. The direct car shortage therefore is about 25 per cent.

The Pittsburgh district is now shipping about 300 cars a day in the lake trade, about 15,000 tons or about one-sixth of the production. Shipments are much lighter than earlier in the season, and are going to dwindle gradually in the next few weeks, ceasing almost entirely quite a time before the season of navigation closes. While many consumers apparently have counted upon the ending of the lake shipping season to release so much coal for line trade as to make the situation much easier, coal producers assert that the elimination of lake shipments will hardly be felt, and point to the fact that the decrease that has occurred to date has been attended by a greater scarcity of coal.

The divergence in prices of mine-run between gas and steam has disappeared almost entirely, and prepared sizes of gas coal are at only a very moderate advance over mine run. Steam coal is quotable a shade higher than a week ago. Both steam and gas slack have advanced rather sharply. Counting out occasional low and high-priced sales involving but small tonnages, the general run of the market, covering the great bulk of the transactions, is quotable as follows: Steam coal: Slack, $2.10@2.30; mine-run, $2.50@2.60; Gas: Slack, $2.20@240; mine-run, $2.50@2.70; prepared sizes, $2.60@2.90, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous trade steady, but not very brisk. Not able to meet Pittsburgh prices. Cars grow scarcer. No change in anthracite.

Bituminous—The old difficulty continues. Jobbers find that mine prices are more than they can pay. At the same time they know that this market, as well as Canada and the section eastward, are not paying these high prices, for when they send out circulars quoting these prices they get no orders. The plan has been to get an order before the coal is bought and then find an operator who will sell on that basis.

The fall rush for coal is not in sight, and the idea that there will be one has about been given up here. Not till things become more quiet and industries move normally will there be need of large amounts of coal. Still, if the trade will go on as at present, making slow improvement without any setbacks, there will be no complaint. It has been so much poorer in the past few years than now that anything tolerably fair looks good to the trade.

It becomes harder and harder to quote bituminous prices. Such figures as are given out here by the most reliable jobbers would be repudiated by most mine owners. The jobbers know that, and yet they are able to get what coal they need at prices that form the basis of their quotations and are satisfied. The situation shows that there is coal enough to meet conditions, even if prices are various.

Quotations, as given out by leading members of the trade, are $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for same three-quarter, $4.20 for mine run, $4.10 for slack, $4.60 for smokeless, $5.70 for Pennsylvania smithing, $6.75 for domestic size coke, and $5.75 for breeze, all per net ton, f.o.b. Buffalo.

Anthracite—The trade is still waiting for more coal. The lake trade suffers on account of the handlers' strike in Duluth and Superior, the others from a general slow mining, which the operators seem unable to improve. Locally the supply has been better of late, but the demand is as far ahead. This condition promises to last indefinitely. Buffalo is near the mines and ought to feel easy on that account, but the increasing car shortage makes everybody anxious.

In the lake trade the movement is good. While the ports of Duluth and Superior are closed by the strike, the fleet is sent to other ports, so that when the strike is over (it is now in its second month), the bulk of the shipments can be directed there. For the week the loadings were 111,300 net tons, of which 44,700 tons cleared for Chicago, 18,600 tons for Sheboygan, 15,300 tons for Port Arthur, 12,100 tons for Fort William, 10,800 tons for Milwaukee, 7000 tons for Ashland and 2800 tons for Racine.

Rates are 60c. to Chicago, 55c. to Racine, 47½c. to Milwaukee, 42½c. to Fort William Port Arthur, Ashland, Sheboygan.

CLEVELAND

Southern and eastern Ohio mines, now operating at 60 per cent., are not quite able to meet the demands of this district, despite the fact lake shipments are practically nil again. General business conditions are improving rapidly, and the market as a whole looks quite good.

Bituminous—Hysteria over the high cost of commodities appears to have subsided. Opinion is well-nigh unanimous that a strike will not be called in the iron and steel industry—an event that would automatically cut coal consumption in the Cleveland district 65 per cent. In every branch of industry the continued report is of improvement. As a result, coal operators believe market conditions are fast becoming stabilized, and that normal consumption along with present prices will rule for some little time.

Consumers are taking all of the bituminous coal they can get. Operators are showing more of a willingness to contract for fairly long periods—as the coal industry goes—and in this attitude consumers agree. It seems to be taken for granted by both operators and consumers that present levels will be maintained through the winter, with the possible exception of domestic coal. Considerable fuel is reported on track in the various railroad yards outside of Cleveland. The carriers are putting in more than the usual amount of railroad fuel for this season of the year.

Southern and eastern Ohio mine operators say the car situation has been slightly improved as a result of protests. The improvement, however, is slight indeed, most operators declare, and few of the mines are being operated more than 60 per cent. Mien mine workers still are flowing out,

and the movement is believed to be weakening the firm attitude of the workers on their proposed wage and hour demands. For the time being, dissatisfaction is less apparent in the Ohio fields.

Prices in the Cleveland market are unchanged, so far as bituminous is concerned, but all along the line dealers and operators report nothing but firmness. Advances are looked for in the domestic bituminous grades, but the steam coal and prepared size grades will remain stationary for a time, it is believed.

Anthracite and Pocahontas—Shortage of both continues the outstanding feature of the market, with dealers making personal trips to the mines in order to expedite and augment shipments. Receipts still are only a fraction of the demand. Anthracite prices have been marked up again by most dealers, those holding back now planning to catch up with the procession in a week or ten days.

Lake Trade—While practically all iron ore dock workers at the head of the Great Lakes have returned to work following their strike, the coal forces still are about half out. As a result, little more than railroad fuel is being shipped. Lake Erie docks now are dumping between 1600 and 2000 cars of bituminous coal a day, against 2500 and up to 3400 cars daily for this time of the year. At Duluth and Superior in August, for example, receipts of bituminous coal amounted to 520,500 tons, compared with 1,442,000 tons in August, 1918. Anthracite handled at these ports in August totaled 62,100 tons, against 218,600 tons in August a year ago. The outlook for an early settlement of the upper lake dock difficulty is not promising. Where early in the season it was thought that light shipments in the fall would suffice to meet demand, the movement has been cut down more than anticipated, and as soon as all the docks are again working, the lake trade will take all the bituminous it can get.

DETROIT

Demand for bituminous coal is pronounced more sluggish in Detroit than in other leading markets.

Bituminous—While reports coming to local jobbers and wholesalers indicate a steady improvement in demand for bituminous coal in most of the other large markets, as well as in export lines, Detroit buyers are said to be taking far less stock than the business outlook and present condition of the market would seem to justify. Jobbers seem at a loss to explain the attitude of the backward buyers, though the theory is still advanced that the limitations on current business are prompted by the expectation of the consumers that they will be able to get their coal at a lower cost, if they hold back long enough.

While there is only a moderately large movement of bituminous into the local market and the greater part of the business is handled on the basis of shipment direct from producer to consumer, there is a certain amount of free coal on tracks, which possibly is creating among some of the buyers a misleading conception of market conditions. Half a dozen brokers, soliciting the same group of buyers and each offering the same consignment of coal, it is explained, may have led the buyers to imagine the market is flooded with stock pressing for sale, encouraging the belief that they can obtain as much coal as they want, whenever they decide to buy.

West Virginia 4-in. lump is quoted at the equivalent of about $4 a net ton at the mines, while 2-in lump is offered at $3.75, with run-of-mine $3 and slack ranging from $2.25 to $2.50. Domestic lump from the Hocking district is held at $3.25 to $3.50, with egg $3, mine-run $2.25 to $2.35, and slack $1.90 to $2. With the exception of Jackson Hill, which is about $1 higher than Hocking, the product of other Ohio mines is held at about the same price as Hocking.

Shortage of car supply apparently is extending from West Virginia to the Ohio territory, as complaints of deficiency in the latter district are increasing.

Anthracite—Low temperatures during the last few days have stimulated inquiry from household consumers for anthracite. Most of the retailers are said to have only a limited supply and there is considerable complaint about the producers' lack of promptness in shipment, as well as concerning transportation delays between the mines and destination.

Lake Trade—Because of the long continued idleness of coal-unloading docks at the American head of the lakes, due to the strike of coal dock workers, it is reported more than 60 lake freighters are holding coal cargoes at ports either on Lake Superior or Lake Erie. Several unloading docks are resuming work this week with new forces, whose inexperience renders progress slow. Some of the freighters have lost nearly four weeks due to inability to discharge cargoes while a few have been diverted to Lake Michigan ports for unloading. The curtailment of shipments during the dock strike is likely to be reflected in a shortage of supply in the Northwest this winter, according to some of the shippers. The movement from mines to loading ports already is greatly reduced. Labor troubles at the mines and deficient car supply are likely to interpose further checks on shipments.

COLUMBUS

Domestic sizes are showing unusual strength in the Ohio market. There is also a good demand for both mine-run and screenings, and the entire market is strong. A slight improvement in the car supply has stimulated production in all fields.

The feature of the Ohio coal trade is the demand for prepared lump, which is gradually increasing under steady buying on the part of retailers. Dealers' stocks are not large, and with consumers placing more orders retailers are anxious to be prepared. As a result they are placing orders, mostly for immediate shipment. Prices have advanced materially with $3.25 to $3.50 being paid for Hocking 3 and 4-in. lump. Pomeroy lump is about 25c. higher. There is also a strong demand for West Virginia splints which are now selling around $4.50 at the mines. Pocahontas is so scare that it has ceased to be a factor in the domestic trade. Producers and distributors are forced to accept orders conditionally as to date of shipments. Retail prices have advanced under better buying. Hocking lump is selling between $6 and $6.25, while West Virginia grades are up to about $6.75 to $7.

Steam demand is also strong, although the pressure is not shown as in the domestic department. Screenings are fairly strong, selling in the neighborhood of $1.75 to $2. Some of the larger users are trying to accumulate reserves and are buying liberally. Sufficient stocks are available to take care of current demand. Iron and steel plants are using a fairly good tonnage of steam sizes, while general manufacturers are also in the market. The railroad demand is stronger and a larger tonnage is being taken on existing contracts.

There is a better car supply, especially in the Hocking Valley, which is reflected in the output. It is reported that about 55 per cent. car supply was afforded to operators on the Hocking Valley Ry. lines. Other roads are not so well supplied. In the eastern Ohio field the production is cut to less than 50 per cent. Cambridge and Massillon fields show up with 50 per cent. output. Pomeroy Bend is producing about 50 per cent.

Lake trade is progressing better with a fairly good tonnage moving toward the Northwest. Docks of the upper lake ports are somewhat congested as the interior movement is not rapid. Lake prices are strong at former levels. Indications point to a continuation of the lake trade right up to the date of closing navigation.

CINCINNATI

Good demand for domestic coal. Prices likely to increase in future. Car shortage curtails production.

Wholesale coal dealers report a fairly good demand, mainly from domestic consumers, but the usual rush in business at this time of the year is not in evidence now. There has been no change in prices in the past month, but the opinion prevails among dealers that there is likely to be an increase within a short time, for the reason that mine laborers continue to want increases in wages, causing operating expenses to advance steadily.

Reports to operators and dealers from coal sections in Ohio are to the effect that soft coal will be selling at $4 a ton at the mines by Oct. 1 unless there is an improvement in the car situation. The car situation in Ohio is said to be worse at this time than several weeks ago. The output is away behind schedule. The miners in Ohio are not working more than 40 per cent. of their normal time. And they have a 48-hour week. Operators say if they could get cars five days each week there would be no danger of a shortage of soft coal or the high prices that seem almost sure to come. The car situation soon may have a direct bearing on the labor situation.

Ohio produced last year about 30,000,000 tons of soft coal. Today only a little more than 22,000,000 have been produced, according to figures given out. And conditions instead of growing better are growing steadily worse as far as the car supply is concerned.

Officials of the Southern Ohio Coal Exchange say that the shortage of cars at 200 mines in Ohio in August would have carried 70,000 tons of coal.

LOUISVILLE

Operations continue on two-day basis. Demand keen but production short and stocks low. Industrial consumers buying much more freely.

Operations in the Kentucky fields continue on a two-day basis generally, a few mines managing to secure a few extra cars now and then. The average is on the two-day basis. Mines which have installed additional equipment, and have a larger production, are having trouble in getting increased production recognized in allotment of car supply. Industrial as well as domestic stocks are low. Domestic consumers have stocked a fair volume of coal, but retail yards are almost empty. Industrial concerns are discovering that there is a general car shortage, and are beginning to get anxious about their coal supply. They are unable, however, to secure much prompt delivery coal, as many concerns are sold up and refusing business.

A goodly amount of West Virginia block coal has been coming on the market from car pool territory, where cars have been more plentiful than in the Kentucky district, and is helping materially. There is also a better supply of river coal this year, statistics for the first six months of the year showing that 30,878 tons of coal were received by the Ohio waterway as compared with 28,500 tons last year. No coal was received in January or February of 1918, when the river was in bad shape.

There has been a slump in rail receipts this year as compared with last year for the first six months, when 2270 cars of 104,651 tons were received, as compared with 2897 cars last year of 121,531 tons.

BIRMINGHAM

Demand fair for high-grade steam and equal to production at present. Consumers holding off on buying medium and low grades with the apparent hope of obtaining the better grades later. Labor Day and car supply cause heavy loss in output.

Consumers are buying the best grades of steam coal fairly well—in fact they are taking the limit of production at this time and there is a scarcity in the supply, but little or no improvement is shown in orders booked for medium and lower grades of steam fuel. The indications at present point to a stiffened demand for steam coal, which will force consumers to fall back on the supply of medium and inferior quality product, as there will not be a sufficient supply of high-grade coal available to meet any appreciable increase in requirements.

The rail lines in this district, with the exception of two, are reported to be very short on coal supply, not receiving sufficient tonnage on contracts to take care of current needs. One line has already bought some coal in the spot market and will likely be followed by others in the near future.

There is practically no domestic coal to be had through the next two months, the market being very strong. Retailers have not as yet accumulated much stock, deliveries to consumers about evening up with receipts.

Shortage of labor on Labor Day and the scarcity of equipment at the mines has caused a heavy loss in production this week. Mines are receiving only about 60 per cent. car supply, which is not sufficient to take care of the business in hand. Figures compiled by the Alabama Coal Operators' Association from weekly reports received from the mines indicate a decrease of about 3,000,000 tons in the output of coal to date as compared with 1918. While the loss is probably not so large, due to failure of some operators to make their reports regularly, as was required under Federal control in 1918, there is a large deficiency.

Coke

CONNELLSVILLE

Market slightly stiffer. Box cars extremely scarce.

Coke for spot or prompt shipment is firmer than a week ago in both furnace and foundry grades. Minimum of quotations a week ago still holds but maximum quotations are higher and there is less coke moving at minimum figures. There has been a very moderate amount of buying

of furnace coke for spot and prompt shipment, and quite a fair volume of buying of foundry grades. The stiffness of the market is due to offerings being scant rather than there being heavy buying pressure.

Supplies of open-top cars are practically satisfactory, but supplies of box cars, for shipping foundry coke, are extremely meager. For several years there has been more or less scarcity, resulting in the old rule being broken, that foundry coke must be shipped in box cars. A distinct scarcity began about two months ago and has so increased in the past fortnight that shipments in box cars are estimated to amount to only about 25 per cent of the total shipments of foundry coke. The acuteness of the shortage is due to the grain movement, which has taken so many box cars that even the steel mills in the district that must ship their product in box cars are short and some have piled considerable tonnages of steel products, particularly sheets and tin plates. Minimum quotations on foundry coke can be done only on open top car shipments, as even indifferent brands bring decidedly higher prices if they must be shipped in box cars.

There are no contract negotiations to speak of. Quite a number of furnaces normally tributary to the Connelisville coke region remain idle, but they are showing scarcely any disposition to get into blast, presumably because the pig iron market, while firm, is not active enough to enable a furnace to sell a round tonnage upon which to get into blast. The spot and prompt market is now quotable at $4.75 @5 for furnace and at $5.50@6.50 for foundry, per net ton at ovens. Until a week or ten days ago $6.25 was the higher quotation on foundry coke, but two or three operators have advanced that price to $6.50 and have effected some sales at the higher figure. It is only occasionally that any foundry coke can be had at $5.50.

The "Courier" reports production in the Connellsville and the Lower Connellsville region in the week ended Aug. 30 at 247,395 tons, an increase of 1955 tons.

Middle Western

MILWAUKEE

Anthracite gets a final lift of 10c. per ton. Coke advanced 25c. per ton. Stove and egg anthracite scarce. All other kinds of coal in good supply.

All grades of anthracite except buckwheat were marked up 10c. per ton on Sept. 1. Soft coal remains unchanged. Coke was raised 25c. per ton, or to $12 for the larger sizes and $10.75 for pea. No charge is made for carrying in coke. An official of the leading dock company is authority for the statement that there will be no further advance in anthracite. For years it has been the rule to maintain a difference of 50c. per ton between the April price and the price after Sept. 1.

There is a good supply of coal on the docks and a fair run of cargoes keep arriving. With over three months of navigation ahead, there is no reason why there should not be an ample supply of coal on the docks at Milwaukee when the season closes. Stove and nut sizes of anthracite continue scarce.

The demand for coal for domestic use increases as the summer draws to a close. With the month of August completed, the receipts since the opening of navigation to Sept. 1 aggregate 532,886 tons of anthracite and 1,958,729 tons of soft coal, a gain of 142,577 tons of the former and a loss of 194,330 tons for the latter as compared with receipts during the same period last year.

Prices of coal in Milwaukee are about as follows:

Anthracite:	Per Ton
Chestnut	$12 70
Stove	12 60
Egg	12 40
Pea	11 20
Buckwheat	9 75
Bituminous (Domestic):	
West Virginia splint, screened	7 75
Hi-Heat	7 75
Hocking lump, egg and nut	7 50
Pittsburgh, screened	7 50
Pocahontas, mine-run	8 50
Pocahontas, lump, egg and nut	10 75
Cheerful Chunks (Kentucky, for grates)	9 25
Smithing	8 50
Cannel (Kentucky)	11 75
Steam Coal:	
Youghiogheny, screened	6 75
Youghiogheny, pile run	6 50
Youghiogheny, screenings	5 50
Pittsburgh, screened	6 50
Pittsburgh, pile run	6 25
Pittsburgh, screenings	5 50
Hocking lump, screened	6 50
Hocking lump, pile run	6 25
Hocking lump, screenings	5 50
West Virginia splint, screened	6 75
West Virginia, pile run	6 50
West Virginia, screenings	5 50
Kentucky lump, screened	7 50
Kentucky lump, pile run	7 25
Kentucky lump, screenings	5 50
Pocahontas, mine-run	7 50
*Pocahontas, screenings	
Smithing	7 50
*Kanawha Gas, mine run	

* Sold up and out of the market.
An extra charge of 75c. per ton for coal carried in.
An extra charge of 25c. per ton for less than ton lots.

ST. LOUIS

Little coal on the market on account of strikes. City demand easy for domestic and steam not heavy. Country demand is good, however, with little to offer. War time prices prevailing. Car shortage worst on record and movement is slow and unsatisfactory. Labor troubles continue.

The local situation is a day-to-day proposition. With the majority of the mines in the Standard and Mt. Olive field on strike, there is little coal to offer. In the Standard field a few of the mines are operating at about one-eighth to one-fourth of their usual force, and the railroads are taking all of this coal. Some mines are idle on account of the strike, and others are idle because their locals have not been reorganized. At many mines some of the more peaceable miners are afraid to go to work on account of the threatened trouble.

Prices in the Standard district are around $2.50 for 2-in. lump, $2.75 for 6-in. lump, and screening at about $2. When the coal moves into the country prices range about 15c. higher.

The railroads are having a hard time getting their contract supply of fuel. In the face of all the idle mines, the Illinois Central R.R. is unable to keep the few that are working supplied with cars.

The miners have a happy faculty of reporting for work on the days that there are no cars at the mines and the railroads have a peculiar way of taking away empty cars during the night after the mine has blown for work for the next day, so as a rule there is no work.

There is little chance that conditions in this field will improve any until after the conference in Cleveland on the 9th. As a matter of fact, several miners prophesied this some time ago and they are surely making good on it.

In the Mt. Olive district some of the mines are working and others are idle on account of the strikes. Working time is fairly good, everything considered. In this field the operators have kept their prices on St. Louis shipments down to $2.40 on domestic sizes. Shipments out in the country are from $2.85 to $3, as well as to Chicago and the north. There is considerable dissatisfaction as a result of the Mt. Olive operators keeping their prices the same as before the labor troubles when the price of Standard is much higher and so little to be obtained, but this attitude is satisfactory to the dealers and to the consuming public in St. Louis.

In the Carterville field of Williamson and Franklin County the situation is quiet. The car supply is so bad that some days the entire field has less than 25 per cent. of the equipment needed to run it. At other places the mines are working but two days a week, and the Missouri Pacific R.R. is taking all of the coal, leaving nothing for commercial shipments. The short-sighted, incompetent ruling that prevented the railroads from keeping more than ten days' supply of coal on hand in the summer months is what has caused this appalling coal shortage right now. In the summer months when cars were plentiful and the mines were idle the railroads would not stock up in coal. Now they are taking everything they can lay their hands on.

The Illinois Central is in the worst shape for car supply. The movement is not exceptionally good on this road either. The Iron Mt. R.R., however, is the worst offender for taking all the coal that the mine produces. The C., B. & Q. and C. & E. I. are rendering the best service in the field. None of the mines, however, are working anywhere near full time, and many of them are unable to accept orders at all for future shipments, being sold up for over three months.

The railroad tonnage from this field is heavier now than it has been for many months. Similar conditions prevail in the Duquoin field. The prices in all these fields advanced on the 1st and are practically uniform for both association and independent operations.

In St. Louis proper there is practically no anthracite moving in and no smokeless. Arkansas coal is also out of the market. The domestic demand for coke is fairly good and a big tonnage is moving out to the northwest.

Domestic buying is unusually slow on everything. Several dealers have lots of orders ahead and indications are that the buying that is going to be placed before cold weather sets in is about finished. When cold weather comes the poor element will, of course, come in for Standard coal, but until then the market ought to remain quiet in a domestic way.

The industrial situation is also quiet and the demand for steam is easy as a rule, with here and there an exception. Country demand is exceptionally good for domestic coal of any and all kinds, and the steam demand shows considerable improvement in the last week or two.

Some of the dealers advanced their prices 25c. a ton on Sept. 1 on account of the hauling rates going up 25c. a ton. With the increase in the cost to the dealer of 20c. a ton on high grade, there has been no provision made for an increase in retail prices yet, but this will likely come about the 15th.

The wholesale prices on the Carterville district coals are $2.25 for the domestic sizes. Screenings are $2.10 to $2.30 and mine run $2.40 to $2.75 per net ton f.o.b. mine.

Coal and Coke Securities

NEW YORK STOCK EXCHANGE CLOSING QUOTATIONS, SEPT. 8, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co., of Allegheny	(CO)	45	
Burns Brothers, Com	(BB)	133	134
Burns Brothers, Pfd ●	(BB)	103	115
Central Coal & Coke, Com	(CK)	55	
Central Coal & Coke, pfd	(CK)	63	
Colorado Fuel & Iron, Com	(CF)	44	45½
Colorado Fuel & Iron, Pfd	(CF)		125
Consolidation Coal of Maryland	(CGM)	75	
Elk Horn Coal, Com	(EH)	35½	36
Elk Horn Coal, Pfd	(EH)	40	47
Island Creek Coal, Com	(ICR)	39	
Island Creek Coal, Pfd	(ICR)	75	
Jefferson & Clearfield Coal & Iron, Pfd	(JF)	63	
New Central Coal of West Va	(NCC)	5	
Pittsburgh Coal, Com	(PC)	62½	62¾
Pittsburgh Coal, Pfd	(PC)	95	96
Pond Creek Coal	(PD)	20½	20¾
Virginia Iron, Coal & Coke	(VK)	60	64

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	96½	
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	75½	
Colorado Fuel & Iron, Gen. 5s, 1943	89½	92
Colorado Fuel & Iron, Cu. Tr. 5s, 1934	77½	79
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	83½	88
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	96	
Jefferson & Clearfield Coal & Iron, Sec. Mort, 5s, 1926	99½	100
Lehigh Valley Coal, 1st Gtd. 5s, 1933	75	
Lehigh Valley Coal, Gtd. Int. Red. to 4½, 1913	90	
Lehigh Val. Coal & Nav. Con. S. F., 4½, Ser. A, 1954	80½	
Pleasant Valley Coal, 1st S. F., 5s, 1928	80½	83
Pocahontas Coal & Coke, Joint 4s, 1941	83½	85
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	90	
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946		78
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	87	89½
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	87	
Utah Fuel, 1st Sinking Fund 5s, 1931	55	70
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	84½	85½
Virginia Iron, Coal & Coke 1st 5s, 1949		

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations compiled by the Matthew Addy Company as per Department of Commerce Committee Schedule.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$30.35	$30.35
Northern Basic	27.55	27.55
Southern Ohio No. 2	28.55	28.25
NEW YORK, Tidewater delivery		
2X Virginia (silicon 2.25 to 2.75)	32.40	31.90
Southern No. 2 (silicon 2.25 to 2.75)	35.20	33.95
BIRMINGHAM		
No. 2 Foundry	27.75	28.00
PHILADELPHIA		
Eastern Pa.	30.65*	30.65
Virginia No. 2	32.10–34.10	32.10–34.10
Basic	30.90*	30.90
Grey Forge	29.90*	29.90
CHICAGO		
No. 2 Foundry Local	26.75	26.75
No. 2 Foundry Southern	28.00	28.00
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley	28.15	28.15
Basic	27.15	27.15
Bessemer	29.35	29.35

* F. o. b. furnace. † Delivered.

STRUCTURAL MATERIAL—The following are the base prices, f.o.b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill	—New York—		St.	Chi-
	Pittsburgh	Current	One Year Ago	Louis	cago
Beams, 3 to 15 in.	$2 45	$3 47	$4.24½	$3.54	$3 47
Channels, 3 to 15 in.	2 45	3 47	4.24½	3.54	3.47
Angles, 3 to 6 in., ¼ in. thick.	2 45	3 47	4.24½	3.54	3 47
Tees, 3 in. and larger	2 45	3.52	4.24½	3.54	3.47
Plates	2 66	3 67	4.49½	3.54	3.67

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	Cincinnati	St. Louis	Denver	Birmingham
2.75	3 25	3.44	4 30	3.25

NAILS—Prices per keg from warehouse in cities named:

	Mill				Birming-	San	
	Pittsburgh	St Louis	Denver	Chicago	ham	Francisco	Dallas
Wire	$3.25	$3 90	$4 90	$3.90	$4 50	$5 25	$5.00
Cut	4.925	5 40	5 61	5.50	. . .	6.65	6 40

TRACK SUPPLIES—The following prices are base per 100 lb. f.o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pitts-burgh	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in and larger	$3 35	$4 27	$4 44	$5 65	$4 50	$5 05
Track bolts	4 35	5.17 Prem.	6 65	6.00		6 05
Standard section angle bars	3.00	4 22 Prem.	4 60			6 50

COLD FINISHED STEEL—Warehouse prices are as follows:

	New York	Chicago	Cleveland	St. Louis
Round shafting or screw stock, per 100 lb. base	$5.00	$4.90	$4 75	$5.00
Flats, squares and hexagons, per 100 lb. base	5.50	5 40		5 50

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill	Cin-				Birm-
	Pittsburgh	cinnati	Chicago	St. Louis	Denver	ingham
Straight	$5 75	$7 50	$6 50	$7 00	$8 15	$7 00
Assorted	5 85	7 50	6 50-7 00	7.25	8 40	7 25

Cincinnati—Horseshoe nails sell for $4 50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots

	—New York—						
	Current	One Month Ago	One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in	$57 30	$55 30	$64 75	$58 80	$52 00	$77 55	$65 00
6 in. and over	54 30	52 30	61 75	55 80	49 00	74.55	62 00

Gas pipe and 16-ft lengths are $1 per ton extra

STEEL RAILS—The following quotations are per ton f.o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra

	—Pittsburgh—		—Chicago—	
	Current	One Year Ago	Current	One Year Ago
Standard Bessemer rails	$45 00	$55 00	$45 00	$65 00
Standard open-hearth rails	47 00	57 00	47 00	67.00
Light rails, 8 to 10 lb.	2 58½*	3 13*	2 83½*	3 13½*
Light rails, 12 to 14 lb.	2 54*	3 09*	2 79½*	3.09½*
Light rails, 25 to 45 lb.	2 45*	3 00*	2 70*	3 00*

* Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$23.00	$21.00	$22.00
Stove plate	17.50	22.00	22.50
No. 1 machinery cast	25.00	24.00	23.50
Machine shop turnings	11.00	10.00	13.00
Cast borings	11.00	12.50	13.00
Railroad malleable cast	16.00	20.75	20.50

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0 12	$0 16½	$0 18	$0.13	$0 18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham	Denver
Solid	14c	13c.	15c	15c
Hollow	18c			22c.

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Steel			Iron		
Inches	Black	Galvanized	Inches	Black	Galvanized
⅛, ¼ and ⅜	50½%	24%	¼ to 1½	39½%	23½%
½	54½%	40%			
¾ to 3	57½%	44%			

LAP WELD

2	50½%	35%	2	32½%	18½%
2½ to 6	53½%	41%	2½ to 4	34½%	21½%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	46½%	29%	¼ to 1½	39½%	24½%
½	51½%	39%			
¾ to 1½	55½%	43%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	48½%	37%	2	33½%	20½%
2½ to 4	51½%	40%	2½ to 3	35½%	23½%
4½ to 6	50½%	39%	4½ to 6	34½%	22½%

Stocks discounts in cities named are as follows

	—New York—		—Cleveland—		—Chicago—	
	Black	Gal-vanized	Black	Gal-vanized	Black	Gal-vanized
⅜ to 3 in. steel butt welded	47%	31%	43½%	34½%	57½%	44%
3½ to 3 in. steel lap welded	42%	27%	45½%	30½%	53½%	41%

Malleable fittings, Class B and C, from New York stock sell at list + 12½%. Cast iron, standard sizes, 10% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows

	New York and St. Louis
Galvanized iron rigging	+12%
Galvanized cast steel rigging	7%
Bright plain rigging	35%
Bright cast steel	22½%
Bright iron and iron tiller	50%

STEEL SHEETS—The following are the prices in cents per pound from jobbers' warehouse at the cities named

	Pittsburgh, Mill in Carloads	—New York— Cur-rent	One Month Ago	One Year Ago	Cleveland Current	Chicago Current
No. 28 black	4 35	5 50	5.62	6 495	5 27	5 62
No. 26 black	4 25	5 40	5 52	6 395	5 17	5.52
Nos. 22 and 24 black	4 20	5 35	5 47	6 345	5 12	5 47
Nos. 18 and 20 black	4 15	5 30	5 42	6 295	5 07	5 42
No. 16 blue annealed	3 75	4 77	4 77	5 695	4 67	4 77
No. 14 blue annealed	3 65	4 67	4 67	5 595	4 57	4 67
No. 10 blue annealed	3 55	4 57	4 57	5 495	4 47	4 57
No. 28 galvanized	5 70	6 75	7 42	7 745	6.62	6.97
No. 26 galvanized	5 40	6 45	7 12	7 445	6.32	6 67
No. 24 galvanized	5 25	6 30	6 97	7 295	6 17	6.52

For painted corrugated sheets add 30c per 100 lb for 25 to 28 gages. 25c. for 19 to 24 gages. For galvanized corrugated sheets add 15c., all gages

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair size orders, the following amount is deducted from list

	New York	—Cleveland—		—Chicago—		St. Louis
	Current	Current	One Year Ago	Current	One Year Ago	Current
Hot pressed square	$1 50	$2 25	$1 40	$1 85	$2 00	$2 25
Hot pressed hexagon	1 50	2 25	1 20	1 85	2 00	2 25
Cold punched square	1 50	2 25	75	1 50	1 30	2 25
Cold punched hexagon	1 50	2 25	75	1 50	1 30	2 25

Semi-finished nuts sell at the following discounts from list price

	Current	One Year Ago
New York	50—10%	50%
Chicago	50%	50%
Cleveland	60–10%	50%
St. Louis	45%	...

MACHINE BOLTS—Warehouse discounts in the following cities

	New York	Cleveland	Chicago	St. Louis
¾ by 4 in. and smaller	50%	50%	50–5%	50–5%
Larger and longer up to 1 in. by 30 in.	40%	40%	40–5%	40–5%

WASHERS—From warehouses at the places named the following amount is deducted from list price

For wrought-iron washers

New York..... $1 25 Cleveland..... $3 75 Chicago..... $3.00

For cast-iron washers the base price per 100 lb. is as follows:

New York..... $6 00 Cleveland..... $3 75 Chicago..... $4.25

RIVETS—The following quotations are allowed for fair sized orders from warehouse.

	New York	Cleveland	Chicago
Steel ⅞ and smaller	50 10%	55%	55%
Tinned	50–10%	55%	55%

Boiler, ½ to 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:

New York $4 72 base Cleveland, $4 00 Chicago $4 87 Pittsburgh $4 65

Structural, same sizes:

New York $4 82 Cleveland $4 10 Chicago, $4 97 Pittsburgh..$4 75

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York — Current	New York — One Year Ago	Cleveland — Current	Cleveland — One Year Ago	Chicago — Current	Chicago — One Year Ago
Raw, 5-bbl. lots	$2 15	$1 90	$2 50	$2 10	$2 37	$2 05
5-gal. cans	2 30	2 ...	2 75	2 25	2 57	2 25

WHITE AND RED LEAD—Base price

	Red — Current		Red — 1 Year Ago		White — Current	White — 1 Year Ago
	Dry	In Oil	Dry	In Oil	Dry and In Oil	Dry and In Oil
100-lb. keg	13 00	14 50	14 00	14 50	13 00	14 00
25 and 50-lb. kegs	13 25	14 75	14 25	12 75	13 25	14 25
12½-lb. keg	13 50	15 00	14 50	15 00	13.50	14.50
5-lb. cans	15 00	16 50	...	...	15.00	16.00
1-lb. cans	16 00	17 50	...	...	16 00	17.00

500 lb. lots less 10% discount. 2000 lb. lots less 10–2½% discount.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Chicago	$12 00	Birmingham	$15 00
St. Louis, salmon	15 00	Denver (hard red)	14 00
Cincinnati	17.00		

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply — C.L.	1-Ply — L.c.l.	2-Ply — C.L.	2-Ply — L.c.l	3-Ply — C.L.	3-Ply — L.c.l.
No. 1 grade	$1 50	$1 75	$1 90	$2 15	$2 30	$2 55
No. 2 grade	1 35	1 60	1 70	1 95	2 05	2 30

Asbestos asphalt saturated felt (14 lb. per square) costs $5.00 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $2.25 per roll in carload lots and $2.50 for smaller quantities.

Shingles, red and green slate finish cost $6.00 per square in carloads, $6.25 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago:

	Carload Lots — N. Y.	Carload Lots — Chicago	Less Than Carload Lots — N. Y.	Less Than Carload Lots — Chicago
Tar felt (14 lb. per square of 100 sq. ft.)	$70 00	$70 00	$71 00	$71 00
Tar pitch (in 400-lb. bbl.)	21 00	18 00	22 00	19 00
Asphalt pitch (in barrels)	34 00	34 00	37 50	37 50
Asphalt felt	68 00	68.00	72 50	72 50

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0 065	$0.135	$0 185
St. Louis	08	15	...
Seattle	09	175	30
Los Angeles*	082	154	236
New Orleans	165	22	325
Pittsburgh	065	115	...
Chicago	08	144	...
Denver	125	18	25
Cincinnati	78	104	2092

*F. o. b. factory, 4, 8 and 10 inch

LUMBER—Price of pine per M in carload lots:

	1-In Rough 10 In. x 16 Ft.	2-In T. and G 10 In. x 16 Ft	8 x 8 In. x 20 Ft
St. Louis	$42 00	$39 00	$35–36
Birmingham	40 00	48 00	43 00
Denver	43 25	35 00	43 00
Cincinnati	45 00	45.00	45 00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder.

	Low Freezing 20%	Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	...	$0.27½	$0 30	...	$2.40
Boston	$0.22½	24½	26½	$0.31	2 20
Kansas City	.19	23½	.26½	.30	2 25
New Orleans	22½ (50%)	22½	.24½	...	...
Seattle	14½	18½	.21	.315	1 90
Chicago	.18½	.21½	.25½	29½	2 15
St. Paul	19	23½	.26½	...	2 45
St. Louis	19	.23½	.25½	.30	2.40
Denver	17½	.22	.24½	.28½	2 25
Los Angeles	21	.26	.30	...	**2.75**

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7	6 7	8½	14½
Fiber or sponge	8	13	9	18
Transmission	7	13	7½	17
Axle	4½	4½	3–4	5½
Gear	4½	7½	5½	8
Car journal	22 (gal)	4.7	6½	8

BABBITT METAL—Warehouse prices in cents per pound:

	New York — Current	New York — One Year Ago	Cleveland — Current	Cleveland — One Year Ago	Chicago — Current	Chicago — One Year Ago
Best grade	90 00	125 00	80.00	108 00	75.00	100 00
Commercial	50.00	70 00	18 50	23.00	15.00	24.00

HOSE—Following are prices of various classes of hose:

	Fire — 50-Ft. Lengths
Underwriters' 2½-in.	70c per ft
Common, 2½-in.	40%

	Air — First Grade	Second Grade	Third Grade
½-in. per ft	$0 50	$0 35	$0.25

Steam—Discounts from list

First grade	30%	Second grade	40%
Third grade			40-10%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	40%	30%
Denver	30%	25%
Birmingham	30%	35%
Chicago	45%	35%
Cincinnati	30-5-2½%	40-2½%

RAWHIDE LACING—20¢ per cut; 45c. per sq.ft. for ordinary.

PACKING—Prices per pound

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.50
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	.90
Wire insertion asbestos sheet	1.10
Rubber sheet	.50
Rubber sheet, wire insertion	.70
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.20
Asbestos wick, ½- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ½-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ½-in., 8 ft.; ¾-in., 6; ⅞-in., 4½; 1 in., 3½; 1¼-in., 2 ft. 10 in.; 1½-in., 2 ft. 4 in. Following is price per pound for ½-in. and larger, in 1200-ft. coils:

Boston	$0.25	Atlanta	$0 29½
New York	.27	Denver	29½
St. Louis	.26½	Kansas City	27
Chicago	26½	New Orleans	25
St. Paul	.28	Seattle	.25
San Francisco	.24	Los Angeles	.26

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING — Pipe Size	Standard List Per Lin.Ft.	BLOCKS AND SHEETS — Thickness	Price per Sq.Ft
1-in.	$0 27	½-in.	$0.27
2-in	36	1 -in.	30
3-in	45	1½-in	45
4-in	60	2 -in	60
6-in.	80	2½-in.	75
8-in	1 10	3 -in.	90
10-in.	1 30	3½-in	1 05
85% magnesia high pressure			List
For low-pressure heating and return lines		4-ply	58% off
		3-ply	60% off
		2-ply	62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½-lb. rolls	48c. per lb
Rubber tape, ½-lb. rolls	60c. per lb
Wire solder, 50-lb. spools	46c. per lb
Soldering paste, 2-oz. cans	$1.20 per doz

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver — Single Braid	Denver — Double Braid	Denver — Duplex	Birmingham — Single Braid	Birmingham — Double Braid	Birmingham — Duplex
14	$11 25	$14 00	$31 00	$11 24	$15 39	$27 17
10	21 85	28 25	56.75	21.56	34 73	48.55
8	31 05	38 50	77 95	30 11	58 59	66.49
6	48 80	62 65	...	59.28	82 11	...
4	70 00	75 30		84 86	118 86	...
2	104 85	112 45		..	155 40	...
1	136 85	146 15		..	188 86	...
0	..	194 25		..	228.90	...
00	..	239 60		..	279 30	...
000	..	294 00		..	338 50	...
0000	..	358 25		..	446 75	...

Pittsburg—23c. base; discount 50%; St. Louis—30c base

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc the following freight rates per 1000 lb. are effective:

Boston	$0 30	New Orleans	$0.38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	24
Cleveland	.17	St. Paul	.49½
Denver	.99	Pacific Coast (all rail)	1.25*
Kansas City	.59		

Note—Add 3% transportation tax Minimum carload, 80,000 lb.

COAL AGE

Volume 16 New York, September 18, 1919 *Number* 12

Shall the Coal Industry Be Bond or Free?

By R. Dawson Hall

THERE are basic commodities on which the public depends for its existence, and the people are apt to be grossly unfair when the supply of these fundamentals is hindered or partly cut off. The pampered industries that cater to our love of luxury and ease can fail us and "soak us" with unreasonable charges, but those industries the service of which is material to our existence we would have as our bond servants who must work regularly for us, for low wages and without honor.

It was early discovered that coal was a public utility of this character. The Scottish Parliament in the early part of the seventeenth century recognized the need for plenty of fuel and at a low figure. In those days it was not customary to bait capital; labor was the favorite prey of legislation. So when the Scots wanted cheap and abundant coal they passed a law taking away the liberties of those who worked in the mines. In 1606 they made an enactment declaring it to be a felony for a mine worker to leave the employ of a coal operator — "master," they termed him — without obtaining permission of either the operator or the district magistrate. In other words, a man was adjudged by the law to be a thief if he took possession of his own labor. Labor in those days was surely enough a commodity — future labor as well as past labor — and it was the property not of the man that produced it, but of the master who controlled it. If any man was hired away by another, that employer was subject to a fine of 100 pounds sterling.

But this was not enough. The operators of coal mines were given the right "to apprehend all vagabonds and beggars" and to compel them to mine coal. This, in the days when mines had neither efficient drainage nor adequate ventilation! Though filled with firedamp, the "safety lamp" was unknown. Mining was extremely hazardous, so the mines were filled, like the navy, with impressed men. But why be squeamish? The public must have coal even if the freedom of the individual be interfered with. So special laws were passed to fill the mines with workers and to keep them enslaved when they got there.

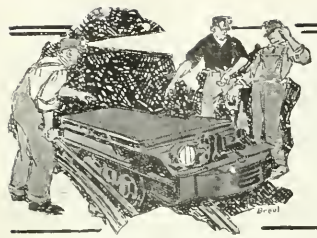
The habit of interfering with personal liberty is one that grows. When men are abused, then they endeavor to escape service and the industry by which they are employed loses its natural accretion. No men of character seek such an occupation, and the men engaged soon become rowdy, lazy and ignorant. It must have proved so, for in 1641 the Covenanting Parliament, which talked so loudly of freedom and violated that freedom so flagrantly, made it a law that miners should work six days a week the year long. There were to be no Christmas or Easter holidays. An idle day meant a fine of twenty shillings, about five dollars, and a sound whipping into the bargain. But it seemed to the legislators as if this had to be, for the public must have coal. If it fails to come to the mill, the mart or the domestic grate, someone must suffer. It was so then, and the laboring man was the victim; it is so today, and the operator is the berated party.

Beaten, fined and prohibited from selecting "masters," the serfs of the industry apparently did not tend to increase in numbers. Kindness had not been tried. Cruelty being the only known expedient, it seemed necessary to be more cruel. So thirty years later the Scottish Parliament again empowered the coal operators to go into the highways and hedges to collect the vagabonds and impress them for mine service with "all manner of severity and corrections," including whipping but not torture. These disciplinary measures covered not impressment merely, but the daily work of the men impressed. It is almost needless to say that men so necessary to supply a public utility were not allowed the benefit of the habeas corpus act.

Then came the union of the Parliaments, and the British Parliament passed an act declaring the miners were slaves. But at last a change came, and in 1775 those who were newly beginning work at Scottish mines were promised freedom and those already at work were given, after seven or ten years, a means of securing their full rights as citizens on application to the sheriff. If they struck, however, they were to be under bonds for two years additional. Finally a Tory government led by the younger Pitt put an end to the whole obnoxious business, and there has rarely been a coal shortage since.

Perhaps some day there will come a bright light that will show our legislators, whether they be Covenanting or Tory, that the industries which serve most should be as free or freer than those which serve least; that oppression of the useful industries decreases the number employed in them and so increases unduly the numbers of those who are engaged in callings that are dependent on their services; that free industries are like free men, the crowning glory of a great state.

If the land cannot be half slave and half free, surely we cannot enslave the useful industries and free those that merely waste the wealth that other industries so laboriously create.



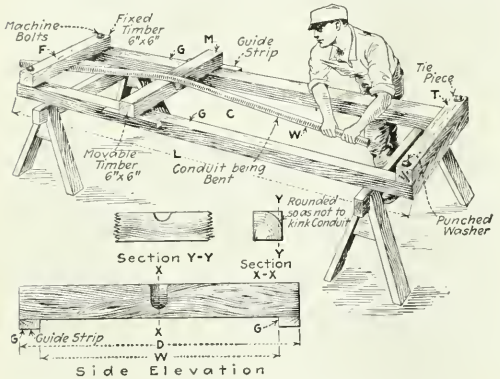
IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Construction and Manipulation of a Rack for Bending Large Pipe*

By A. D. Adair
St. Louis, Mo.

A pipe or conduit bender of the rack type is convenient and economical for bending tubes of the large sizes. The pipe is inserted in one end of the rack or vise and there held rigidly while force is applied to the other end to bend the tube into the required form.



DETAILS OF A RACK TO BE USED FOR BENDING LARGE SIZES OF PIPE

The rack shown in the arrangement illustrated has proved to be a highly useful tool. The method of construction is shown in detail.

The essential members of this device are two longitudinal timbers, *G* and *G* (see the diagram), which should, for heavy work, be at least 6 in. square. Across the longitudinal pieces are bolted two fixed pieces, *F* and *T*, each about 6 in. square and 2 ft. long. A movable timber *M* (see construction detail), with a groove cut in it for the reception of the conduit, is arranged to slide longitudinally on the rack. When in use, the rack is elevated on a box, frame or saw-horse, as suggested in the upper part of the illustration. In bending the tube, one end is placed under the timber *F*. Then *M* is shifted to the most desirable position. Next the mechanic throws his weight on the other end of the tube *W*, which will produce a bend in it.

A bend cannot, ordinarily, be made with one setting of *M*. It is, on the contrary, necessary to form the curve by degrees. That is, with one setting of *M* the tube is partially bent; then *M* is shifted backward or forward as may be required and the tube bent further. This process is continued until the desired contour has been obtained. The movable timber *M* should have the slot which is cut in it for the conduit rounded as detailed in the diagram, because, if this procedure is not followed, there is a possibility of introducing kinks or wrinkles into the conduit.

For the best work, the width and the radius of the slot should be such that the conduit fits into it nicely. Hence, it follows that it is desirable to have a separate movable timber with a groove of different proportions for each size of duct. Or, instead, a number of different grooves of different sizes may be cut in the same movable timber to accommodate tubes of different diameters. However, a skilled workman can operate successfully on conduits of a number of different diameters by using a groove of but one size. The groove should also be rounded as shown in the illustration and should never, except for the roughest sort of work, be cut square.

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Drafting-Room Hints

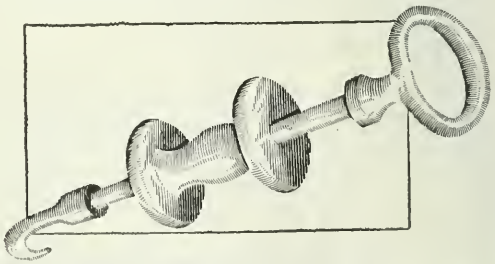
By S. G. Haverstick
Frostburg, Md.

The following are hints for use in the drafting room. They are not original, but have been given me by various parties and I have found them useful: A weak solution of picric acid makes one of the best mediums for coloring prints yellow. This is especially good where a large surface is to be treated, as it goes on smooth and is indelible. In coloring tracings it should be applied lightly, as it is nearly as opaque as black ink, the yellow being nearly non-actinic. Peroxide of hydrogen applied to burnt or over-exposed blueprints will help to clear the whites and bring out good clear blues.

Cotter Key Extractor

By Charles H. Willey
Concord, N. H.

The accompanying illustration shows an assembled view of a tool that does away with the old method of using file tang to pry out, or pliers to twist out, cotter pins in places that are hard to reach. The hooked

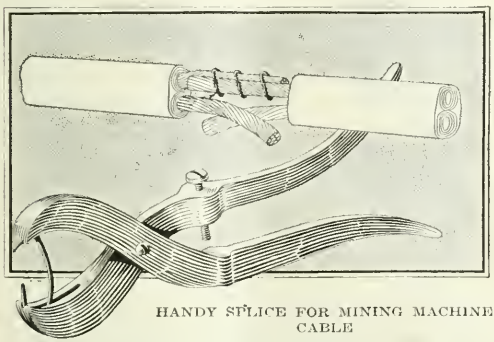


THIS TOOL MAKES IT EASY TO GET AT COTTER PINS IN INACCESSIBLE PLACES

end of this tool is simply entered in the eye of the cotter. While pulling on the handle with one hand, with the other the sliding hammer is worked vigorously back and forth, striking each time on the shoulder of the handle. These impacts pull the cotter. The hooks are made of tool steel in several sizes to meet the range of sizes of cotters used. The sliding hammer is made an easy fit and of such shape outside that the hand fits into it so that there is no danger of the flesh being pinched when the hammer strikes the shoulder. The illustration conveys the other details with sufficient clearness to render further description unnecessary.

Splicing a Cable with Hog Rings

A handy splice for a direct-current mining machine cable is made as follows: Peel the insulation back about 3 in. and lap the positive wires for the distance that they have to be peeled. Then, with a pair of 10-cent hog ringers and a few hog rings, the splice can be made secure, as the rings clamp around the cable when they



HANDY SPLICE FOR MINING MACHINE CABLE

are bent with the ringers. The positive wires should then be well taped. The negative may then be treated in the same manner. This makes a splice as strong as when the cables are twisted together and requires much less time. When a splice of this kind has been made, the cable is not much larger at the place of splice than elsewhere. This splice has the advantage also of saving cable, as less length is required for joining the ends. Another advantage is the less amount of time required to do the work.

Automatic Car-Door Opener Saves Lots of Time in Dumping Cars

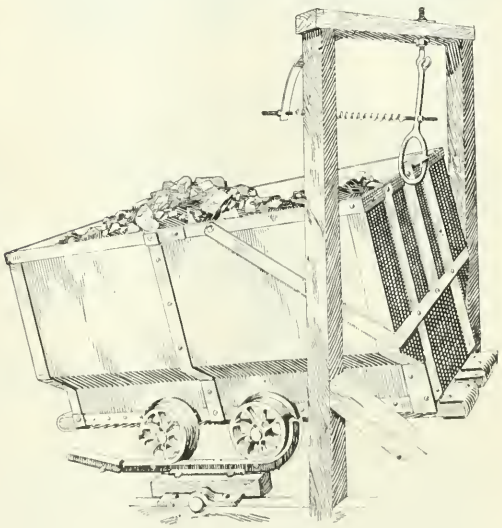
By Ralph W. Mayer
California, Penn.

A kickback dump is used at many mines for emptying cars filled with slate or rock. One mining company using the type of cars in which the end doors have to be raised in order to empty the car, has adopted a novel method to accomplish this result. A ring automatically engages the hook on the car door, raises the door, and automatically releases the hook after the car has been dumped

A substantial frame is erected over the horns at the end of the dump. This consists of two uprights and a crosspiece overhead. An eye-bolt is put through this timber over the middle of the track. The ring for engaging the car-door hook is fastened to a straight piece of 2 x ½-in. iron bar. This bar has a loop, or eye, on its end, which hinges into the eye-bolt fastened to the overhead timber. This allows it to swing freely in all directions. A piece of 2 x ½-in. iron is fastened to the top of the timber and extends back over the car dump about 2 ft., where it is bent at right angles downward toward the track. It should reach down about 18 in. The cross timber to which it is fastened must be placed high enough so that there will be plenty of clearance between this iron and the car when it is in dumping position.

A spiral spring is fastened between the end of this iron and the rod suspended from the timber to which the ring is attached. Both ends of the spring are secured to bolts by means of which the tension on the spring can be regulated. One end of the spring is fastened to the bent iron extending back over the car, and the other end to the rod supporting the ring. Several holes are drilled through both the iron and the rod, so that the bolts on the end of the spring may be passed through any one of them and the position of the spring regulated up or down so as to secure the setting most advantageous to the average run of cars to be handled.

When the car to be emptied is against the horns of the dump ready to be tilted, the ring should press



HOW THE CAR DOOR OPENER IS OPERATED

against the car door tightly and surround the lifting hook. The spiral spring holds the ring pressed against the door with its lower side three or four inches below the hook. As the car is dumped the hook catches on the ring, lifting the door of the car.

After the contents of the car have been discharged and the car returned to a level position, the lower side of the ring is again below the door hook, and the car is thus free to move away from the dump. This door opener is easily installed, at a small expense. When once in place no attention need be paid to opening or closing the car doors, thus saving much of the time spent in dumping cars.

Modern Mine-Wiring Practice*

By Terrell Croft
University City, St. Louis, Mo.

SYNOPSIS — *The methods and appliances employed in transmitting electric energy about the mine have now been well developed. This article enumerates some of the practices that have proved themselves most efficient.*

LOW and medium pressure wiring in mines should be supported on approved porcelain or glass insulators with metal or wood pins as supports. The spacing between insulators should never exceed 20 ft. where the roof is low or 35 ft. where it is high. Only one conductor should be attached to each insulator. The tie wire should be of the same material and carry the same insulation as the conductor. If porcelain insulators are used, only those made by the wet process should be permitted. Dry-process porcelain is subject to deterioration under the effect of acid-laden water and vapors.

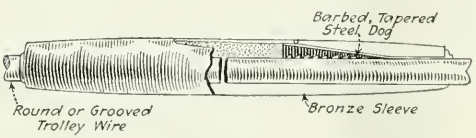


FIG. 1

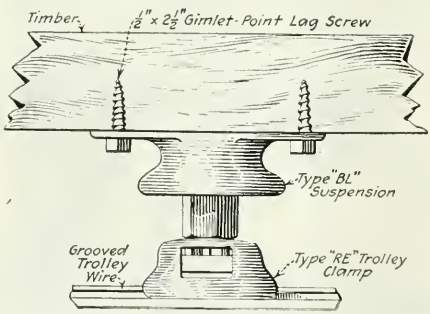


FIG. 3

Splices in mine wires should be made carefully because of the moisture, frequently acid-laden, which exists. Joints between dissimilar metals should be soldered because of the excessive electrolytic corrosion which will occur if they are not. Furthermore, all such splices should be taped carefully in order to, in so far as possible, exclude moisture. Trolley wires are joined with a mechanical splicer (Fig. 1) which can be filled with solder if desirable. Ordinarily they are not soldered in practice.

In installing trolley wire the hangers should be plumb and accurately located in relation to the mine track. On curves, hangers must be close together to prevent distortion of the clamps. A spacing of from 6 to 10 ft. between centers is usually satisfactory. The boss of the clamp should bear firmly against the hanger to minimize the tendency toward bending. Where the roadway is timbered, hangers suitably designed (Figs. 2 and 3) for direct attachment to the timbers may be used. In some mines, timber hangers of the type shown in Fig. 3 are supported directly from the roof with two lag screws driven into plugs or expansion bolts. If attached directly to the roof, a hanger with an expansion bolt stem (Fig. 2) may be employed. If they are not installed plumb, a "bump" (Fig. 4) in the trolley wire will result. Where the roof is high a side-suspension arrangement (Fig. 5) may be employed. Special clamps (Fig. 6), designed for the attachment to the steel timbers now frequently used in main entries, are now manufactured.

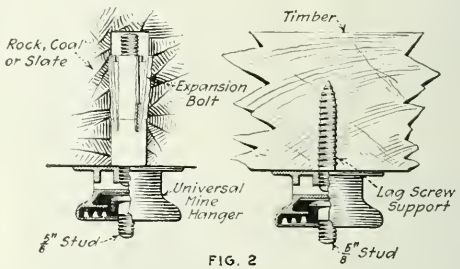


FIG. 2

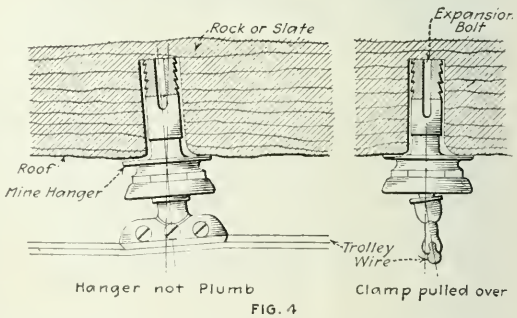


FIG. 4

FIGS. 1 TO 4. A SPLICER AND SOME HANGER DETAILS

Fig. 1—Typical construction of trolley and feeder wire splicers. Fig. 2—Showing how the same hanger may be used on either timber or rock roof. Fig. 3—Westinghouse type BL timber hanger. Fig. 4—Difficulties due to improper installation

Mine trolley clamps (Fig. 7) have in recent years received considerable attention from the manufacturers and satisfactory designs are now obtainable from a number of concerns. The clamp should be relatively short. If there are any decided irregularities in the

*For detailed information relating to mine wiring the following references are recommended: "Standardization of Electrical Practice in Mines," Circular No. 23, Bureau of Standards, Government Printing Office, Washington, D. C.; "Suggested Safety Rules for Installing and Using Electrical Equipment in Bituminous Coal Mines," Technical Paper No. 138 Bureau of Mines, Government Printing Office, price 5c; Article, "Rules for Electric Wiring in Mines," *Coal Age*, May 25, 1918, page 968.

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trolley-wire contour (Fig. 4), excessive arcing will result. The jaws of the clamp which grip the trolley wire should be sufficiently narrow that they will not interfere with the passage of the trolley wheel. The device should be of such a design that it can be clamped rigidly after its proper alignment and location have been determined.

Section insulators in trolley wires are used where the insulation of a portion of the overhead conductor is desirable. It is considered good practice where the roof is bad to sectionalize each branch or room heading. Section insulators are of three kinds: non-switching, hand-operated and automatic. Those of the non-switching type merely interpose an insulating block in the trolley wire. The two sections of wire thus insulated from one another may be electrically connected by closing a switch, from which "jumpers" run to the two trolley wire sections.

A hand-operated section insulator (Fig. 8) is merely a non-switching section insulator to which a knife switch mounted on one of its sides has been added. The trip driver in passing under the section insulator may close the switch when his trip runs into the section and open it as the trip passes out.

Automatic section insulators are so designed that the trolley wheel in passing over them will cut in the section of trolley wire ahead of the locomotive and on the return cut it out. The automatic section insulators are more expensive, heavier and more complicated than the hand-operated insulators.

Trolley wire for mine service is now, in practically every case, grooved No. 0000 hard-drawn copper (Fig. 9). The round trolley wire (Fig. 10) is at present seldom used because the hangers employed with it must have their lips formed under it for its support. This may introduce a bump—that is, it does not provide a smooth "under-run." The figure 8 wire (Fig. 10) provides a smooth under-run and good mechanical attachment to the hangers, but it is difficult to handle in that it tends to kink. The grooved wire has neither of the foregoing disadvantages and affords both a good mechanical support and a smooth under-run. No. 00 wire has been used and No. 0 occasionally for small entries and into rooms where the service is light. Usually it is uneconomical to install wire smaller than No. 0000 even if the load which it carries is small, because of the tendency of the smaller conductors to break and to deteriorate rapidly from wear.

The properties of grooved trolley wires are, electrically, practically the same as those of hard-drawn round copper wire of equivalent cross-sectional area. The dimensions shown in Fig. 9 are standard and were adopted several years ago. They also include the dimensions that were added at the Chicago convention of the American Electric Railway Association in October, 1912. The manufacturers of trolley-line equipment design it on the basis of the foregoing dimensions. The American Society for Testing Materials recommends that sizes be specified in circular mils and not as gage numbers. The circular-mils areas shown in parentheses in Fig. 9 differ from the corresponding numbers by less than five parts in a thousand.

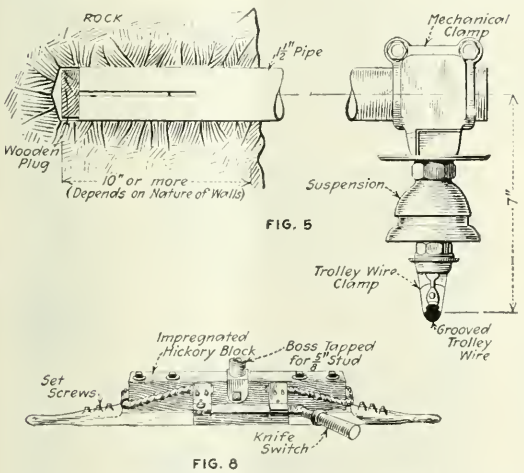


FIG. 5 FIG. 8

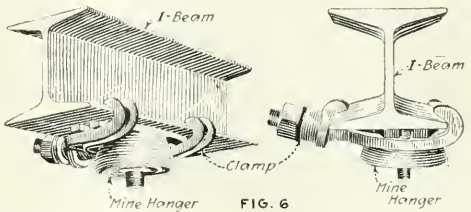


FIG. 6

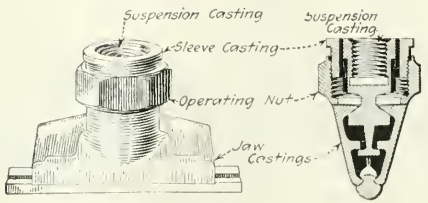


FIG. 7

FIGS. 5 TO 8. TROLLEY WIRE SUPPORTS AND TROLLEY CLAMPS

Fig. 5—Trolley wire supported from side wall by pipe arm (General Electric Co.). The combination pipe clamp and flat-top suspension provide a good arrangement for sustaining the trolley wire around curves where the top is quite irregular. Fig. 6—Mine hanger supported on I-beam (Ohio Brass Co.). Fig. 7—Typical trolley clamp ("New Modoc," Form 1, Ohio Brass Co.) Fig. 8—Section insulator with switch

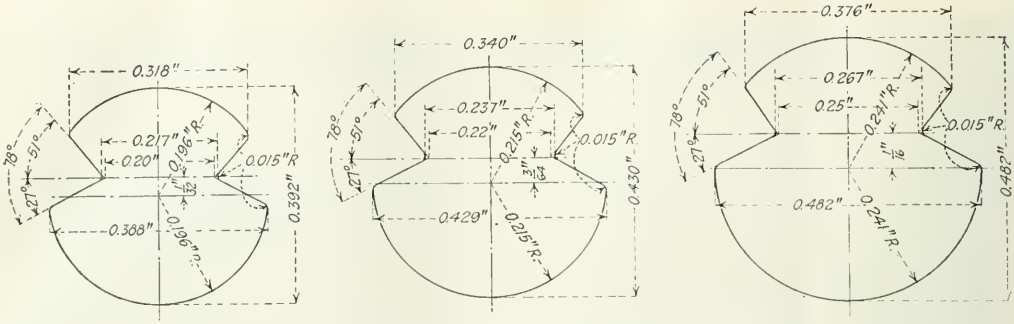
*The location of the trolley wire with relation to the track will be determined by local conditions. Ordinarily the center of each hanger may be 7 in. outside of the outer edge of the rail.

When dead-ending a trolley wire (Fig. 11) it should be anchored securely and insulated. This may be accomplished either by using a strand insulator, an ordinary turn-buckle or a Brooklyn strain insulator, which is really a combination of the two devices just mentioned. A suitable galvanized clamp should be used for holding the dead-end loop at the end of the trolley wire.

A trolley wire should be protected to prevent men or animals from contacting therewith. The protection may comprise boards or strips extending down each side of the trolley wire with a space between sufficient to admit the trolley wheel.

A trolley frog should be located 2½ ft. in advance of the point of the latch and be restrained in a horizontal

*Practice recommended by the Ohio Brass Company



I—2-0 wire (133,200 circ. mil) II—3-0 wire (168,000 circ. mil) III—4-0 wire (211,600 circ. mil)

FIG. 9. AMERICAN-STANDARD GROOVED COPPER TROLLEY WIRE (ALL DIMENSIONS ARE IN INCHES)

position by suitably located hangers on the trolley wires near the frog.

In tapping a feeder into a trolley wire (Fig. 12) a properly designed feeder clamp should be employed. The total cross-sectional area of all the taps should equal or exceed the cross-sectional area of the cable. Pieces of copper wire hooked around ordinary clamps will ultimately give trouble and should not be used.

In tapping lighting circuits from a trolley wire a specially-designed clamp (Fig. 13) should be used. The practice of hooking or twisting a piece of bare copper wire around a trolley wire in lieu of a current tap is to be condemned both because it is dangerous and because in the long run expensive, if the trouble and time it may cost are considered.

Some Figures on Trolley Costs

The cost of erecting one mile of trolley wire complete is about $1500. This is based on copper at about 25c. per lb., with No. 0000 trolley wire, No. 0000 bonds and No. 0000 cross-bonds every 250 ft. Of the $1500, $1100 is the approximate cost of the material and the remainder the cost of installation. These data are based on conditions existing in 1917 and 1918 in bituminous mines. It is about 50 per cent. greater than the cost in 1914 and 1915, based on copper at 15c. per pound. The conditions in anthracite mines are usually more difficult and the total cost will average from 25 to 50 per cent. greater than for bituminous mines. The cost increases appreciably for curved untimbered haulageways with many turnouts.

The resistance of rail joints, unless they are bonded, may be exceedingly high and where bolts are loose and corrosion excessive may be equivalent to an open circuit. For this reason bonding is imperative as an economic proposition[2]. The steel rails used are practically always of sufficient area to conduct the current economically.

Two methods of bonding are in common use—channel-pin and compressed-terminal bonding. As will be explained, the channel pin, although least in first cost, is likely to be too expensive in ultimate cost to justify its employment on main haulageways.

In the channel-pin method of bonding a grooved steel plug, into the groove of which has been inserted a piece of round copper wire, is driven into a hole drilled in the rail. The wire fits snugly into the groove and the driving in of the plug wedges it in position. While the resistance of such a plug when new is low, moisture will ultimately enter the joint and produce corrosion and a consequent high resistance. For these reasons channel-pin bonding is desirable only for temporary tracks in rooms and chambers. Old trolley wire is frequently used for the bonding wire.

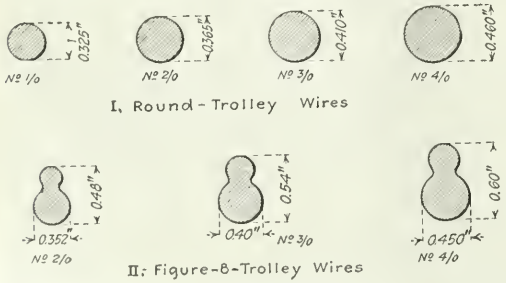


FIG. 10. SECTIONS OF ROUND AND FIGURE 8 TROLLEY WIRES

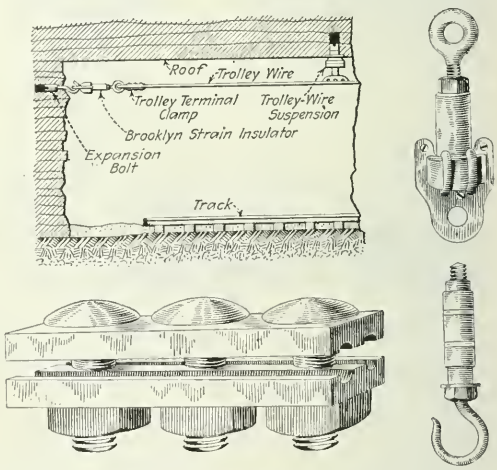


FIG. 11. METHOD OF DEAD-ENDING A TROLLEY WIRE

In installing the compressed-terminal bond, a screw compressor is employed which forcibly expands the bond

[2]The fish plate alone (according to the Ohio Brass Company) is not sufficient to carry the return current and should never be depended upon to do so. While it is true that new fish plates on a new rail will materially increase the conductivity of the rail return circuit they should never be considered as being adequate substitutes for bonds. In a short time the fish plate where it contacts with the rail becomes corroded and offers a high resistance. To insure long life and proper condition of bonds, the fish-plate bolts must be tight so as to minimize vibration at the joints.

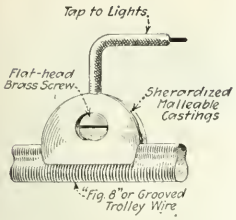
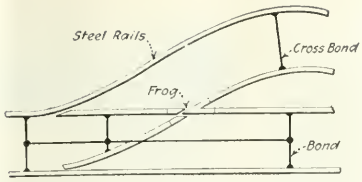
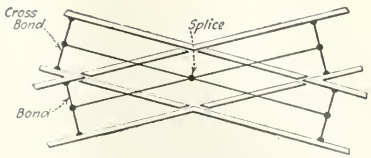


FIG. 13. CURRENT TAP



I—Showing bonding around single-track turnout



II—Showing bonding around single-track crossing

FIG. 11. METHODS OF BONDING AROUND TURNOUTS AND CROSSINGS

terminal in a hole in the rail. At the same time it forms a button head which reduces the possibility of the entrance of moisture around the terminal to a minimum.

The sectional area desirable for a bond is difficult or impossible of definite determination. One rule frequently followed is that the total cross-section area of the bonds should equal the total area of the overhead circuit. That is, the cross-sections of the bonds on a haulageway should equal the total cross-section of the copper wire and the feeder cable. Other users have adopted the empirical rule that the area of the bonds should be one-half of that of the overhead copper. However, in no case should the safe carrying capacity of the bond be exceeded. One rule in this connection is that the bond area should be not less than 500 circ. mil per ampere of average load.

In drilling holes for bonds no oil should be used. Furthermore, the holes should always be drilled and reamed just prior to the installation of the bonds so as to insure good electrical contact.

As to whether the bond should be installed under or over the fish plate, local conditions must determine. Where an old installation is being bonded the expense of removing the rusted fish plates and bolts is excessive and usually renders the placing of the bonds under the plate out of the question. In new installations where a 60-lb. per yd. or heavier rail is used, it is desirable to place the bonds under the plates for mechanical protection and for the prevention of theft. Where the bond is placed under the plate a shorter length can frequently be used. The space between the fish plate and the rail is not ordinarily great enough to accommodate a concealed bond where the rail weighs less than 60 lb. per yard.

Cross-bonding (Fig. 14) is necessary so that should a bond on either rail break the current can find a return path to the supply station through a cross bond to the other rail. There is no method of computing the spacing of cross-bonds. However, the practice is to space them about every 200 or 250 ft. The area of the cross-bonds should be equal to the area of the rail bonds. Cross and longitudinal bonds should be arranged around the turnouts and crossings as diagramed in Fig. 14.

Bonding to auxiliary return paths such as water and air pipe lines is desirable for two reasons. It reduces the electrical resistance of the return path and it minimizes the possibility of electrolysis or electrolytic corrosion. Such auxiliary bonds can be installed at intervals of 300 ft. where the pipe line parallels the track[3]. The joints should be well soldered and served with tape to prevent corrosion.

Borehole cables are conductors carried down a hole bored from the surface to the underground workings. Boreholes are used because they may provide a direct route and, furthermore, because the cable installed in them has almost complete mechanical protection. Ordinarily boreholes, which may be about 5 in. in diameter, should be lined with a steel casing cemented in at the top and extending above the ground level 4 or 5 ft. to prevent the entrance of surface water. It is desirable that a lightning arrester and disconnecting switches be connected in the circuit at the location where the cable enters the borehole.

Where the voltage does not exceed 600, ordinary rubber-insulated copper conductors can be used in the borehole just as they are in iron conduit. Each conductor should be supported at the top by a suitable strain insulator. Where the voltage is 2200 or above, it is considered necessary to use lead-cased cables. The weight of the cable then becomes excessive so that it is necessary to use the steel armor wire to support the conductor.

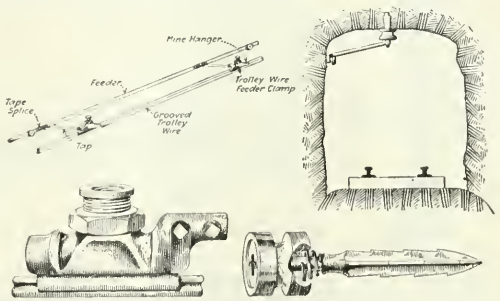


FIG. 12. TAPPING A FEEDER INTO A TROLLEY WIRE

Ordinarily three-conductor cables are employed for three-phase service and may be provided with varnished cambric insulation. They should be lead-cased steel-wire armored and jute-and-asphalt finished. The weight of the cable is sustained by the armor wires, which are clamped in a suitable support (Fig. 15) which may rest at the top of the borehole casing. Potheads or end bells of the disconnecting type should be placed at each end of the cable.

In supporting cables in mine shafts, the best practice dictates that the steel armor wires be used to sustain the weight the same as with borehole cables. Sometimes unarmored cables are supported in wooden cleats at regular intervals, but this method is not wholly satisfactory. The steel wire armor of a cable not only permits it to be supported effectively, but also provides adequate mechanical protection. Stranded steel messenger cables, extending down the shaft, to which the steel armored lead-covered cables are lashed with steel wire at intervals of 20 to 40 ft., have been used successfully.

[3]Old steel hoisting ropes have been employed by certain mining companies to reinforce a return circuit. The rope is supported on the props along the entries and cross-bonded at 200 to 300-ft. intervals to the rails. All joints should be carefully soldered

The messenger wire must be grounded effectively at both ends.

In ordering or requesting quotations on mine cables the following information should always be given to the manufacturer: Quantity required in feet or in pounds; sizes in B & S gage or in circular mils; solid or stranded; kind of insulation; operating voltage; kind of service and the delivery point. Also, determine in advance where the joints can be made to best advantage and order the lengths of cable accordingly. If uncertain as to the proper kind of cable to specify, put your problem up to a responsible manufacturer. Give him complete information—he cannot have too much.

Mining machine cables are made in three forms: Flat duplex, round duplex and concentric duplex. Flat duplex cable is the least expensive but has the disadvantage that it is liable to kink when being handled. Round duplex does not tend to kink but it has a somewhat larger over-all diameter and is more expensive than the flat duplex. The concentric duplex is more solid and compact than either of the other forms and resists wear better. It is more expensive and a little more difficult to splice than either of the others.

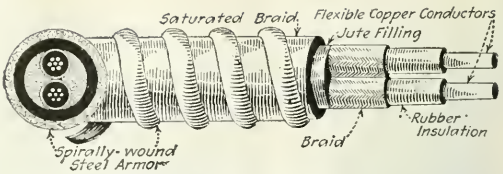
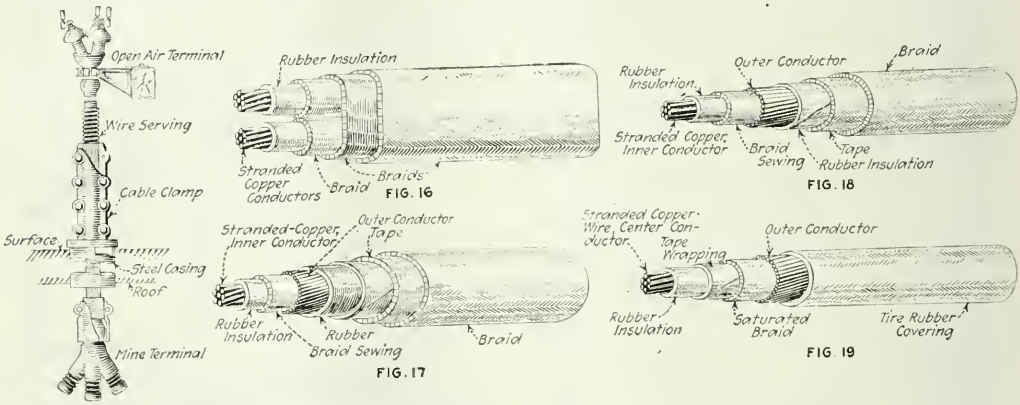


FIG. 20. STEEL-ARMORED ROUND DUPLEX MINING-MACHINE CABLE

Mining-machine cable construction varies in detail with the different manufacturers. That described below (Standard Underground Cable Co.) is typical. Flat duplex cable consists of two flexible conductors (Fig. 16) each insulated with rubber and braid with two or three braids thereover. Round duplex has individual conductors which are rubber insulated and with the braid served over them as for flat duplex. But instead of being laid up parallel the conductors are cabled together, the interstices being filled with jute fiber, thus forming a round core over which is placed a tape and one or more braids. Concentric duplex is made up in two constructions. Construction *A* (Fig. 17) has a flexible inner conductor, rubber-insulated and braided, over which is applied the second conductor of equal cross-section laid up in the form of a spirally wound layer of copper wires, over which is applied a belt or rubber insulation, the finish over all being a tape and one or more braids. Concentric duplex construction *B* (Fig. 18) differs from construction *A* only in that the outer layer of rubber is omitted, the tape and weatherproof braids being applied directly over the outer conductor.

The number and quality of protecting tapes and braids with which mining-machine cables of the various types are finished varies with the practice of the different manufacturers and the individual wishes or requirements of the purchaser. Cotton yarn, rather than jute, has in the past been used in the outer or finishing braids of practically all types and styles of mining-machine cables. The reason is that cotton is more serviceable and absorbs the insulating compound more thoroughly. Recently certain of the leading manufacturers have adopted a finishing braid of seine twine saturated with a weatherproof compound. This gives a very durable protection. It is considerably more expensive than ordinary cotton braid but is more economical.

Rubber-covered mining-machine cable (Fig 19) is now made by the Goodrich company. It is claimed that this protection is not subjected to moisture troubles because, until it is mechanically injured, the cover is impervious to moisture. It resists wear in the same manner as does a rubber tire tread. It is lighter and more flexible than cables having braid protective coatings. The construction data are as follows: Conductors of soft drawn tinned copper. Inner conductor is composed of 133 wires



FIGS. 15 TO 19. CONSTRUCTION DETAILS OF A NUMBER OF DIFFERENT KINDS OF CABLE

Fig. 15—Lead-covered steel-wire-armored cable installed in a borehole with terminal clamp and terminals (Standard Underground Cable Co.). Fig. 16—Flexible, duplex-parallel, braided, rubber-covered mining-machine cable, weatherproof finish. Fig. 17—Flexible, duplex-concentric, braided, rubber-covered, mining-machine cable, weatherproof finish, construction "A." Fig. 18—Flexible, duplex-concentric, braided, rubber-covered, mining-machine cable, weatherproof finish, construction "B." Fig. 19—Goodrich "standard" duplex-concentric, special-rubber-covered mining-machine cable.

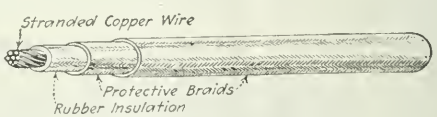


FIG. 21. SINGLE-CONDUCTOR, LOCOMOTIVE-GATHERING REEL CABLE, BRAIDED

insulated with the National Electrical Code thickness and quality of rubber insulation, then taped and covered with one weatherproof braid. Over this is placed the second conductor composed of 49 wires, and the whole is finally covered with abrasion resisting rubber—serving both as outer insulation and protective covering.

Armored mining-machine cable (Standard Underground Cable Co.), Fig. 20, can be furnished with any number of conductors but is usually duplex, being either: (1) Flexible conductors, rubber-insulated and braided, twisted together and protected either with one or more saturated braids or a spirally wound steel armor, or (2) concentric duplex same as construction *A* except with the additional protection of a spirally wound steel armor. The soft-steel galvanized armor furnishes protection against abrasion. Cable of this type is used extensively in the Pennsylvania and West Virginia fields. In other fields it has not been generally adopted because it is difficult if not impossible to wrap cable of this type on drums. It is used in short sections and dragged from one room to another.

Gathering locomotive cable (Fig. 21) comprises one flexible conductor which is insulated with National Electrical Code thickness and quality of rubber and then protected by one or more tough braids.

In constructing transmission lines wooden poles are used in all except the most important installations. It is good practice to use wooden cross-arms for the lower voltages, but where the line is three-phase high voltage, steel cross-arms of a type which will provide equal distances between the three conductors are preferable. All metal pole fittings should be galvanized. Poles should satisfy all standard specifications. Cedar is the best material, but chestnut is almost as good, from the standpoint of durability. Yellow pine rots rapidly. The butts of all wood poles should be treated with a preservative, as such treatment is more than justified. Poles should be set in the ground at least one-fifth to one-sixth of their length. The lowest wire should be from 18 to 22 ft. above the highways.

Production of Soft and Hard Coal in the United States in 1918

The final figures of coal production for 1918, compiled from reports from all operators in the country, have just been completed by the Geological Survey. These official figures show for the year 1918 a total output of 579,386,000 net tons of bituminous coal, a figure less by 1.1 per cent. than the estimate published eight months ago. The total production of coal, anthracite, bituminous and lignite, in 1918, was 678,212,000 net tons. Pennsylvania ranked first in output, with West Virginia second and Illinois a close third. The number of men employed in the production of bituminous coal in 1918 was 615,300, compared with 603,143 in 1917. The average number of days worked, the highest recorded, was 249, compared with 243 in 1917.

The total value of the production of the bituminous coal mined in 1918 was nearly $1,500,000,000, and of both bituminous and anthracite coal, $1,828,423,000. The average value per ton realized for bituminous coal was $2.58, compared with $2.56, the estimated weighted average of the established Government prices in effect throughout the year.

BITUMINOUS AND ANTHRACITE COAL PRODUCED IN THE UNITED STATES IN 1918

	Loaded at Mines for Shipment (Net Tons)	Sold to Local Trade and Used by Employees (Net Tons)	Used at Mines for Steam and Heat (Net Tons)	Made Into Coke at Mines (Net Tons)	Total Quantity (Net Tons)	Total Value	Average Value per Ton	Number of Employees	Average Number of Days Worked
Alabama	16,061,991	304,038	593,739	2,225,194	19,184,962	$54,752,329	2 85	26,221	278
Alaska	67,267	6,384	1,955	...	75,606	411,850	5 45	239	254
Arkansas	2,111,992	41,457	73,920	...	2,227,369	8,172,376	3 67	3,928	204
California and Idaho	5,800	600	...	...	6,400	17,250	2 70	15	240
Colorado	10,580,811	436,338	311,009	1,079,413	12,407,571	33,404,743	2 69	14,483	255
Georgia	21,725	888	6,250	37,853	66,716	239,377	3 59	190	258
Illinois	83,268,864	3,641,044	2,381,197	...	89,291,105	206,860,291	2 32	85,965	238
Indiana	28,961,651	941,707	775,276	...	30,678,634	70,384,601	2 29	30,376	227
Iowa	7,399,030	602,556	190,609	...	8,192,195	24,703,237	3 02	13,328	245
Kansas	7,188,358	173,330	200,259	...	7,561,947	22,028,142	2 91	10,665	234
Kentucky	29,350,941	1,049,985	678,090	593,601	31,612,617	80,666,842	2 55	39,342	230
Maryland	4,343,293	98,288	55,716	...	4,497,297	12,466,189	2 77	5,568	261
Michigan	1,280,658	98,954	85,206	...	1,464,818	5,615,097	3 83	2,558	237
Missouri	5,119,591	385,896	162,243	...	5,667,730	17,126,498	3 02	9,590	235
Montana	4,177,894	179,079	175,532	...	4,532,505	11,444,875	2 53	4,559	264
New Mexico	2,836,801	39,075	39,271	1,108,092	4,023,239	10,787,082	2 68	4,095	301
North Carolina	466	42	912	...	1,420	6,745	4 75	50	40
North Dakota	526,046	173,744	19,943	...	719,733	1,762,577	2 45	828	229
Ohio	42,888,610	2,015,720	908,613	...	45,812,943	118,095,518	2 58	48,450	223
Oklahoma	4,567,930	37,600	207,917	...	4,813,447	17,508,884	3 64	8,451	228
Oregon	4,112	3,946	5,270	...	13,328	37,454	2 81	40	292
Pennsylvania (bituminous)	137,492,980	4,984,384	3,612,890	32,460,487	178,550,741	463,159,736	2 59	174,306	269
South Dakota	640	7,302	...	...	7,942	22,230	2 80	21	145
Tennessee	5,904,593	148,130	181,901	596,424	6,831,048	19,305,203	2 83	10,694	265
Texas	2,204,266	11,854	45,015	...	2,261,135	5,937,997	2 63	3,936	262
Utah	4,238,718	64,827	94,978	738,302	5,136,825	13,937,097	2 71	4,160	258
Virginia	8,188,502	392,712	107,519	1,601,075	10,289,808	25,865,895	2 51	11,004	277
Washington	3,659,830	74,315	193,606	154,461	4,082,212	14,132,869	3 46	5,109	275
West Virginia	81,579,916	2,636,785	1,159,951	4,559,187	89,935,839	230,508,846	2 56	89,530	238
Wyoming	9,055,252	130,777	252,659	...	9,438,688	22,581,019	2 39	7,554	268
Total bituminous	503,088,528	18,681,757	12,521,446	45,094,089	579,385,820	1,491,942,849	2 58	615,305	249
Pennsylvania (anthracite)	85,927,696	2,674,439	10,223,949	...	98,826,084	336,480,347	3 40	147,121	293
Grand total	589,016,224	21,356,196	22,745,395	45,094,089	678,211,904	1,828,423,196	2 70	762,426	258

Mine Transportation After an Explosion

The transportation of material into a mine after an explosion is often made difficult by falls of roof, wrecked mine cars, or other obstructions, the cars and track being temporarily useless, so that the material must be carried or dragged by the workmen. Gangs of workmen should be assigned certain distances over which they must convey the material. In this manner the men become accustomed to the travel over their section, and, as the work advances, they may be moved farther into the mine and a new crew added on the outside to deliver material at the first station at the mine or shaft entrance.—*Rescue and Recovery Operations in Mines.*

Height of the Gas Cap in a Safety Lamp*

It is well known that the heat of the flame in a safety lamp exerts an influence upon the height of the gas cap secured in a mixture of gas and air. Mr. Young's paper describes experiments conducted to determine the extent of this influence.

By C. M. Young†
Urbana, Illinois

THE safety lamp is the most common and convenient apparatus for detecting inflammable gases in mines. The presence of gas in this lamp is shown by a blue flame, called the cap, if the wick has been lowered to suppress the luminous flame. The height of the cap increases with the proportion of gas and with the temperature of the lamp flame. Lamps of the Wolf type, burning benzine, have a hotter flame than those in which vegetable oils are used, such as the Davy and the Clanny, and are more sensitive than the latter and their many modifications. The Piehler alcohol lamp gives a still higher flame while the Clowes hydrogen lamp is more sensitive than all. While the effect of the temperature of the source of ignition is well known, I know of no previous attempt to correlate the change of this temperature with change of the height of the cap produced.

In order to determine the height of the cap at various temperatures, it was necessary to have a source of ignition the temperature of which could be accurately controlled over a considerable range. This condition was met by a coil of wire of high fusing point heated by an electric current controlled by a variable resistance. The use of a coil offered the further advantage of freedom from complications arising from the flame of a burning fuel. Such a flame, being itself of variable height, would to some extent raise or lower the elevation of the base of the cap and therefore add to the difficulty of determining the height of the cap. Besides this, the presence of a small cap from the lamp fuel, commonly known as the "fuel cap," would interfere with the observation of small gas caps.

After some experiment, a coil was made of platinum wire, No. 26, diameter 0.016 in. The coil was 17/64 in. in outside diameter and had eight full turns in a length of ½ in. This was connected to an electric circuit through an adjustable resistance, as shown in Fig. 1. In order to measure the temperature, a thermocouple was inserted in the center of the coil; the leads passed out at the ends and were conducted to a millivoltmeter. It is probable that the current of air passing upward through the coil resulted in the indication of a temperature somewhat below that of the coil, but the error was not of such nature as to change the general conclusion drawn from the observations.

Partly because of the fact just mentioned and partly because the impossibility of measuring the exact height of the cap rendered refinements in other parts of the work unnecessary, no cold junction was used in connection with the thermocouple. Moreover, there was no object in ascertaining the exact temperature at which a given percentage of the particular gas used would give a cap of certain height. The height of cap varies with the composition of the gas and the results obtained could not be checked with those obtained with another gas unless that gas were measured in accordance with its cap-forming power instead of its composition and percentage.

The object of the experiment was not to find the exact height of cap given with a certain percentage of gas at a given temperature of the coil, but to show that the height of the cap varies with the temperature of the source of ignition. Points such as the relation between the exact temperature of the source of ignition and the height of the cap in mixtures of pure methane and air, and the relation between the height of the cap and the size of the igniting body, are reserved for future investigation.

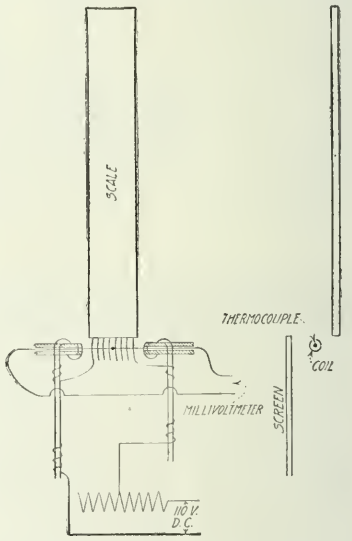


FIG. 1. COIL CONNECTED TO AN ELECTRIC CIRCUIT THROUGH AN ADJUSTABLE RESISTANCE

A scale was placed back of the coil and in front of it a screen to cut off the light from the coil; the base of the scale, the top of the coil, and the top of the screen were at the same elevation. The apparatus was blackened to prevent reflection of light from the coil as far as possible. For the proper proportioning of gas and air, an Oldham gas-testing machine was used. As methane was not available, gas from the city

*To be presented before the September meeting of the American Institute of Mining Engineers, Chicago, Ill.

†Assistant Professor of Mining Research, University of Illinois.

lines was employed. No attention was paid to the composition of the gas or to the percentage present, but the apparatus was arranged to give a mixture approximately equivalent in cap-forming power to certain percentages of methane.

The apparatus was calibrated with an unbonneted Clanny lamp and the mixtures used were approximately equivalent in cap-forming power to mixtures of methane and air containing 4, 3, 2 and 1 per cent. of methane. No higher percentage was used because of the approach to the explosive limit. The relations between the temperature of the igniting coil and the height of the cap produced with these mixtures are shown by graphs *A*, *B* and *C*, Fig. 2.

With a gas mixture equivalent to 4 per cent. methane, no cap was observed at 660 deg. C. (1220 deg. F.), but a cap about $\frac{3}{8}$ in. high appeared at 662 deg. C. (1223.6 deg. F.), thus roughly indicating this as the ignition temperature of the gas. The composition of the gas

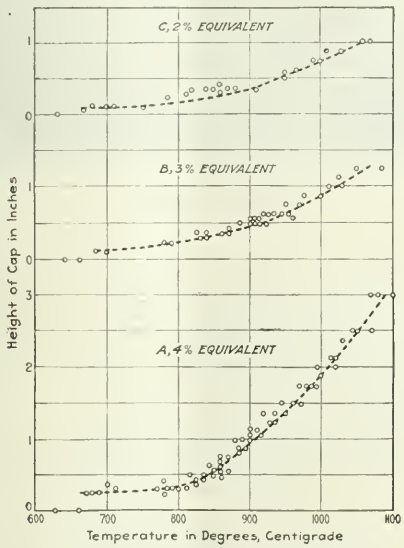


FIG. 2. RELATION BETWEEN TEMPERATURE OF IGNITING COIL AND HEIGHT OF CAP

is variable but the following analysis is fairly representative of its composition at the time when the tests were made: CO_2, 6.7 per cent.; O_2, 0.2 per cent.; illuminants, 12.1 per cent.; H_2, 20.8 per cent.; CO, 8.8 per cent.; CH_4, 18.4 per cent.; N_2, 33.0 per cent. The ignition temperature of such a mixture is uncertain, but that of methane is commonly given as about 650 deg. C. (1202 deg. F.) while that of hydrogen is somewhat lower. It may be judged from the appearance of the cap at 662 deg. C. that the temperature indication was not seriously in error.

The abrupt appearance of a cap $\frac{3}{8}$ in. high at 662 deg. C. was somewhat unexpected, as it might be supposed that the cap would increase gradually from 0. The measurement of the height of the cap was difficult because of the lack of a quite definite summit, but none of many observations with a 4 per cent. methane equivalent showed a cap less than $\frac{1}{4}$ in. high and this small cap appeared and disappeared abruptly with very small temperature changes.

Graph *A* is a composite of the readings of four sets of observations, graph *B* is a composite of two sets, and graph *C* represents only one set. In each case there is a nearly horizontal portion, while the temperature is lower than about 850 deg. C. (1562 deg. F.). At these lower temperatures, changes in temperature made little difference in the height of the cap. The explanation of this fact is not certain but it may be due to the burning of the constituents of the mixture having lower ignition points than methane. It seems quite possible that the heavy hydrocarbons that constitute 12.1 per cent. of the gas would be thus burned. Beginning at about 800 deg. C. (1472 deg. F.), increase of temperature produced a more marked effect on the height of the cap. This is especially noticeable in the case of the richest mixture.

When an attempt is made to draw curves through the points, it is found that there is some evidence of irregularity in the region between about 825 deg. and 925 deg. C. (1517 and 1697 deg. F.), where some points are found lying above the position of a smooth curve. This is shown most plainly in graph *C* but is found also in *B* and *A*. It occurs at a lower temperature in *C* than in *A* while in *B* it occurs at about the same temperature as in *A*. No explanation for this peculiarity is at present apparent.

With gas equivalent to 4 per cent. methane the cap was plain and while low could be measured with some accuracy. High caps ranging above about $1\frac{1}{2}$ in. were hard to measure because they fluctuated somewhat, and also because the top faded out without a definite limit.

With gas equivalent to 3 per cent. methane, the cap was less plain than with 4 per cent.; and with a 2 per cent. equivalent it was hard to see. Experiment with a mixture equivalent to 1 per cent. methane showed a faint cap, about $\frac{1}{4}$ in. high, when the coil was bright red. Raising the temperature did not apparently increase the height of the cap, but the cap was so faint that it was obscured by the light from the coil and no measurement was attempted.

The experiments show that there is a fairly definite relation between the temperature of the source of ignition and the height of the cap formed in a mixture of a combustible gas and air, the height of the cap increasing with the temperature. More rigid investigation might reveal a relation between these variables capable of mathematical expression, but the conditions of the experiment made do not warrant an attempt at such expression.

Combustion Over Fuel Bed

Combustion over the fuel bed is a chemical reaction between gaseous oxygen on the one hand and gaseous, liquid and solid combustible, which rises from the fuel bed, on the other hand. The gaseous and liquid combustible results from gasification of fixed carbon on the grate and distillation of volatile matter. The solid combustible consists chiefly of finely divided carbon, known as soot, which is produced by decompositions of volatile matter. Also particles of coal are carried along with the current of gases. To burn these gaseous, liquid and solid combustible materials oxygen must be supplied by admitting air over the fuel bed. The velocity and completeness of combustion are influenced by concentration, mixing, temperature and time of contact of oxygen and combustible, and therefore a knowledge of their effects is important.

New Development on Pond Creek, Pike County, Kentucky

By M. W. Gilliam
Williamson, W. Va.

Perhaps in no other section of the country has the development of coal land been more rapid than on Pond Creek, Pike County, Kentucky. Up to a few years ago there were only three companies operating on this creek. The railroad has recently been extended about 4 miles, making the total length of this spur of the Norfolk & Western 13 miles long. In this short distance there are now 15 coal companies working mines.

Among the latest developments on this creek is the Sullivan Pond Creek Co., which is located near the end of the Pond Creek railroad. This company has a total of 6000 acres of coal land lying on Mullens and Pinson Forks. It is now working the Pond Creek Seam, which on its property averages 5 ft. of clear coal.

This operation is employing the most modern equipment and is preparing to produce 30,000 to 40,000 tons of coal per month. During the development work the coal will be loaded over the present temporary wooden tipple. This is to be replaced by a modern tipple equipped with shakers, picking tables and loading booms. The new tipple will probably be of steel construction.

The most modern electrical equipment will be used. Power is purchased from a local central plant which furnishes 2200 volts at the substation. The first substation building has been completed and the initial installation made. In the accompanying illustrations Fig. 1 shows this stone building, which is 26 ft. long, 18 ft. wide and 11 ft. high.

The installation of only one synchronous converter has so far been completed. This is a 200-kw., six-phase,

FIG. 1. EXTERIOR VIEW OF SUBSTATION

275-volt, direct-current machine, made by the General Electric Co. Fig. 2 shows the installation of this machine which is characterized by its neatness, convenience of operation and the electrical safety devices employed.

The incoming 2200-volt line is protected by lightning arresters located just outside the building. The choke coils and disconnecting switches are placed inside the building at the nearest point of entrance. Thus, in the case of unusual disturbances to the electrical equipment, they will be readily accessible. The outgoing direct-current lines are also well protected by approved lightning arresters.

Protection from low voltage is afforded by a low-voltage release, and the alternating-current oil switch is arranged so as to automatically trip the direct-current circuit breaker, upon opening of the former. An automatic reclosing circuit breaker will also be installed, and thus with the exception of starting and stopping the machine this station will require little attention. The use of rubber mats and Pyrene fire extinguishers are other refinements which add to the completeness of the station.

The inside equipment already received consists of two 6-ton General Electric gathering motors, two Sullivan C.E. 7 cutting machines and one Sullivan electric

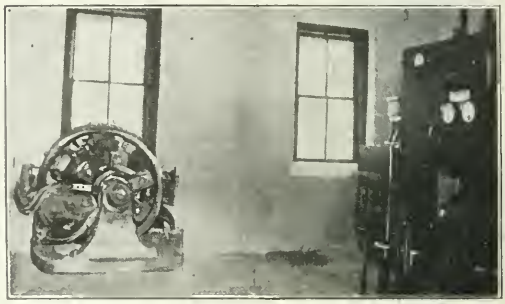


FIG. 2. SYNCHRONOUS CONVERTER INSTALLED IN SUBSTATION

rock drill. Three 6-ton General Electric gathering motors, one 15-ton General Electric haulage motor, and several other cutting machines will be delivered in the near future. This equipment will be added to as the mine is developed. The inside wiring of the mines will be modern in every detail. The heavy rails that will be installed will be provided with electrically welded bonds.

This interesting new development is under the management of William Farrell. The entire electrical work is under the direction of the West Virginia Engineering Co., of Charleston and Williamson, West Virginia.

British and German Military Mining Explosives

By Mark Meredith
Liverpool, England

At the commencement of the war, wet guncotton was the only explosive used in the British army for demolition purposes, and it was consequently employed largely in the early days of military mining in small charges. Owing, however, to its inferior cratering properties as compared with the safety explosives of the ammonium nitrate group, and the large amount of carbon monoxide present after an explosion, its use was superseded first by blastine and finally by ammonal. The latter explosive was used practically universally in all mining operations, guncotton being used for demolitions and emergency charges only.

Toward the latter part of the war, owing to the scarcity of aluminum, the supply of ammonal became greatly restricted, and experiments were made with amatol and sabulite, with a view to their use. The former explosive proved to possess only about 65 per

cent. of the lifting power of ammonal, and the latter about 85 per cent. Fortunately the necessity for their adoption never arose.

The compositions of various English explosives used or experimented with were as follows:

	Ammonal, Per Cent.	Amatol, Per Cent.	Sabulite, Per Cent.	Blastine Per Cent
Ammonium nitrate	65	80	78	
Trotyl (T.N.T.)	15	17	8	11
Charcoal	3			
Coarse aluminum	16			
Fine aluminum	1	3		
Ammonium perchlorate				60
Sodium nitrate				22
Paraffin wax				7
Calcium silicide			14	

Ammonia proved to be an extremely safe explosive for use in trench warfare. Its chief defect was its excessive hygroscopicity, an ordinary detonator failing to fire it when it contained over 4 per cent. of moisture. It was extremely sensitive to waves of detonation; it was found that if two ½-lb. charges in tins were suspended in the air at a distance of 9 ft. apart, the second one would be fired by the detonation of the first.

The following were the usual mining explosives used by the Germans:

	Glukauf, Per Cent.	Westfalite, Per Cent.	Donarit Per Cent.
Amonium nitrate	83	95	80
Circuma	11		
Copper oxalate	5		
Di-nitro benzol	1		
Resin		5	
Troyl			17
Nitro-glycerine			1
Flour			3

The compositions of these explosives approximates fairly closely to "amatol."

Device That Makes for Safety in Shotfiring in Mines

It will be generally admitted by all familiar with the operation of a coal mine that the work of shotfiring in mines is a most hazardous occupation, requiring not only skill and judgment in the firing of the shots, but the same judgment and experience in the location, charging and tamping of the hole. A misplaced shot is always dangerous, but the greatest hazard is experienced in the firing of the blast.

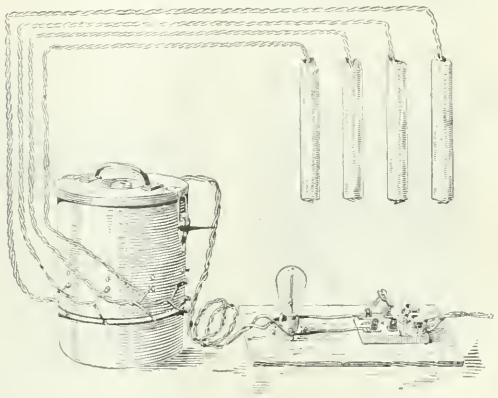
The laws in many coal-mining states provide numerous restrictions regarding the work of shotfiring, and, in some states, the employment of competent shotfirers is made compulsory. In Kansas, Oklahoma, West Virginia and other coal-producing states, the lives of many shotfirers have been sacrificed in the work.

The need has long been felt of a reliable and practical device that will reduce the hazard of shotfiring, and we believe that the Gentry shotfirer, here described, is a means to this end. The apparatus is shown in the accompanying figure and consists of an electro, automatic device, by means of which a large number of shots can be fired in succession, at regular intervals and when no one is in the mine.

In appearance, the Gentry shotfirer resembles a 25-lb. black-powder can. As shown in the figure, there are numerous electric connections, which are spaced at regular intervals around the circumference of the can. The lead wires for firing the shots run from these connections to the various places where the shots are located in the mine.

Within the can is a clock, arranged after the manner of an alarm clock and which can be set to start the firing of the shots at any desired time. The wire furnishing the current for the firing is shown in the figure as running from the switchboard to the can. The device is so arranged that the rotation of a turntable within the can establishes electric connection, successively, with each of the plugs in the circumference of the can. By this means each shot is fired in its regular order and at any desired interval of time from the last preceding shot.

The Gentry shotfirer is the result of a year and a half of study and development work to insure simplicity of construction and reliability of operation. The apparatus can be operated by any electric current and does not necessitate any rewiring of the mine. The expense

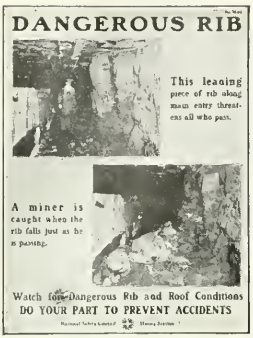


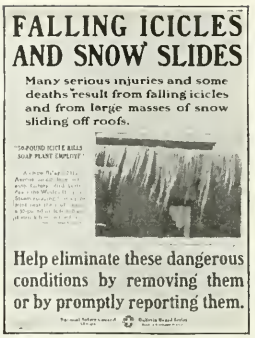
DETAILS OF THE GENTRY SHOTFIRER

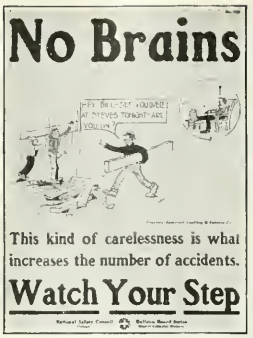
of installing this system of firing is therefore merely nominal. No argument is needed to convince the most skeptical that such a machine will pay for itself in a short time, by reducing the cost of firing shots in a mine to a minimum. This fact has been thoroughly demonstrated in a number of instances, in mines where the shotfirer is in successful operation.

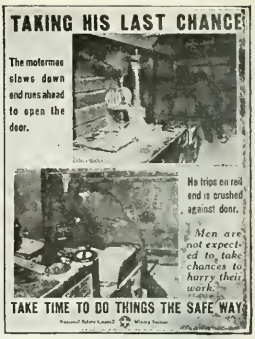
The device is manufactured and sold by the Mine Supply Co., Vincennes, Ind., which has also successfully introduced what is known as the "Schellinger signal system," which is said to be replacing the pneumatic-gong signal. *Coal Age* will be glad to hear from those who have installed either of these devices, in the practice of shotfiring and signaling in mines, and to receive any comments or discussion along these lines.

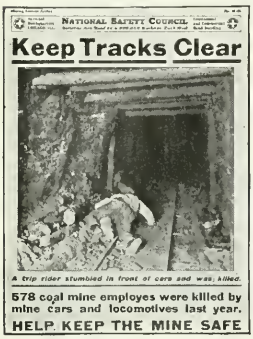
COAL BROKER'S RIGHT TO COMMISSION.—A broker is entitled to a commission for effecting a contract for a sale of coal when he produces to his principal a customer, ready, willing, and able to buy on the terms provided by such principal, within the period allowed, or if the time is not limited before the revocation of the agency. The right to commission is not defeated under such circumstances by the principal's wrongful refusal to consummate the sale. Nor is it necessary that the broker procure a binding written contract covering the sale, if the principal is in a position to execute the contract himself. And if a broker's authority to negotiate sales of coal is not coupled with a condition that the purchasers are to supply necessary cars, or other means of transportation, failure of the broker to provide therefor in his negotiations will not render the negotiated contracts invalid, nor deprive the broker of his right to commission. (Alabama Supreme Court, Rust & Shelburne vs. Eldorado Coal Co., 81 Southern Reporter, 567.)


DANGEROUS RIB
This leaning piece of rib along main entry threatens all who pass.
A miner is caught when the rib falls just as he is passing.
Watch for Dangerous Rib and Roof Conditions
DO YOUR PART TO PREVENT ACCIDENTS


FALLING ICICLES AND SNOW SLIDES
Many serious injuries and some deaths result from falling icicles and from large masses of snow sliding off roofs.
Help eliminate these dangerous conditions by removing them or by promptly reporting them.




TAKING HIS LAST CHANCE
The motorman slows down and runs ahead to open the door.
He trips on rail end and is crushed against door.
Men are not expected to take chances to hurry their work.
TAKE TIME TO DO THINGS THE SAFE WAY


NATIONAL SAFETY COUNCIL
Keep Tracks Clear
A trip rider stumbled in front of cars and was killed.
578 coal mine employes were killed by mine cars and locomotives last year.
HELP KEEP THE MINE SAFE

NATIONAL SAFETY COUNCIL
Bulletins Are Read by 500,000 Workmen Each Week
IT KILLED A MAN
The chip is smaller than a 10c piece and as sharp as a razor. It flew from a striking face of the sledge hammer and cut an artery in workman's groin. He bled to death!
Inspect Sledge Hammers Carefully
The same kind of an accident could happen when using hammers with mushroomed head.

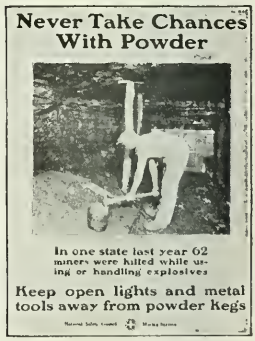
NATIONAL SAFETY COUNCIL
BE SURE THE ROOF IS SAFE
1,147 coal miners were killed last year by falls from roof. This is the cause of more than one-half of all deaths in coal mines. Help prevent these accidents.
USE PROPS WHERE NEEDED

LOST HIS LEG
The scraper thought the safeguard was not necessary. His trouser leg caught on the "bita" and he was badly injured.
Always Keep Safeguards In Place

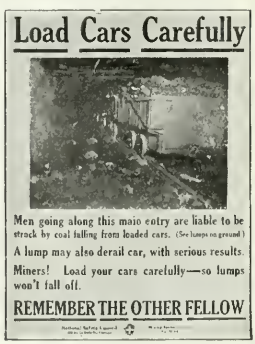
PLAYING SAFE
Look how well these buddies have their roof propped.
Miners who don't take chances are seldom injured.
How About Your Roof?

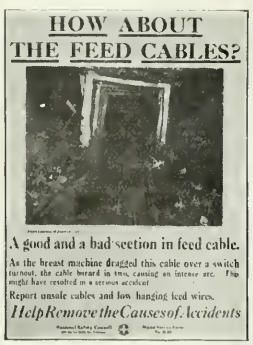
Luck Was With Them
Right under this hanging roof these men sat and ate their lunch.
Never thought about examining the roof.
Within fifteen minutes after they had left, the roof fell. They escaped probable death this time.
Luck failed for 1147 coal miners last year who were killed by roof falls.
DON'T DEPEND ON LUCK IT MAY FAIL YOU TOO

A Dangerous Stunt
Don't use your teeth to crimp a cap
This has caused many many fatal accidents
USE CRIMPING PLIERS
There are more than enough accidents in and about mines without looking for trouble.


Never Take Chances With Powder
In one state last year 62 miners were killed while using or handling explosives
Keep open lights and metal tools away from powder kegs

Bulletins Are Read by 4,500,000 Workmen Each Week
NATIONAL SAFETY COUNCIL, CHICAGO, ILL.
Carelessness and Nails
Bratticeman after repairing brattice
leaves extra battens with nails in them.
Miner steps on nail and injures his foot.


Load Cars Carefully
Men going along this main entry are liable to be struck by coal falling from loaded cars. (See lumps on ground)
A lump may also derail car, with serious results.
Miners! Load your cars carefully—so lumps won't fall off.
REMEMBER THE OTHER FELLOW


HOW ABOUT THE FEED CABLES?
A good and a bad section in feed cable.
As the breast machine dragged this cable over a switch turnout, the cable heard in two, causing an intense arc. This might have resulted in a serious accident
Report unsafe cables and low hanging feed wires.
Help Remove the Causes of Accidents

WRENCH SLIPS
The wrench doesn't fit the head of the bolt. When the wrench slips the workman falls back.
Sometimes a man's back is seriously injured in this way.
Use the Proper Tools!

How the National Safety Council Spreads the Gospel of "Safety First"

John Mitchell

[OBITUARY]

THE death of John Mitchell, as the outcome of an attack of pneumonia, on Sept. 9, at the Post-Graduate Hospital in New York City, removed a labor leader who had for many years enjoyed the approval of the public in general, whether employers or employees. His reputation never seemed to wane, unlike the usual fate of presidents of labor organizations when they surrender their authority and enter into other pursuits. Those who had formerly been led by him still continued to respect him, however much they might question the breadth of his views and dread the fairness of his judgment.

He is the father of the eight-hour day in the coal mines of the United States, and no one would wish a return to a day of any greater length. For many years the eight-hour day has been looked upon as the most efficient period of working time. The old slogan ran, "Eight hours for work, eight hours for play, and eight hours for sleep." Though many employers strove hard to prove that a longer period of time was advantageous, the even division of the day into three equal parts for public labor, private pleasure, and personal recuperation won the day. For Mr. Mitchell's part in it he is entitled to much honor, though had he not labored so diligently for it, it probably in time would have arrived as the outcome of the natural trend of affairs.

JOHN MITCHELL

John Mitchell was a native of Braidwood, Will County, Illinois, where his father, Robert Mitchell, a native of Ireland, was a miner, a farmer, and a soldier in the Civil War. Mr. Mitchell was deprived of his mother when he was only two years old. Two years later his father married again, and about three years later died, leaving the child in the care of a stepmother. He received only irregular schooling for four years, his summers being spent in farm work.

When only ten years old he ran away from home and hired himself out to a farmer. Three years later he became a trapper boy at the Braidwood Mine. His career as a union man commenced when he was only 16 years old, at which time he entered the mines at Braceville, Ill. The United Mine Workers of America was not then formed, and it was the Knights of Labor with which he affiliated. Not many years later he might have been discovered in Colorado, New Mexico, and other states in the West and Southwest, fitting himself at night by application to his studies for the position of leadership which he was later to occupy as the president of the United Mine Workers of America. In 1890 he returned to Illinois, entered the Spring Valley Mine, becoming extremely active in the affairs of the union. As soon as the United Mine Workers of America was organized, he enrolled as a member, and he was the president of a Knights of Labor local that had been established in the Spring Valley. In January, 1898, he was elected national vice president at the Columbus convention of the United Mine Workers, his immediate superior being President Hatchford, who resigned, leaving Mr. Mitchell as acting president.

In January following—for the United Mine Workers did not hold biennial sessions at that time—he was elected president, and continued to be so elected until 1908, when he resigned on account of ill health. The American Federation of Labor made him a vice president from 1898 to 1914, and the National Civic Federation elected him vice-president of that body in 1905, after a service of many years as a member of the executive committee of the industrial department.

The most spectacular event in John Mitchell's life was the anthracite strike of 1902. At that time the President of the United States, Theodore Roosevelt, established an arbitration board by which the differences were settled. Mr. Mitchell was at that time willing to accept arbitration, but it had been refused. In honor of that settlement the miners yearly celebrate a day in honor of John Mitchell, that being the only day in the United States when the work of a *living man* is so celebrated.

It is necessary to pass over rapidly the various honors to which Mr. Mitchell fell heir. He was named one of the five trustees of the Nobel Peace Prize Fund, which was awarded to Roosevelt in 1906. In 1913 he was appointed State Labor Commissioner by Governor Sulzer. However, the Court of Appeals held that the appointments made by the governor after the regular session of the Legislature was adjourned were illegal.

There was no objection to Mr. Mitchell other than technical, and in 1914 Governor Glynn appointed him a member of the State Workmen's Compensation Commission, but he served only one year, when he became chairman of the New York State Industrial Commission, which position he held up to the time of his death.

For a while during the war he served on no less than four separate food commissions. He lived at Mt. Vernon, N. Y., with a happy family consisting of his wife, a miner's daughter of Spring Valley, Ill., Catherine O'Rourke Mitchell, and four children, all of whom during the war entered the Navy, and one of whom, aged 22, was chosen by the physicians as the one who should try to save the life of his father by providing blood for his anemic veins. All the boys volunteered, but the youngest was chosen as being the one most likely to revive his father. Though 35 cu.cm. of blood was passed into his system, he died nine days after his operation for the removal of gallstones, from the attack of pneumonia that supervened.

He has left his imprint on the generation in which he lived, and he dies much regretted by the American people of all walks of life.

NEWS FROM THE CAPITOL

BY PAUL WOOTON

Senate Committee Obtains Data on Export Coal Situation

Consideration of the export situation of the coal industry was continued when the Senate Investigating Committee took up its hearings again on Sept. 10. Senator Frelinghuysen introduced into the record what is regarded as the latest and most accurate figures on the world coal situation. They were compiled with great care by the export coal department of the United States Shipping Board. The Shipping Board's figures are as follows:

WORLD'S COAL SITUATION

Coal Exporting Countries	Pre-War Production	Pre-War Exports	Estimated Post-War Production	Estimated Post-War Exports	Post-War Requirements
Great Britain	287,412,000	76,689,000	214,000,000	23,000,000	*
Germany	191,500,000	34,880,000	91,500,000	23,500,000	48,300,000*
Canada	14,000,000	2,062,000	14,000,000	2,062,000	16,053,000
South Africa	9,000,000	869,000	9,000,000	869,000	.....
India	17,000,000	735,000	17,000,000	735,000	.....
China	.....	1,515,000	.....	1,515,000	3,135,000
Japan	21,415,000	3,906,000	28,000,000	3,906,000	.....
Australia	12,417,000	2,136,000	12,417,000	2,136,000	..... *
France	41,000,000	1,044,000	46,000,000	.....	17,000,000*
Belgium	23,000,000	4,974,000	14,000,000	.....	12,000,000*
Netherlands	1,843,000	6,040,000	1,800,000	.....	8,000,000*
Poland	7,000,000	.....	50,000,000	40,000,000	..... *
Total available for export in countries other than United States				97,723,000	

COAL NEEDED BY EUROPEAN COUNTRIES OTHER THAN ABOVE MENTIONED

Portugal	1,223,000
Gibraltar	361,000
Spain	3,226,000
Denmark	3,434,000
Norway	2,391,000
Sweden	5,181,000
Switzerland	1,722,000
Italy	*12,017,000
Malta	1,186,000
Austria-Hungary (including Czecho-Slovakia and Jugo-Slovakia)	13,782,000
Greece	767,000
Bulgaria	51,000
Roumania	301,000
Russia	8,804,000

COAL NEEDED BY COUNTRIES OTHER THAN ABOVE

Africa (not including above-mentioned)	6,336,000
Asia (not including above-mentioned)	1,347,00
South and Central Africa	11,994,000
	179,511,00
Total available for export in countries other than U. S.	97,723,00
	81,788,000
Pre-war exports of the United States	19,325,00
Amount estimated necessary to make up world's total coal shortage	62,463,000

*GREAT BRITAIN—It is estimated that the introduction of the seven-hour day and the probable nationalization of the British coal mines will bring the coal exports of Great Britain to a smaller figure than 23,000,000 tons per year. The production has already dropped from 287,412,000 tons in 1913 to the estimated amount of 214,000,000 tons in 1919-20. Britain has already increased the price of her coal by $1.50 per ton, and, according to our latest advices, has entirely stopped the export of coal, permitting coal to be sold only for bunkering purposes and domestic consumption.

*GERMANY—The amount of 23,500,000 tons represents the coal to be delivered annually by Germany for the next ten years to Belgium, France and Italy according to the Peace Treaty, whereby Italy is to receive 8,000,000 tons, France 8,000,000 tons and Belgium 7,500,000 tons. The figure 48,300,000 tons comprises the need of Germany due to the loss of the Saar Valley mines and the Upper Silesian mines to Poland. The requirements of the population of the territory lost by Germany is taken into consideration and already attributed to the countries to which that territory belongs according to the terms of the Peace Treaty.

*FRANCE—Will need approximately 9,000,000 tons of coal besides the 8,000,000 tons to be supplied by Germany according to the Peace Treaty. It was, also, taken into consideration that the French industry was partly destroyed during the war, and thus a reduction of 12,000,000 was allowed. At the same time, the Saar Basin, with a production of 12,000,000 tons, has been added to the French production, and the needs of the population of the Saar Valley region and Alsace-Lorraine taken into consideration.

*AUSTRALIA—The Australian production is at present suffering on account of strikes, but this can be considered only as a temporary condition

*BELGIUM—Needs 4,500,000 tons coal annually. It was taken into consideration that the Belgian production has dropped from 23,000,000 to 14,000,000 tons, and also, that Germany has to supply 7,500,000 tons to Belgium according to the terms of the Peace Treaty.

*THE NETHERLANDS—Owing to the fact that the Netherlands used to both export and consume a large amount of German coal and, also, to the fact that Germany will be in great need of coal herself, thus not being in position to export any, the Netherlands will have to cover her own needs of approximately 10,000,000 tons per year. Part of this is covered by her production of 1,800,000 tons, while the balance of 8,000,000 tons will have to be imported from foreign countries.

*POLAND—The production of Poland before the war amounted to 7,000,000 tons while her consumption amounted to 10,000,000 tons, but with the Upper Silesian coal mines now turned over to Poland, she will have an increased production of about 43,000,000 tons, thus making a total production of 50,000,000 tons annually, which will leave a surplus of 40,000,000 tons available for export. Most of this coal will go naturally to its prior destination, that is, to the eastern German industrial cities, partly to Austria and Czecho-Slovakia.

*ITALY—Although Italy imported annually about 12,000,000 tons of coal, she will need only approximately 4,000,000 tons for the next ten years owing to Germany's obligation to deliver to Italy 3,000,000 tons per year according to the terms of the Peace Treaty

*OTHER COAL EXPORTING COUNTRIES—The figures on export coal applied to other coal-exporting countries are taken as they were before the war, for the war has actually not influenced the production of these countries. It can be anticipated that Great Britain will make efforts to increase the coal production of her dominions.

An increase in the production of Chinese coal can, also, be anticipated owing to the fact that Japanese interests are developing at the present time the Chinese coal mines in Manchuria and will possibly do so in Northern China.

NOTE—At the time these figures were compiled it was assumed that the Upper Silesian mines (which go to Poland according to the Peace Treaty) will contribute considerably for the relief of the European coal situation. But since that time conditions at these mines are getting worse daily and some time will elapse before Poland will be in a position to deliver coal to other countries.

It was also taken into consideration that Germany has to deliver over 23,000,000 tons of coal annually, according to the Peace Treaty. Representatives of the German coal-mining-industry have been conferring recently with the Peace Conference at Paris, at which they have undertaken to prove that Germany is not in a position to fulfill her obligations within this year, and naturally Belgium, France and Italy will have to obtain that coal elsewhere. It is safe to assume that the figure of 62,463,000 tons of coal as representing the world's shortage is rather conservative.

The Peace Conference has appointed a Coal Commission which is to consider the question of relieving the threatening European coal famine. It is expected that the work of this commission will result into a general coal rationing which will apply to all European countries

Belgium is the only European country recovering more or less rapidly from the effects of this war. Her mines, which fortunately have all been worked during the war by the German Army of Occupation, are increasing daily their production, and it is estimated that they will have reached by this time a production of coal equal to about 70 per cent of their pre-war output. Belgium has even been lately in a position to help France to an extent of shipping 300,000 tons of coal for that country.

It is the belief, at the Shipping Board, that while Germany cannot expect to meet her promise to export 23,500,000 tons that an increase in production from Upper Silesian Basin may be expected. This is due to the fact that Poland has no indemnities nor reparation to pay, and that taxes are certain to be less than they will be in Germany. It is regarded as obvious that Ger-

man operators will be quick to secure properties and take up production in Poland, since the result of the plebiscite is certain to give the Silesian fields to Poland.

In connection with the Shipping Board's figures a lesson can be drawn from the results of nationalizing coal mines. Prior to the war certain of the Westphalian mines had been operated by the Government. Some of these mines were literally operated at the points of the Kaiser's bayonets. Even under those conditions of absolute control neither profits nor production were satisfactory, and were less than those of privately operated mines in which conditions were similar. Now, under the extended scheme of nationalization which is to be applied in Westphalia, it is deduced that production will never reach the pre-war level.

While Canada has not taken the amount of coal this year that had been estimated, it was pointed out at the hearing other countries are taking, so that the decrease in Canadian demand is really of no significance in the general situation.

Senator Frelinghuysen also inserted in the record an extended statement of the British coal situation. This was accompanied by extensive statistical tables.

What is regarded as an important contribution to the information in regard to the export situation was furnished by the Geological Survey. The submission of the information was prompted by the desire that no wrong impression should be gained as to the German coal situation. Despite the ceding of the Silesian and Saar coal fields Germany, in the opinion of the Geological Survey, will have coal resources left with which to supply her own needs and to meet the requirements of the Peace Treaty.

No shortage of labor, speaking generally, exists in the coal-mining industry, Percy Tetlow, the statistician of the United Mine Workers of America, told the committee. There are more miners ready to work, he said, than are required to produce the maximum amount of coal which the market will absorb. The lack of steady employment was given by Mr. Tetlow as the most potent factor in keeping alive the spirit of unrest which characterizes the workers in mines. Since the mine worker is employed on an average of only 226 days a year, he contended that the only way the situation can be met is by a shorter working day. Senator Frelinghuysen told Mr. Tetlow that it is his earnest hope that there be no suspension of work during the negotiations which are to take place between the miners and the mine operators.

Mr. Tetlow pointed out that the United Mine Workers had had a very difficult situation trying to curb radicalism among the miners. This was due, he said, to the number of foreigners engaged in the industry, who are not familiar with our institutions. He told of the continuous efforts which have been made to Americanize the foreign element among mine workers.

That the price figures submitted by the National Coal Association to the Committee be checked by the Federal Trade Commission was a suggestion made to Senator Frelinghuysen by the Railroad Administration. While the Railroad Administration did not challenge the figures directly, it was pointed out "that the Government prices were maximum prices and there well may have been contracts in effect with prices lower than the Government prices. It should also be made clear by the National Coal Association whether the Government prices given are merely the Government run-of-mine prices or the average of all the Government prices weighted by the number of tons of each size of coal sold at the price fixed for that size."

H. B. Spencer, of the Railroad Administration, at the request of the Committee, stated that during 1918 five million tons of anthracite had been consumed by the railroads.

The principal presentation of the case of anthracite companies was made by A. S. Learoyd. He declared most emphatically that, in his belief, nothing is going to happen to create a shortage of the domestic sizes of anthracite. "Our fear," he asserted, "is quite to the contrary. We are going to have difficulty in selling our coal before the end of the calendar year." He predicted that the Canadian purchases this year would be 3,600,000 tons. With the exception of 30,000 tons sent to Cuba for use in gas plants, there are no other exports of anthracite. Mr. Learoyd characterized as unfortunate the refusal of the Hudson Coal Co. to report its figures to the Anthracite Bureau of Information. He deprecated statements that New England was far behind in its receipts of anthracite and produced tables showing that distribution, following the Fuel Administration's allotments, is practically normal.

Certain portions of the anthracite region have all the laborers they can employ, Mr. Learoyd told the Committee. But there are certain companies who could increase their production if more men were available. Car supply is ample, he testified. He also noted an increased efficiency since the prohibition edict due to a larger percentage of men reporting to work on the days following holidays and pay days.

Much of the complaint with regard to coal prices, Mr. Learoyd said, is due to the use of the ton as a unit. With such a large unit, the increase in price seems large when, as a matter of fact, coal has increased less than nearly any other commodity. Anthracite, at the mines, he pointed out, had it been purchased in April showed an increase over the pre-war price of 51.5 per cent. With the monthly increases, the price today is 62 per cent. over the pre-war prices, he stated. The causes for the increase in price were made necessary, he testified, by increases in labor cost, increases in the cost of material and supplies and increases in taxation. In analyzing these, he showed that wages had advanced from 55 to 75 per cent, as compared with 1914. Materials and supplies necessary to anthracite production have increased from 100 to 110 per cent. In addition to the heavy increases in taxes, both local and Federal, there are numerous other increases to be added after the coal leaves the mine.

Mr. Learoyd pointed out that he could not attempt to analyze the costs and profits after the coal left the mine. He pointed out that his company had lost 3 cents per ton on production from Jan. 1 to July 31. S. D. Warriner, the president of the Lehigh Coal and Navigation Co., pointed out that the 8 per cent. dividend paid by his company is made up from returns on the company's railroad property and by drawing upon accrued surplus. The failure of early buying was given as another cause for increased expenses. Mr. Warriner expressed the opinion that his company could end up the year with a profit of some 2 or 3 per cent. He pointed out the necessity of holding down prices on domestic sizes so as not to decrease that demand with its consequent bearing on steam-coal production. He said that oil, gas and coke burners had brought about serious competition to the anthracite industry.

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A Contrast in Salesmanship

WHEN a salesman comes to the manager of a mine, he inquires what the manager is in need of, and the manager, having indicated the line of his needs, takes the salesman onto the ground and shows him the actual conditions and asks him just what he can agree to do with the problem as it presents itself. The salesman looks over the conditions carefully and makes his proposition. Perhaps something entirely different is offered the manager from what he has been confidently expecting. But whatever it may be that the salesman thinks advantageous, it is suggested courteously with reasons given for the substitution.

Then comes the matter of price. The salesman probably has his figure inflexibly determined in advance, according to rate sheets immutably fixed by his firm, the more immutable the better the concern. But his manner on this matter is conciliatory. He explains apologetically that the price is so outrageously high that he is almost ashamed to offer his goods, but then what can he do? Prices of all materials are so high and labor is now paid so much more than ever before that even if his company was content to do business without the reasonable profit it is charging, he would still have to ask what a few years ago would have been almost an unthinkable figure.

That is how sales are made today—sales of everything except labor. The union says, "We demand." The seller of labor abuses the buyer. The labor salesman makes no attempt to fit his offering to the needs of the purchaser. He is not endeavoring to render any service whatever to the man to whom he is trying to sell his labor. He consults only the convenience of the firm he represents, which is, in his case, the union. "We demand," is the first and last of his argument. It appears fourteen or fifteen times in painful and discourteous iteration in the anthracite mine workers' formula.

No wonder the operator is moved to say, "No." How much better would be a courteous explanation, something of an apology for frequent changes in the schedule of rates; how much more desirable a readiness to knit the desire of the seller into the needs of the purchaser. All the doctrine of dissent, all the psychology of negation, is bound up in those uncompromising words—"We demand." The evil spirits of men are always aroused by such inconsiderate words of defiance.

If there is a motto which fits best the coat of arms of a trust—labor trust or other—it is the word *mandamus*, "we demand." Let labor go easily. Words like these, the expressions of irresponsibility born of unrestrained power, foreshadow something other than victory. Where powers are thus arbitrarily abused there rises in the minds and hearts of the victims a spirit not of submission but of self-defence and reciprocal defiance. The public is ready for reason, for argument, for service, but not for the bludgeon—and in the end the public pays, not the coal companies.

The public always pays. Why then does it not take an interest in making labor contracts accord with the dictates of decency and reason? In the long run it pays the costs of victory. Why does it never inquire as to the merit of the matter at issue? The public pays sorrowfully, bitterly, vengefully. Why then does it not look at something more than the final score, but with diligence condescend to read the labor items and insist that those items be kept in accord with reason?

Every undue wage increase, one, that is, that more than restores the purchasing status of the individuals affected, enables the individual to acquire new tastes, which tastes form a new standard of living. This fact, any new adjustments for increased costs of living must carefully consider, or dissatisfaction will result. With production remaining unchanged, better standards of living for any class are impracticable unless certain other classes of workers are to be compelled to accept lower standards than heretofore.

Only Narrowly We Escaped A Low-Price Era

AS the public looks back at the trying days which followed the signing of the armistice, it may begin to realize how happily but how narrowly it escaped an era of lowered prices, lowered wages, uncertainty, bankruptcy and panic. Had wages been allowed to drop, the nation would have experienced a period of soup kitchens. Everyone would have waited till the bottom of the depression was reached. Then, having lost all confidence, months and even a year or so would have run before everything would have moved surely.

Fortunately, wages did not drop. They were the rock on which confidence speedily erected a foundation. People soon became ready to buy, and to produce, when they found that what cost $1 one day could not be bought for 50c. a month later. Unfortunately, there was some small degree of doubt and hesitation. Bitter is the price we must pay for it, because it reduced production of numberless needed articles. The lack of production in the early part of 1919 has no little to do with the present high level of prices.

It is customary to say that idleness is regrettable because it causes hardship. When the idleness is at an end, then the misfortune is believed to have reached an end also. But the shortage of production in the time of idleness causes a lack of material in the busy time that follows, and the public continues to suffer from that shortage.

It is hard to blame the producer, especially the coal operator, for shutting down his operations in the face of a lack of orders; it is difficult to blame the wholesaler and retailer for having been slow to buy when prices seemed uncertain; it is uncharitable to blame the public for having been cautions in building and in purchasing articles of a staple character in view of the general uncertainty. But if they had all had a little more faith and a little more judgment in forecasting the future, there would not have been a shortage of articles of all kinds.

Nowadays, when men do not get steady work they want more pay to balance the idle time. It is not

possible for economic law to grant such increases to the majority at least of workingmen. If a farmer works half as many days as he normally should, he will probably get about half as big a crop as usual. So if the world works half time, it produces half product, and it can live only half as well.

Thus on the correctness of our economic faith rests our living. There are twelve months in our year; we must work in all of them. We must find a way somehow to make every day count. Our campaign, with the motto "Let's go," must start in the future at the first appearance of lagging, and when the next lull comes, our powerful Uncle Sam himself, with roads, city pavements, sewers, buildings, harbors and river works, and even reclamation-service expenditures, must set the pace for the rest of us.

The mine workers of Kansas had 364 strikes in two years and won $784.84 as an outcome. They lost over a million dollars in working time during these suspensions of work. How much more profitable is farming than freebooting! How much better is working than striking! Blessed are the peacemakers. No wonder men write to us and others to tell them of some happy regions where there are no unions and no Howats.

Our Experience in Nationalization

FROM our experience with the railroads we can readily see the outcome of nationalization. Rates have risen both for freight and passenger service the traveler has less trains to choose from, small freight is not removed daily, special tourist rates are suspended, the service at all large stations is inadequate for the amount of travel, privileges in passenger transit are restricted, space which was granted free on club cars to chair-car passengers is now often sold to any who desire to purchase it and the pullman ticket holder is denied the privilege of using it without charge, freight cars are not supplied when or in as large a quantity as desired while demurrage charges are higher. Meantime, food charges on dining cars have been raised except where the portions served are smaller.

Under those circumstances it is a matter for regret that the railroads are not paying their expenses. But even the showing obtained, unfavorable as it is, has been secured by letting repairs wait. In 1918, even after the armistice, no rail was ordered. In 1919 only 200,000 tons of steel rail have been purchased, about one-tenth as much as the railroads of the country need for maintenance purposes. From 30 to 40 per cent. less ties have been bought than proper maintenance would require. Freight cars are getting rapidly into disrepair. Just how much nobody knows. However, because no figure can be put upon the neglect of repairs of freight cars, is no evidence that this is not one of the more deplorable items. Some have estimated that the car repairs as a whole have fallen 30 to 40 per cent below the proper level. Coal-car repairs are admittedly behind those of other railroad cars.

The public had a right to presume that as soon as the armistice was signed, the Government would try to make up for the lowered expenditures during the war by an activity that would be bracing to business. The administration, however, showed its normal sense of the fitness of things by going around begging private business for jobs on behalf of discharged soldiers while refusing to buy anything to make up for previous failures to purchase. Much of the work of the Bureaus of Reëmployment could have spared their labor had the railroads placed their orders, reassured business and so kept everything moving.

Nothing was clearer than that natural law was more regulative of business than the Administration of Railroads. Some business did come to the steel companies, but none from Walker D. Hines or the railroads he supervised. The only stimulus which Mr. Hines supplies is the fear of a car shortage which will make all material in great demand or a strike of his employees that will prevent all goods from reaching a market. He has so feared to spend a dollar that he may shortly have to spend much more than that sum to secure the supplies which he has delayed buying.

Really, the public may be excused for conceding that under normal nationalization conditions it would be justified in expecting that a better chief than Walker D. Hines would be chosen to direct the destinies of the railroads and by indirection the destinies of the nation. Transportation is an important feature of our national life. If it is badly handled by a false economist we may again go back to zoning, commandeering, diversion of coal, pooling, workless days and other expedients, with Mr. Hines declaring that the fault rests not with him but with the wicked trusts and unexpected hindrances.

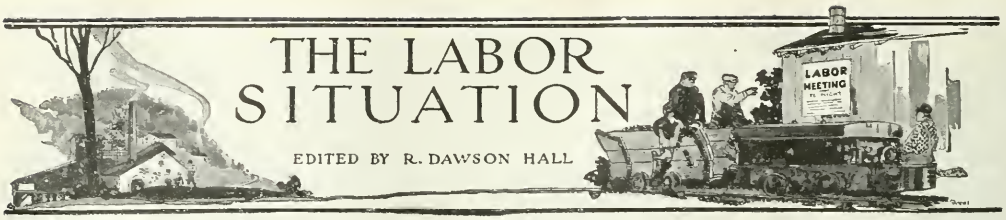
Of all those who, by delaying purchases, nearly caused a panic, our Director of Railroads was among the chief. The public has recovered its confidence despite his misjudgment, and now, perhaps, as the result of his course of conduct, we shall pass from a near panic of low prices to the opposite pole, a high-price climax.

We are told that labor when sold, is not a commodity, because men may not so regard the only thing a man has to sell. But when the miner buys the labor of farmer, of shoemaker, of boarding-house keeper he is not buying a commodity, so may not these persons also conspire without limit to sell him the only thing they have for sale at the highest prices they can get for it? No, that is profiteering, for while mine labor is not a commodity, farm labor, shoe labor and kitchen labor, clearly are. Is it not so?

When the World Is Poor

OWING to the war we are a year or more behind in the supply of our needs. That gives us a promise of steady work, but assures us of penurious times till our wants are supplied. This is no time for magnificent pipe dreams. The corporeal basis for these does not exist, though a steady fare of gorgeous motion pictures may nightly cause us to believe that it does. We must make up for the destruction of the past, fret as we may at the size of the bill.

When we get back to the plethoric housing and full shelves and bursting granaries of pre-war days we can, with some hope for success, plan for a new world and a better future. If our baseless visions of plenty, however, make us work industriously and beam kindlier than ever on one another, well and good. The vision, though untrue, will be well justified in its results. If it merely makes us discontented. then the sooner we wake up the better.



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

A few weeks ago it seemed permissible to hope that the leaders of the labor unions would remember that the mine workers were citizens of a country where other working men had to live and that what one laboring man compelled his employer to concede, other laboring men would have to pay. The labor leaders of the coal industry know that the working man cannot argue about wages as the boy does about apples—that the more he picks the less will go to waste. The more wages the miner gets, the less of his product others can afford to buy and the less of the material made by the use of his product others can purchase.

The labor leaders full well know the folly of the indiscriminate wage, the excessively short day and nationalization. For a while they led everyone to think, and appeared to think themselves, that they were going to be reasonable to the poor underlings who did not have the distinction of being engaged in the mining of coal. But in the end they were hurried into approving the wildest schemes of the wildest schemers in the union

Thus the "Leaders" Must Follow the "Led"

It is little good having men with a grounding in economy, men with a sense of what is right, if in the upshot they are to be pushed into one folly after another by the less instructed and less ethical of their followers. Acting President Lewis is rated as being a wise and honorable man, but after he had put his ear to the dust he came out unreservedly for a 60 per cent. increase.

The public seems to take little interest in the matter, just as if it was not in any way the real victim of the wage revision. It always acts the same way. It sympathizes with the mine worker, wishes him Godspeed and a larger wage and then tears its hair when the wage is granted and blames the operator for its own fault and the cupidity of the mine worker. The consumer is the party most at interest; he should form his own conclusions as to the matter, and let the mine worker know what they are in no uncertain manner. He should back the operator in his fight when he is right, condemn him when he is wrong and stand ready to pay the price for coal which any rightful increase in wage makes obligatory.

He should not condemn the operator if that functionary refuses to make improper concessions and so causes a strike and business paralysis and should not fail to condemn him if he tries to avoid a strike by making unfair concessions which inevitably increase the cost of coal. There is an equity in wage revisions. The consumer should have an inkling as to what that equity is and hold the conferees, at least roughly, to it.

Would Have an Increase of 113 Per Cent.

An increase in wage of 60 per cent., a decrease in time of 25 per cent., making an increase per hour of 113.33 per cent., is demanded despite the fact that living has gone up only 75 per cent. at most since the war began and large advances have meantime been granted—all this would seem to be a matter in which the public will rightly have some interest when the workers' representatives meet the operators at the Hotel Iroquois, Buffalo, Sept. 25.

If the discussion drags along without result for about five weeks, namely, till Nov. 1, then there is to be a strike. The no-suspension rule is not this year to be put in force. As for the automatic-penalty provision, the darling of the union leader as much as the operator, and of the Fuel Administration, it is to be swept away. Probably no one will much regret it. The union will suffer the most. The penalty was always a somewhat welcome goad to belabor the men into accepting the orders of the union administration, whereas the operator usually found it interfered with the ending of an illegal strike and so quite generally consented to remit it. The penalty has always seemed to add to the acerbity of disputes and to give a further occasion for quarreling. Perhaps it is just as well abolished.

Biggest Meeting Union Ever Held

The Twenty-seventh Consecutive and Fourth Biennial Convention of the United Mine Workers of America met at Gray's Armory at 10 a.m., Tuesday, Sept. 9. Never has a larger convention of that body assembled. There were over 2000 in attendance, the Indianapolis Convention in 1918 being attended by only 1800 delegates. The crowd overflowed all the accommodations. The session opened with an address of welcome from the state of Ohio, the city of Cleveland, the Cleveland Federation of Labor and the chiefs of the railroad brotherhoods whose headquarters are in Cleveland.

Henry Raisse of the Cleveland branch of the Federation was temporary chairman. Mayor Harry L. Davis spoke for the city. The city of Cleveland, knowing that some friction exists between Indianapolis and the United Mine Workers of America, at present domiciled there, is anxious to capture all future conventions for which Cleveland is certainly a convenient point. John Moore, president of the Ohio State Federation of Labor and also, by the way, president of District No. 6 (Ohio), extended a welcome to the visiting delegation on behalf of the State Federation.

Brotherhoods Are the Honored Guests

Warren S. Stone, Timothy J. Shea and W. G. Lee, representing the railroad brotherhoods, welcomed the guests, and, not at all incidentally, laid out their revolutionary program before them—that Plumb plan which is so full of menace to the real interests of the laboring men of this country. Acting President Lewis and the mine workers, however, did not seem to realize the mischief bound up in that Plumb foolishness.

Mr. Lewis then made his address as acting president. He introduced a list of foods showing how they had gone up in price, but he did not show how rent had remained unchanged meanwhile, nor did he take pains to tell how powder had been "stabilized" by union contracts. As a matter of fact, the increases in prices have been more than discounted by the wage raises of the day workers, and that if it were not so the proposed increases alone would be more than sufficient to offset them.

It is of no interest for us to be told about phenomenal changes in prices. The whole increase is less than 75 per cent., and the day laborers are seeking an increased hourly wage of 113 per cent., which is 50 per cent. more than the increased cost of living, ignoring all that has been granted already. The quoted prices may extenuate the men's demands, but cannot justify the outrageous wages being asked.

Mr. Lewis presented the following statements to the assembly as a basis for their action:

First—The United Mine Workers of America is in no way responsible for the failure of the Senate of the United States to ratify within a reasonable length of time the treaty of peace and to thus officially terminate, in the bituminous fields, the Washington wage agreement. We

have, as an organization, demonstrated our good faith and exhibited every moral desire to liquidate our responsibilities. We are today, however, face to face with a situation wherein we cannot justify any further delay as concerns our own affairs. I accordingly recommend that this convention take action declaring the Washington agreement officially terminated at a date not later than Nov. 1.

Second—In the event that a basic agreement in the Central Competitive Field is not negotiated by the date fixed for the expiration of the present contract, I recommend that there be no sectional settlements by districts or groups of districts, but that there be a complete cessation of mining operations throughout our entire jurisdiction.

Third—In the event that a satisfactory basis agreement is reached in the Central Competitive Field, that it shall from its date of operation affect all outlying districts and be retroactive to that date.

Fourth—I recommend that the automatic penalty clause, incorporated, as a war-time provision, on the Washington wage agreement, be eliminated in our next contract.

William Green followed with his report, which was recorded in sufficient detail last week. The auditors, F. J. Mossop, Albert Neutzling and T. G. Morgan, then presented their report for the eight months—Dec. 1, 1918, to Aug. 1, 1919.

It shows the total membership, including fully-paid and exonerated members, to be as follows, though it is proper to say that some of the figures in the table have been omitted and the location column has been amplified:

District No.	Location	1918 December	1919 March	1919 July
1	Northern Anthracite (Scranton)	15,411	17,441	16,446
2	Central Pennsylvania (Clearfield)	47,760	49,384	39,848
3	Not organized	....	.....	.
4	Not organized	....	.....	.
5	Western Pennsylvania (Pittsburgh)	36,861½	40,967½	43,652½
6	Ohio	46,486½	44,205	42,019
7	Central anthracite (Hazleton)	13,913½	14,797½	16,504½
8	Block coal of Indiana (Brazil)	1,150½	1,093½	967
9	Southern anthracite (Shamokin)	15,741	22,906	26,827½
10	Washington	4,799	5,227	4,292½
11	Bituminous coal of Indiana (Terre Haute)	30,798½	32,553½	27,136
12	Illinois	96,251	99,303½	79,241
13	Iowa	15,766½	14,861	11,359½
14	Kansas	10,935½	12,376½	10,355
15	Colorado	2,751	3,774½	3,618½
16	Maryland	4,785	5,296	3,399
17	Northern West Virginia (Fairmont)	26,101½	27,206	26,216
18	Rocky Mountain Field, Canada	6,385	7,876½	171
19	Tennessee	11,532	13,656½	11,164½
20	Alabama	7,207	9,750	8,323
21	Arkansas, Oklahoma, Texas	16,963	14,922½	12,766½
22	Wyoming	7,808½	7,363½	5,654
23	Kentucky	4,921½	6,324½	6,216½
24	Michigan	3,286½	2,397½	2,343
25	Missouri	9,195½	8,877½	5,645½
26	Nova Scotia, Canada	0	0	11,453½
27	Montana	4,789	4,936½	3,838½
28	Vancouver, Canada	178	9	0
29	Central West Virginia	5,717	6,935½	5,203½
828	Local union in Indianapolis	15	10½	12½
		447,510	474,452½	424,67[illegible]

These figures are not exactly those of the auditors, for they had evidently been the prey of a printer in a hurry, who mixed the columns after they were set, as can be seen by adding the columns in the tables of paid-up membership and exonerations which in the auditors' report appear just before the table above reprinted. It will be noted that William Green misquoted the total membership in July, which was 424,674, as here stated, and not 453,040 as Mr. Green made it. He has carried the average exonerations for eight months as the exonerations for July, whereas the number had dropped below the average of 43,648 to only 15,282 in the latter month.

Nova Scotia has recently entered the United Mine Workers and the outcome is shown in the table. Central Pennsylvania has lost 10,000 members since March. Indiana is losing members rapidly, nearly 5000 have left since the month just mentioned. Illinois had lost twice as many as Central Pennsylvania from March to July, owing to the dislike of the administration. Iowa is losing heavily, as also Kansas and Maryland. The Rocky Mountain field of Canada lost nearly all its members to the One Big Union, but it is now recuperating and repenting. All the South and Southwest weakened between March and July, and Wyoming did the same. In July Kentucky had not commenced its recent phenomenal growth. A drop of 50,000 in 4 months is a big fall for the union. It appears that its strength increases largely only where organization work is being done, and that when the organizers are withdrawn the work dwindles.

The morning session of Sept. 10 was devoted to reading telegrams, some expressing regret at being unable to be present and others containing expression of goodwill. Samuel Gompers wrote that his "venerated father" had just died and his funeral would be on Sunday. Frank J. Hayes expressed his regret that sickness detained him in bed. John P. White sent his kindly greetings. Word came also from the Colorado State Federation and from that of Ohio. The delegates from the suspended locals—25 in number—of Illinois tried to get the convention to seat them. There were other delegates from the northern anthracite region, central Pennsylvania, Ohio, the "bituminous" district of Indiana, Kansas and Alabama whose right to vote was also contested by district organizations.

Committees were appointed on Officers' Reports, Resolutions, Constitution, Appeals and Grievances, on the Wage Scale, and on Transportation. The last is a mere matter of auditing the allowances of transportation to delegates.

Would Exhibit Mrs Sellin's Photograph

The question of the Breckenridge trouble was introduced by Philip Murray, district president of No. 5 district (western Pennsylvania or Pittsburgh field). A picture of Mrs. Fannie Sellins' body mutilated by the discharge of a riot gun or riot guns was handed around the convention. President Murray and Delegate Mattey (or Matti) of district No. 7 were appointed a committee to arrange for the exhibit of the picture at motion-picture shows.

The cigar makers then asked that the members purchase only union-labeled cigars, while the striking musicians of Cleveland memorialized the delegates asking them not to patronize the movies and vaudeville houses, to the end that these musicians could compel these places to make the mine workers and other patrons of such places pay more for admission. The afternoon session was mere marking of time waiting for the action of the committees. A retired anthracite mine worker of District No. 1 had his songs peddled among the delegates and had them endorsed by the convention.

A more serious matter was a resolution of regret at the death of Mr. Mitchell. Chris Evans was made historiographer of the union with a large committee to assist him. Several delegates sang songs of their own and of the composition of others. The report of the Auditing Committee was presented, and Wednesday's meeting closed.

Officers' Reports Are Endorsed

Thursday was devoted to the report of the committee on Officers' Reports. The committee approved them in full and the convention unanimously voted their acceptance in their various parts and as a whole. On Friday the convention took a recess to do honor to John Mitchell. On Saturday the question of the cost of living was discussed. It was passed on to the Federal Administration as the only agency capable of checking the operations of what the meeting regarded as food gamblers and unscrupulous profiteers.

All of those present did not think that everything was being done that could be done. Some wanted commissions to fix prices of everything in daily use and others Congressional legislation reducing the prices of food and clothing 25 per cent, with a penalty of confiscation of all property for those evading the law. There were some who clamored for the prosecution and dissolution of the packing houses; others advocated the erection of Government cold storage warehouses so as to secure a proper disposal of foodstuffs and others even declared that the punishment of profiteers should be death. One speaker advocated a 90-day period to await lowered prices, failing which a general tie up of industry would be arranged. This was along the lines of the proposals of the railroad brotherhoods.

Three men from Kincaid, Ill., have a resolution calling for the abolition of car pushing in the mines, as has been already provided in central Pennsylvania.

The entire convention approved a resolution calling for legislation making lynching and mob violence Federal offenses. One can readily see a number of mine workers around Belleville going to jail for the new Federal offense. In that immediate vicinity were recently enacted the murders of the East St. Louis negroes and the German Prager, and more of like kind are possible in the future. The mine workers will indorse the law but some of them, at least, are not over prone to maintain it. However, there are many other craftsmen of like kidney.

One resolution, that was indorsed, called for the forming of an alliance with the four big railroad brotherhoods to seek nationalization. Apparently the railroads are to be nationalized first and then the mines if the mine leaders' plans materialize. Other basic industries are to follow. A meeting to this end in which the brotherhoods will be represented will be held Oct. 1. Glenn E. Plumb, attorney for the brotherhoods, spoke and his speech will be printed and distributed to all local unions, as was also the speech of Seymour Steadman on behalf of Eugene V. Debs and other "political prisoners."

The questions as to the formation of a labor political party, the repeal of the Espionage Act, the release of Thomas J. Mooney and other "political prisoners," the Russian campaign and the use of state guards and coal and iron police in labor troubles was reserved for later discussion with another question that the mine workers are bitterly divided on, that of the affiliation with the American Federation of Labor. The radicals want to ally themselves

ALAS THESE ARE DAYS OF BIG FEET

PRINCE CHARMING (after looking at the slipper, Living Prices of 1914)—'Tis too small for such a graceless foot.
CINDERELLA (approaching)—He must be looking for me.

only with organizations favoring "direct action" and violent methods, but in this they will make small headway as against the wiser counsels of the majority who do not believe that through the wreckage of industry will be found a way to prosperity.

With the Hudson Coal Co.'s employees showing the way the Delaware, Lackawanna & Western R.R. Co., Coal Department mine workers started a strike, an order for this suspension of work being issued Sept. 8 by the insurgent authorities. John T. Dempsey, the district president, who had returned from Cleveland, was entirely unable to control the men. So 15,000 more idle workers were added to the 12,000 of the Hudson Coal Co., who were already idle.

Fortunately the men employed by the Hudson Coal Co. in Luzerne County refused to go out in sympathy with those in Lackawanna County or for any alleged grievances of their own. So the mines near Plymouth, at Baltimore Nos. 2, 3 and 5 and Langcliffe colliery still continued work.

The trouble with the D., L. & W. started at Archbald colliery about the clearing up of a fall of rock which the company wanted loaded at company-work wage rates and not at consideration rates. But at this mine also the mechanical loader was bitterly discussed and opposed.

The strike of the D., L. & W. men took place on Sept. 9. The company did not try to settle it, saying it was an illegal strike and any discussion with those who were thus striking was a violation of the contract. The officials resolutely affirmed that work must be resumed before any discussion of grievances could take place.

John L. Lewis on Sept. 10 sent an order from Cleveland Ohio, instructing the men to return to work. On Sept. 11 three locals of men employed by the Hudson Coal Co. voted to go back to work on Saturday, Sept. 13. These locals had a membership of 3000 and their members work at Eddy Creek, Grassy Island and Miles Slope collieries in Oliphant. Soon thereafter, all the strikers in both the Hudson Coal Co. and the Delaware, Lackawanna & Western R.R. Co.'s mines went back to work.

In western Pennsylvania labor quiet still reigns. It is one of the older unionized districts and the ferment of early unionism has long died down. Unionism is not a new thing in that district and does not have to be kept working night and day to sustain the interest. Even the Breckenridge trouble does not much excite it. The mine workers have heard before of persons who tried to violently drive out nonunion men and got themselves into trouble and they regard the matter at Breckenridge, or rather at West Natrona, as probably the natural outcome of such attacks.

S. Norman Adams, superintendent of the Allegheny Coal and Coke Co., has filed suit against Philip Murray asking $50,000, charging that Mr. Murray wrote President Wilson a letter making false and defamatory statements. The letter of Mr. Murray is said to state that Norman Adams was not more than 20 ft. away from Mrs. Sellins when he ran up to his deputies and ordered them to kill her. It also says, it is alleged, that Mr. Adams went up to the body and dragged it by the heels to an automobile and threw it into the machine.

Say Union Will Make the Miners Poor

Two lodges in the Williamson field have within the last few days adopted resolutions protesting against the institution of a local or locals of the United Mine Workers in that neighborhood, the vote at one secret lodge at Freeburn being unanimous. At the other there were only two votes cast against the resolution. The resolutions adopted recite that it has been the experience of members of the lodge who have worked in or about organized fields that the "loss of work, loss of money, suffering from lack of food and bloodshed during strikes, stirred up by radical agitators, far exceeds any benefits that the layman might have anticipated that he would derive therefrom."

Organizers of the mine workers recently attempted to bring the workmen at Freeburn into their union, but the effort was futile largely because of the indifference and opposition of the men to whom the appeal was made.

As recorded the miners in the Kanawha district of West Virginia were nearly all on strike during Sept. 4, 5 and 6 when many of them joined a mob for the invasion of the Guyan field. Virtually all were back at work on Monday, Sept. 8; yet there were still threats among those, who had been implicated in the uprising and who had been forced by Governor Cornwell to return to their homes, that at the first opportunity they would again organize and mobilize for another invasion of the Guyan field unless they were allowed to have their way in forcing it into the union.

In other words, there was no spirit of repentance displayed, it being evident that the miners were still bent on making trouble. In the following official statement, made by Governor Cornwell on Monday, Sept. 8, fair warning has been given of what may be expected, if any further disorder takes place:

"The incident of the past few days which has unfortunately placed the State of West Virginia in a very unfavorable light before the country, is the inevitable outcome of persistent radical propaganda to which I have frequently referred in public addresses during the past few months, and is the logical result of newspaper articles and utterances of agitators and political demagogues who were diligent in telling the wage-workers that their liberties were being assailed whenever a measure has appeared in the legislature designed to protect human life and to preserve the public peace.

"The sudden uprising of a large body of armed men was carefully planned by some person, or persons, whose identity it is the duty of the officials of the United Mine Workers as well as public officers to establish. Runners went through the Kanawha coal fields and presidents of several local unions summoned special meetings telling members the order had come from 'headquarters' to arm and assemble.

"I know of some cases where members inquired who brought the order, and the local officers of the miners' union replied that they did not know, and could not produce any official documents. The wildest and wierdest stories were circulated, one being that Fred Mooney, district secretary of the United Mine Workers, had been assassinated in Logan County, these rumors all being spread for the purpose, of course, of inflaming the minds of the men.

"When I went among them in the mountains Friday night, spoke to them and had some of them appeal to me with distressed countenances to know 'Is it true that they are murdering women and babies over in Logan County?', I saw how earnest and sincere were some of these men and how grossly deceived they were by the promoters of the plan, and I made up my mind, because of their innocence and misinformation, that no force should be used to stop the invasion if it could possibly be avoided.

"I assured the men that night that if they would disband then and go home I would investigate the conditions and practices in the Logan coal field and that if any of them were unlawful I would do my best to see that they were corrected and that I confidently believed I could secure that result. I left them in confident belief that they would respond to my appeal and disband.

"While the majority at that meeting did return home, part of them ignored my proposition and took up their march. Though the men who so continued to march did not keep faith with me, I intend to keep faith with them and will make a thorough investigation of the conditions in the Logan field. The Coal Operators' Association over there has wired me, also, demanding such an investigation.

Keeney Discomforted the Bolshevists

"At the time I was at the meeting, I knew that it was a carefully organized and deliberately planned movement and that those directing it were under no misapprehension. I further knew that the officers and citizens of Logan County were arming and preparing to resist the invasion of those armed men, and that many of the Kanawha men would be marching to certain death if they persisted in their unwise course. So I took no chances. I communicated with Secretary of War Baker. In consequence General Leonard Wood, commanding the central military department of the United States army, immediately arranged to send troops into the affected districts. They were held in readiness to move on a moment's notice, and would have been thrown into the affected area on my request in a very few hours.

"Of course, I am most grateful that the final step was not necessary and it is but fair to say that the termination of the unfortunate affair without bloodshed is due to the energy and efforts of Frank Keeney, president of District 17, United Mine Workers of America, whose appeals were finally heeded.

"This I want to emphasize: This thing, or anything like it, must not occur again. Extreme patience was exercised for the reason I believed that it was due to misinformation given by a few to the many, but there can be no excuse for any similar misunderstanding on the part of anybody hereafter. Any future march of armed men across this state bent upon invading another county and breathing threats to shoot up people will be regarded as an attempt at revolution and will be dealt with on the instant as such. I want this statement to be understood in its fullest sense by the people of the state in general and any other like minded persons in particular, in order that all may know what to expect in the future."

The insurgent miners of Illinois are continuing in spasmodic fashion their resistance against the authority of United Mine Workers' officers and are keeping up their strike against the enforcement of the penalty clause contained in the contract with the operators. While the authorities are gradually bringing greater repression to bear upon the "armies" which have taken the field to "pull out" the miners who have remained at work, the work of reorganizing the locals whose charters were revoked is proceeding in some localities. The reorganized locals are composed of men who are loyal to the organization. In this manner the radicals and agitators are to be frozen out.

All Three Armies Failed to "Pull Out" Men

The "first army," which started from Belleville, with the Carterville district as its goal, was captured by the sheriff and a posse when it approached Pinckneyville, in Perry County, and was escorted back to the Randolph County line, where the sheriff of that county and a posse took it over and escorted it to the St. Clair County line. The retreat was not halted until Marissa was reached. From there all but a handful of the men returned to their homes. A later attempt of another group to get into the Carterville district on a freight train was likewise unsuccessful, the invaders being captured and placed on another train and sent back whence they came.

The "second army," which started from Collinsville, came to a halt near Staunton, where the remnant of it is awaiting the action of the Cleveland convention. The "third army," which started south from Springfield, has made little progress.

Operators of the Standard field met at Belleville and decided to call upon Governor Lowden for protection of their property and employees. The effect of this was to cause the Belleville and St. Clair county authorities, which had been rather indulgent with the strikers, to take steps to restrain their activity in interfering with those who want to work.

The strikers have called another State convention to be held in Belleville. Their last convention, held in Springfield, voted to return to work, but the radicals, led by the Belleville and Collinsville groups, started a new rebellion against their own representatives and continued to strike.

Conditions are gradually becoming normal in District 18, United Mine Workers of America, which comprises Eastern British Columbia and the Province of Alberta, and according to reports received by the Minister of Labor up to Aug. 25, 31 of the leading coal mines of the district are again being worked. This represents 60 per cent of the total output. While some opposition still is being experienced by the officials of the United Mine Workers from advocates of the One Big Union idea, the resistance of the latter appears to be declining.

The books, papers, and monies, that are the property of the International Mine Workers of America, District 18, and which were in the custody of Edward Brown, secretary of the International of Calgary, who later transferred his allegiance to the O. B. U., have been handed over to International officers. The latter have left to attend the convention to be held at Cleveland, Ohio, at which it is expected there will be some representation of District 18, if it can be arranged.

"One Big Union" in District 18 Is Dead

The Coal Commissioner, W. H. Armstrong, in a recent statement said that the O. B. U., as far as District 18 is concerned, is nonexistent. He asserts that the miners who forsook the international union are seeking reinstatement, and that their applications are being granted in the majority of cases. He said that the men are going back on exactly the same terms as they were working before, but that when they were in a position to sign a contract it was likely that a new agreement would be entered into between them and the mine owners. During the strike between 8,000 and 9,000 men were idle, and the wives and families of the miners suffered to a considerable extent. The mines, however, were not materially affected, and while it might be a few weeks before full shifts can be taken back, they all would be working in the near future.

Fortunately, it is said on good authority that there will be no shortage of coal this winter in the area which is accustomed to get its coal from District No. 18.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

A Modified System of Longwall

Letter No. 5—It gave me great pleasure to read the remarks of W. H. Luxton, *Coal Age*, July 31, p. 201, in answer to my comments on his previous letter regarding the working of coal by the longwall system, under a light or shallow cover. I was thoroughly convinced that Mr. Luxton's first letter did not convey his real meaning, which he has now explained more clearly. It would be well for all of us if we could act in the same straightforward manner and reply to our critics in the way in which Mr. Luxton has done, which is not only a credit to the man but shows him to be broad-minded and practical.

Referring to his statement concerning the "willful waste of coal in the use of the room-and-pillar system of mining, owing to the pillars that are left unworked because they cannot be recovered with safety, or because they are needed to support the surface and prevent damage to buildings." I want to say that my own personal observation enables me to endorse every word of this and to add that such waste is nothing short of a crime when one considers the value of the coal.

Too often it happens that rails, ties and trolley wires are buried in such workings beyond the hope of recovery. When making a general inspection of room-and-pillar workings under a great depth of cover I have frequently observed much pillar coal that could not be recovered, besides iron rails and even an occasional car that had been caught in the squeeze or buried under a heavy fall of roof.

Pillars Lost in Squeeze Reported Extracted

There are many instances where these lost pillars are reported, by mine foremen, as extracted when the mining engineer comes around to make his survey to extend the mine map and bring it up to date. The only way in which such reported extractions of coal can be checked up is for the mining engineer to take close measurements of the thickness of the coal, at numerous points, when making his survey.

When the necessary measurements are put on the mine map it is possible to calculate the amount of coal that should have been taken out, and to compare this with the total output of the mines since the last survey was made. When this is carefully done, the results will show the great loss sustained by the foreman's failure to extract all the pillars.

Again, by means of a careful taking account of stock, at regular intervals, at a mine, and comparing this with the supplies purchased, it is possible to show what weight of iron rails and how many cars, trolley wire, tools and other equipment have been lost in the mine.

I fully agree with Mr. Luxton in the emphasis he places upon "the need of eliminating wasteful methods of mining and burning coal." The time is fast approaching when the matter of total extraction will have to be considered seriously. But, in the meantime, it is a disgrace to the coal-mining industry that so much of valuable fuel is lost beyond recovery.

In closing, let me say that wherever the thickness of the seam does not exceed the maximum for longwall working there is no system of mining that will compare with that method in respect to the completeness of extraction and safety in mining. No system can afford better ventilation of the working places, or greater concentration of the work, or less damage to the surface, or a lower cost of production, than the longwall system of mining.

ANDREW O. BAIN.

McKeesport, Penn.

Work of Gathering Locomotives

Letter No. 2—Referring to the inquiry that appeared in *Coal Age*, July 24, p. 164, concerning gathering motors, I agree with the statement that previous articles have dealt mainly with features of design of which the practical man knows little. The advanced theory of coal conveyance makes this subject an important one. Even in the same mine, motors vary in the amount of work they will perform because of grades and conditions of track. Also different conditions exert an influence where loaded cars are handled in place of empties.

The question of gathering loads and returning empty cars must be given great weight, because the motorman must at all times be in such a position on the locomotive, when going after loaded cars, as to be able to couple such cars without the assistance of the helper or triprider. This leaves the brakeman free to keep empty cars clear of the motor on its return from the face of a room or entry.

The mine where I am employed at present as gathering motorman has endeavored to use some two or three systems for gathering cars at the face. The most successful of these, all things considered, is the one that I am using at present. This has proved to be a time-saver, and, furthermore, the work is more equally divided between motorman and triprider. The accompanying illustrations. Figs. 1 and 2, show the methods that were tried. Of these the latter has proved the most efficient, everything being taken into consideration.

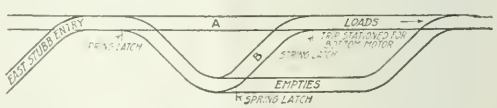


FIG. 1. SHOWING TRACK ARRANGEMENT FOR GATHERING CARS

Following the theory that the gathering motor must take the place of the mule, it seems a rather difficult matter, to the average mining man, that he must replace the old switches with longer ones and that more ties

must be placed under the rails, even in the rooms. Every joint must be fishplated because of the friction between the locomotive wheels and the rails, especially where sand is often used. Without fishplates it will only be a matter of time until the rail is pulled from the joint tie.

I would suggest that a No. 2 frog be used, as its length would enable the cars to pass in and out of the switch without binding, thus decreasing derailments. Guard-rails should be used on both sides of the frog, on the main entry and in rooms. Some difficulties are sometimes encountered at the faces of working places where short rails or "jumpers" are in use to enable loaders to get their cars near the face.

From my own observation I would say that, on the average, one of these cars is derailed in every working place each day. This entails a marked decrease in the daily tonnage. Where it is possible I think the motorman should be used in repairing the track over which he hauls cars.

The motor, in one instance with which I am familiar, is a 5½-ton Ironton machine with Edison batteries and

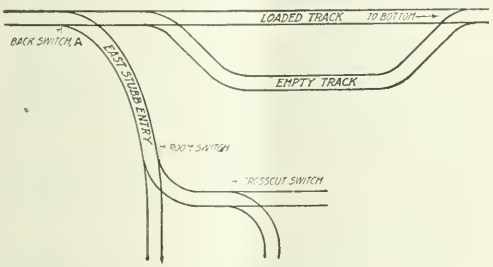


FIG. 2. SHOWING ANOTHER ARRANGEMENT OF TRACK

a General Electric armature. This combination, I can say, without fear of contradiction, has proved itself efficient; and its work has been accomplished beyond all expectations. The grade, is from 5 to 8 deg. against the loads. Formerly it took a good mule to pull one car, now the motor pulls five and six cars a length of 20 rooms, the distance between rooms being about 40 ft., making the round trip 1600 feet.

Now, the motor pulling five cars per trip, averaging a trip every 25 min. or say 20 trips in 8 hours, would haul 100 cars. The track conditions are far from being good, while other disadvantages are in proportion. The cars are equipped with plain bearings, are box shaped and have a capacty of 3 tons each. They are provided with a hook-and-link type of couplings.

The management of any mine should, so far as possible, avoid changing motormen and tripriders, because of the difficulties encountered by these men in familiarizing themselves with all working places. This is especially true with the motorman, because he should know where all the different grades are as well as the bad track conditions.

Also, another great advantage in saving power, which is essential where the motor has to economize in order to last the full shift, is that power should not be applied while the reverse is set for the opposite direction; or, in general, "plugging" should not be resorted to.

While the machine is not in motion the motorman should examine his locomotive to see that every bolt is in place. Larger fuse wires than necessary should not be employed. The motorman will do well to furnish himself with tools to make minor repairs that would necessitate some delay waiting for the electrician.

Tools for placing derailed cars on the track should consist of one "dollie," or "dog", made of 1½-in. square iron, so clamped to the rail as to enable the flange to right itself, together with an oak block cut in a "V" shape and fitted with ¼-in. strap iron; also a chain about 10 ft. in length.

CLAUDE W. CARRUTH.

Edwardsville, Ill.

Perpetuating the Thrift Habit

Letter No. 2—I have been looking over some of the back numbers of *Coal Age*, and am not a little surprised to find that a subject of as much importance to the coal industry as the *thrift habit* among miners should receive no more attention than what has been given it by the single letter of W. H. Noone, which appeared in the issue, Apr. 24, p. 765.

Although the question of thrift has been given much thought by some of the ablest thinkers, generally speaking, the thrift habit is in its infancy among American miners. Attention was brought to this matter at the beginning of the great war, since which time the press generally has urged the necessity of cultivating the habit of thrift among all classes of labor.

Employers of Labor Can Inspire Thrift

The Foreword that appeared in *Coal Age*, Feb. 6, emphasized the need of coal companies doing everything in their power to inspire thrift among their employees. This was a step worthy of the mature consideration of all employers of labor, but of none more than of those who control operations underground. It is this class of workers who, by reason of their surroundings, are prone to shiftless habits. The figures given in the Foreword mentioned show that, through patriotic motives, millions of the families of the country are practicing thrift by methods of economy that enable them to invest in Thrift Stamps and Liberty Bonds.

To my mind, one of the great questions that confronts us today is, How can this habit of thrift be perpetuated? Now that the war is over, we wonder if the same interest will be taken by coal companies and other employers of labor to inspire the thrift habit among their employees, in the same patriotic spirit that was manifested during the four years of the war.

As has been suggested, coal companies can perform a national service in building up and fostering habits of thrift among their men. Because of their superior knowledge of finance, employers of labor are in a position to wield a strong influence over their employees, and it is to their interest that the latter should cultivate and practice habits of economy at home and at work.

The Miner With a Savings Account

The average miner, having once started to save his earnings, is first interested in observing the growth of his bank account, and it is not long before he begins to think of owning his own home, which fact makes him a more reliable and steady worker. This is in strong contrast with the thriftless attitude of miners who shift from place to place and become the tools and prey of men whose sole object is to stir up strife by causing discontent among their fellow workers.

In his letter to which I have referred previously, Mr. Noone says, "The incentive of ownership of property

is a strong factor in perpetuating thrift." Experience has proved that miners who own their own homes are more reliable and valuable as workmen. They make better citizens, being interested in schools and churches, and are generally active in elevating public morals. In any issue that may arise between them and the company, they are more reasonable in their demands and take less interest in propaganda designed to engender strife and dissatisfaction. Nothing will stimulate a man's citizenship more than the consciousness of being a part and parcel of the community in which he lives and responsible for its peace and security.

In concluding, let me say that before habits of thrift can be perpetuated they must be created, cultivated and developed as national characteristics of American citizens. American miners have long been indifferent in respect to laying anything by for the future. Many have contracted extravagant habits that will be extremely hard for them to overcome.

While all miners made big money during the war, the most of them know little in regard to its safe investment and will have to be educated in that direction. There is no more opportune time than the present to begin the work of teaching our miners to live and plan for the future and to lay by something for the proverbial "rainy day." Let us urge all coal companies to take up this matter at once and devise ways and plans by which thrift habits can be fostered among miners.

JOHN ROSE,
Dayton, Tenn. Former State Mine Inspector.

Barometer vs. Outflow of Gas

Letter No. 7—I have been much interested in the discussion of the various subjects that appear each week in *Coal Age* and, particularly, in that relating to barometric pressure as affecting the expansion of gases accumulated in abandoned areas in mines. These practical talks, giving the experiences of the other fellows who are doing things, is just what the average mining student requires and he cannot have too much of it. The exchange of ideas and opinions invariably brings out many points of interest that are not to be found in any of the usual textbooks on mining.

In many instances, theories and conclusions are expressed that are the outcome of long and varied experiences. Textbooks are all right in their place, but the majority of them are so confusing that an average miner is often at a loss to understand their meaning when studying to fit himself for a higher position in life. But practical talks and illustrations, such as are given in the discussions and inquiries that appear in *Coal Age*, are just what men want.

Theoretical Value of Barometric Readings

A considerable experience in the management of coal mines in Canada and serving, until lately, as district inspector of mines in British Columbia, have caused me to take a deep interest in the subject of barometric pressure, in its relation to coal mining. No student of mining will discount the reliability of Boyle's or Mariotte's law, giving the relation of the pressure and volume of air and gases; or the law of Charles or Gay Lussac, defining the relation of their temperature and volume. The former law was stated something like two and one-half centuries ago and the latter is at least a century old. During all that time, these laws have stood the test of clever and practical men.

But, returning to the practical consideration of the effect of changes in barometric pressure on accumulations of gas in mines, let me say that the ventilation of a mine should be such that any possible changes in atmospheric pressure would not, in any way, prove a menace to the general safety of the mine and the workers therein. No practical mining man will attempt to say that the barometer and thermometer are without practical importance, in the study of mining problems. I believe, however, that their use should be confined to the laboratory.

In order to make clear my meaning, let me say that in my opinion, wherever these instruments are required to indicate the approach of danger in a mine, there is something radically wrong in the system of ventilation employed in that mine. Either that is true or the ventilating unit is too small for the mine. In other words, whenever a fall of barometric pressure is considered seriously in connection with maintaining safe conditions in a mine, I would say that the ventilation in that mine is inadequate.

Practical Side of the Question in Mining

My theory is that it is not good mining practice to permit a mine to get into such a condition that it becomes necessary to worry over a slight fall of the barometer. Under normal working conditions, it is an unpardonable practice to allow the accumulation of large bodies of gas, either in the abandoned workings or any other portion of a mine. While there may be exceptions to this rule, I am inclined to think that they are few and far between.

Most of our mining laws very properly require the keeping of daily records of atmospheric pressure and temperature, which are of value in the study of such records. But, where a mine is properly ventilated and the volume of air is sufficient to dilute and render harmless the gases produced in the workings a mere fall of one inch of the barometer need not be taken seriously, and the same statement will apply to a fall or rise in the temperature of the outside air. Wherever there is any cause for alarm from such occurrences, I claim it is time for the inspector of mines to require some drastic changes to be made that would increase the volume of air passing through the mine to improve its ventilation.

Special Conditions in Mining Practice

No doubt, conditions will, at times, make it impossible to dilute the gas generated in a mine rapidly enough to prevent an accident; but such conditions are not normal. For instances, the severe bumps that so frequently occur in the Crow's Nest Pass district and, with less severity, in the Jasper Park collieries, Alberta, are accompanied with unusually heavy outflows of gas into the mine workings. Conditions such as these are exceptional, and yet I question if the barometer or thermometer has ever been of any practical use in reducing the danger arising from the conditions prevailing in these mines.

To avoid danger, it is our practice, in the Jasper Park collieries, to keep the circulation at all times above the average requirements and, as a result, the effect of a rise or fall of barometric pressure is seldom if ever noticed, which should be the case in all mines generating explosive gas. My suggestion is that future mine man-

agers (foremen) should study carefully the causes and their effects in mines; but, in practice, it is of the utmost importance to so arrange the ventilation as to prevent the accumulation of gas, and one will not then lie in bed at night fighting the battles of the day.

There are cases where peculiar local conditions will modify the volume of air passing through the mine, particularly in the winter months. The point that I wish to emphasize, however, is that it is not good mining practice to ventilate a mine on a narrow margin of safety. Hardly any mine can be truthfully said to be exempt from the possibility of a sudden outburst of gas, and justice to mine workers requires the taking of all possible precautions against such occurrences.

Where a mine generates sufficient gas to warrant the use of safety lamps the gas feature should predominate in all safety considerations. Gas is something that should not be trifled with in the operation of a mine. Its existence justifies the most serious consideration of the management.

At no stage of the game, should the miner or laborer be expected to give the gas question the consideration that it demands of the mine manager. He must always provide a wide margin in the ventilation of the mine, which must be so arranged that the volume of air can be increased at any moment to meet any abnormal condition that may develop in the workings.

J. H. McMillan, Gen. Supt.
Jasper Park Collieries, Ltd.
Pocahontas, Alta., Canada.

Markers on Mine Trips

Letter No. 1—I was greatly surprised to read the statement of J. J. S., contained in his inquiry, *Coal Age*, Aug. 28, p. 379, regarding the conditions he has described as prevailing in the mine where he is employed, where he says a steam locomotive is used on the main haulage road to haul cars in and out of the mine.

With the adoption of present-day mining laws in the different states, and with the great advance that has been made in the operation of coal mines in the interest of health and safety, it would seem incredible that any mine is being run after the manner described by this correspondent.

Use of a Steam Locomotive on a Mine Haulage Road Condemned

In the letter to which I refer, the statement is made that the smoke given off by the locomotive operating on the haulage road makes it impossible to see the rails, at times, when walking in and out of the mine. Such a state of affairs is what we might expect or believe to have existed a half a century ago, and I heartily agree with the editor's reply that such a practice should not be permitted in any mine. Also, that refuge holes and proper clearance space should always be provided at the side of a main haulage road to enable men to safely pass the cars hauled in and out of the mine. I would add that these refuge holes should be kept whitewashed, so that they can be readily seen, and not be permitted to be obstructed by refuse and other material.

Not the least surprising to a mining man is the fact that the inspector of mines in that district would tolerate the condition of affairs described by our friend, which it must be said is nothing short of a menace to every man employed in the mine. If a steam locomotive must be run into the mine, it should only be permitted to operate on the return airway and the quantity of air in circulation should be sufficient to dilute the gases and sweep away the smoke and keep that road clear for the safety of the engineer running the locomotive. A law should be made and enforced prohibiting men from traveling such a road and compelling them to use a special travelingway, or pass in and out on the intake air-course when going to or from their work.

Electric Siren or Whistle a Good Alarm on a Mine Locomotive

In regard to the use of some effective means to warn men of the approach of a mine locomotive and enable them to reach a place of safety in time to avoid accidents, in mines where men must travel a haulage road, allow me to suggest that a whistle, or an electric siren operated by a special battery on the locomotive, will give out a distinct and peculiar sound that will be heard at a great distance and will not be confused with other noises such as the rattling of cars, which the sound of a gong too often resembles.

It is well known that some sounds carry farther than others. During the war, aviators have proved the fact and tell us that the bark of a dog can be heard at a greater distance than the noise of heavy artillery firing. Although this statement appears to be somewhat exaggerated, it emphasizes the fact that a shrill sound, as that of a siren, is penetrating and can be heard over a large district. The use of a siren on a mine locomotive would have a special advantage over a headlight, which could not be seen around a curve in the track.

McKeesport, Penn. Engineer.

Lawful Examination of a Mine

Letter No. 4—I heartily agree with the statement of Robert A. Marshall, *Coal Age*, Aug. 21, p. 334, to the effect that the examination of a mine should begin not more than three hours before the men enter the mine. In this connection, allow me to describe a system employed in a mine where, I recall, two firebosses were employed, one during the day and the other during the night. The day fireboss worked from 9 a.m. to 7 p.m., and the night fireboss from 9 p.m. to 7 a.m.

In the dayshift, the dayman makes the regular rounds of a day fireboss from the time he starts at 9 a.m. till 4 p.m. At that hour, he starts to examine the mine for the nightshift, completing the work at 7 p.m., in time for that shift to go to work.

Likewise, the night fireboss comes on at 9 p.m. and makes his regular rounds of the working places till 4 a.m., when he starts to make his examination for the dayshift, completing the examination by 7 a.m., in time for the daymen to enter the mine. This system has the advantage over that in general use, in that it gives to each fireboss a full day or night shift, instead of part day and part night.

Another advantage is that it gives more time and a better opportunity for the careful examination of each working place, and makes it possible for the fireboss to remove any dangers that he may find, at the time they are discovered, instead of marking off the place with a danger board, according to the present custom. The system also permits the two firebosses to work in con-

junction with each other and gives a better control of any danger that is found to exist, as there is no long period of time that must intervene between the finding of danger and its removal.

It may be argued that this system would increase the cost of operation over the old system where a single fireboss performs the entire work. In reply, let me say that the increased cost of two firebosses would be largely compensated by the reduction that would result, in the payment for accidents and loss of time in the operation of the mine. The system would certainly comply with the letter of the law and give a larger margin of safety than the one now in use.

The frequency with which I have observed accidents occur in the afternoon when no fireboss was on duty has led me to think that many miners are prone to become careless in the absence of the fireboss. Moreover, if a fall occurs in the air-course, or the fan has been stopped at some time during the night, the fireboss has little chance, under the old system, to remove the resulting accumulations of gas in the workings, in the three hours he is allotted to make his examination. As a result, the men are held back and the day's output reduced.

With others, I hope to see this subject fully discussed and would like to know the opinions of *Coal Age* readers, in respect to the system just outlined. The discussion cannot fail to promote a deep interest in the duties of the fireboss, who assumes a heavy responsibility when compelled to examine a large territory in a short space of time and remove whatever dangers he may find. FIREBOSS.

Johnstown, Penn.

Letter No. 5—This is a very interesting subject in coal mining and one that should arrest the attention of every mine worker, especially foremen and firebosses, or "mine examiners" as they ought to be called.

The mine examiner should be one of the most efficient men working in and around a mine, because the safety of every man underground depends on the thoroughness of the examination of the workings to detect and remove any dangers that may exist in them. It goes without saying that he should be sober and intelligent and understand every detail of mining work affecting safety. This includes a practical knowledge not only of gases but of roof conditions and methods of timbering rooms, airways, haulage roads and traveling ways.

Examination To Begin Not More Than Three Hours Before Work Starts

Speaking of the lawful examination of a mine, it is my opinion that an examiner should not be permitted to commence his examination more than three hours before the men enter the mine for work. Even in that time, changes in atmospheric pressure and roof conditions are liable to occur that may make a man's place dangerous for work. The barometer may read 30 in. in the evening, say at 9 or 10 p.m. and fall to 29.5 or 29.3 in a few hours.

To avoid a possible sudden fall of the barometer during the night developing a dangerous condition in the mine workings, which would not be detected if the work of the examiner were done earlier in the evening, all mining laws should state that the examination of a mine shall not begin more than three hours before the men go to work. This provision is especially needful where a mine gives off large quantities of gas and has broken roof conditions and abandoned areas in which gas may accumulate.

Reference has already been made to the Illinois Mining Law permitting the examination of a mine to be made "eight hours" before the men enter the mine for work. I fully agree with the suggestion that this is entirely wrong and should be condemned. It is all right that there should be a night examiner at work in the mine, who would be able to detect whatever might be wrong and remove the danger before much damage resulted.

Danger from Ignition of a Gas Feeder

It may happen that a miner would light a feeder of gas when firing a shot before going home. He takes a chance and goes away assuming that everything is all right. If there is no nightman in the mine, the first men in, in the morning, would find a bad fire in progress and the mine would be thrown idle that day and perhaps longer, waiting for the fire to be extinguished and the mine made safe again for work.

The employment of a night examiner to avoid the danger that might arise from unexpected occurrences in the mine should not, however, be interpreted to mean that the examination of the workings should take place at any time during the night. The work of examining a mine, to insure the safety of every man's place before he is permitted to proceed to work, should be limited to a space not exceeding three hours.

In my experience in this work, I have seen dangerous conditions develop, after the examiner had performed his work in this short space of time and before the men entered the mine for work. In one instance, a bad roof fall cut off the ventilation from a whole section of the mine and the places filled with gas. Fortunately, that mine was worked exclusively with safety lamps and the first men in, in the morning, were able to see that something was wrong and gave the warning that saved many lives.

Mine Examiners Are Given Too Much Territory

The chief trouble in the examination of a mine is due to the examiner being given too large a territory to look after and he is unable to give the proper attention to the number of working places that he must examine, to say nothing of the old workings, manways and traveling roads in his section.

In Great Britain, no mine examiner is permitted, by law, to have more than forty places to examine, which gives him ample time to make a thorough examination of every place and observe the condition of the roof and timber, make the test for gas and note the ventilation in each place. He is then able to give a conscientious report of the inspection.

Referring to our own mines here, nightmen are often at work on the road, timbering and cleaning up falls and, occasionally, hauling the loaded cars to the shaft bottom, so as to insure a good start in the morning. When this is the case this work is mostly done by the time the fireboss or examiner enters the mine to make his morning examination. But in any case, the nightmen must be out of the examiner's way and withdraw from those places in the portion examined, so as to insure that no door will be set open by a nightman, but that everything will be left undisturbed after the examiner has performed his work.

Forty Fort, Penn. FIREBOSS.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Terms in Mine Timbering

Kindly explain the meaning of the terms "square set" and "skin to skin," used in mine timbering.

Scranton, Penn. STUDENT.

The expression "square set" is mostly used in shaft timbering and describes a variety of framing used in large excavations to support heavy pressures. The timbers of a square set are boxed into each other, the joints being carefully made to insure a snug fit. All the joints are designed in a manner to resist pressure from any direction. This form of timbering is naturally expensive and only used where the size of the excavation and other conditions require. The expression "skin to skin" means that the different sets of timber are placed close against each other.

Half-Soling Mine-Car Brakeshoes

Recently, attention has been drawn, by numerous references in *Coal Age*, to the advantage gained in repair work by the use of electric welding. The adaptability of this means of welding has advanced so rapidly within the past few years that, today, there would seem to be no limit to its application and usefulness in every industry employing mechanical equipment and particularly in coal mining where many operations are conducted in isolated districts and there are no repair shops at hand.

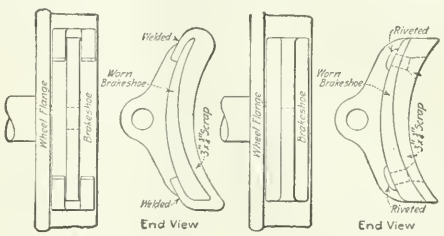
In isolated localities there is always a possibility of the entire plant being thrown idle, for days at a time, because of a breakdown in some part of the machinery or other equipment. Not only is this loss of time avoided in many instances, but the cost of repairs is very greatly reduced by the use of electric welding to mend broken parts or restore worn surfaces.

In coal mining, there are many opportunities to apply the electric welding process in the restoration of worn-out equipment that would otherwise go to the scrapheap. In this connection, it has occurred to me that one instance of its application that is worthy of notice is to be found in the restoring of worn-out brakeshoes and making them fit for continued service.

As is well known to mining men, the brakeshoes on mine locomotives and cars are subject to rapid wear and must be scrapped unless some ready means of restoring the wearing surfaces is available. It is my belief that brakeshoes that have been worn so thin that they are almost ready to be thrown away may be given a new lease on life by the use of electric welding and some of the scrap material that is so abundant around coal mines put to a useful purpose. I have found nothing better than a piece of mine-car binder, 3 x ¾ in. in section, to restore the worn surfaces of brakeshoes.

As shown in the accompanying sketch, there are two ways in which this scrap binder can be attached to a worn brakeshoe to restore the usefulness of the latter. On the right of the figure is shown a face and side view of a worn brakeshoe that has been restored by rivetting to its face a piece of 3 x ¾-in. car-binder.

While the method of riveting this scrap material to the worn surface of a brakeshoe has been successfully applied, I concluded that repair work of this kind can be expedited and its cost reduced by the use of the electric-welding process. I have illustrated my idea of the manner in which this may be done in the face and side view, on the right of the figure, where the ends of



TWO WAYS OF REPAIRING WORN BRAKESHOES

the scrap binder are bent over and welded to the back surface of the brakeshoe. This method of attachment would eliminate the more tedious process of riveting the scrap material to the shoe and would doubtless prove more serviceable and cheaper, if it can be accomplished in a suitable time and at a reasonable expense for the necessary equipment and skill required in its operation. As I have never seen this method tried, it would be interesting to learn the opinion of *Coal Age* and its readers in regard to the feasibility of this suggestion. C. W. STAFFORD.

Huntington, W. Va.

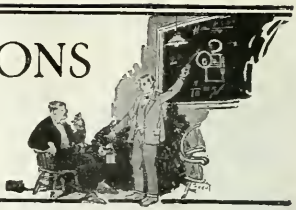
The suggestion of this correspondent is a good one and will be appreciated by all whose use of such equipment makes it easy to understand that a great saving in repair costs can be effected by some such practical method of restoring the worn surfaces of brakeshoes.

Undoubtedly, the electric-welding process can be used effectually to accomplish this work. It would certainly be more readily applied and prove more serviceable in the end than the method of riveting mentioned by Mr. Stafford. However, some of our practical mechanics who have had experience in electric welding will be able to suggest the best method of applying this process in the welding of scrap material to the brakeshoe, possibly without the need of turning over the ends before welding, as illustrated in the figure.

Some will no doubt suggest restoring the worn surfaces of brakeshoes by the use of welding rods especially if scrap material of the kind required is not available. We hope to hear from many on these points.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD



Anthracite Foremen's Examination, Lykens, Penn., May 6, 1919

(Selected Questions)

Ques.—What means of communication are required between the tops and bottoms of shafts and slopes and to the engineers, at all collieries?

Ans.—The anthracite mine law (Art. 4, Sec. 9) requires that all shafts and slopes shall be provided with a suitable means of communication by speaking tube or telephone between the top and bottom of a shaft and an efficient means of signaling from the shaft bottom to the engineer in charge of the hoisting engine.

Ques.—What are the requirements with reference to examinations of attachments between ropes and cages, cars, etc., and the end of the rope?

Ans.—The ropes, safety catches, links and chains employed in hoisting and lowering persons in shafts or slopes must be carefully examined by a competent person appointed for that purpose. The examination must be made every day the apparatus is in use, and any defects found must be remedied at once. (Art. 4, Sec. 13.)

Ques.—What are the provisions for brakes on drums of hoisting engines, and what must be provided to prevent the rope from falling off the drum?

Ans.—An efficient brake (Sec. 14) shall be attached to every drum used for hoisting or lowering persons or material in any shaft or slope. The drum must be provided with flanges or horns of sufficient dimensions to prevent the rope from slipping off the drum (Sec. 15), and these must be properly attached to the drum.

Ques.—How shall the tops of shafts be guarded and when shall the tops of slopes be guarded; what must be done on each lift?

Ans.—The top of each shaft and of each slope, if dangerous (Sec. 6), and any intermediate lift shall be securely fenced off by railing or by vertical or flat gates, and (Sec. 7) every abandoned slope, shaft, and drift shall be properly fenced around or across its entrance.

Ques.—When a shaft or a slope has been idle for some time what must be done before men are permitted to be hoisted or lowered into the mine?

Ans.—Art. 14, Sec. 2, requires notice to be sent to the district mine inspector whenever work is to be recommenced in a mine that has been standing idle for a period exceeding three months. It will also be necessary to have the mine thoroughly examined by competent firebosses and safety inspectors to see that the working places, travelingways, roads and air-courses are in proper condition and the mine safe for work. The examination must also be made of all hoisting and safety equipment.

Ques.—(a) What are the requirements of the mine law in regard to charging holes in coal and rock, for blasting: (b) When a charge misses fire? (c) What duty must the miner perform before and after firing the shot?

Ans.—Art. 12, General Rules, provides as follows:

(a) Rule 30 requires that no iron or steel-pointed needle shall be used in charging holes for blasting in slate or rock, in any mine; and no tight cartridge shall be rammed into a hole in coal, slate or rock, with an iron or steel tamping bar, unless the bar is tipped with at least 6 in. of copper or other soft metal.

(b) Rule 31 provides that when a charge in slate or rock misses fire, it shall not be withdrawn or the hole opened.

(c) Rule 33 requires that a workman about to fire a blast shall give a sufficient alarm and notify all persons in danger from the blast he is about to fire. The alarm must be given before and after lighting the match.

Also, Rule 34 requires a miner, before commencing work and after firing a blast, to enter his place and examine its condition before permitting his laborer or assistant to enter.

Ques.—(a) What are the provisions of the law for removing bodies of gas? (b) What is the duty of a workman when gas is ignited in his working place?

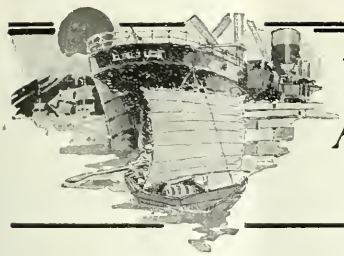
Ans.—(a) An accumulation of gas (Rule 37) shall not be removed by brushing, where it is practicable to remove it by erecting a brattice.

(b) When a person has ignited a gas feeder, by a blast or otherwise (Rule 38), he shall extinguish it immediately if that is possible, and then notify the mine foreman or his assistant. The rule also provides that workmen must see that no gas blowers are left burning when leaving their working places.

Ques.—(a) Who shall have charge of the mine ventilation, and what is the minimum quantity of air he must furnish for each person employed in the mine? (b) How often must the air be measured and to whom must reports be sent?

Ans.—(a) The mine foreman shall have charge of all matters pertaining to ventilation (Art. 12, Rule 3), and the speed of the ventilator shall be particularly under his charge and direction. The minimum quantity of air (Art. 10, Sec. 3) shall not be less than 200 cu.ft. per min. for each and every person employed in the mine, and as much more as the circumstances may require.

(b) The quantity of air in circulation must be measused by the inside foreman or his assistant once every week, at the inlet and outlet airways and at or near the face of each gangway and at the cross-headings nearest to the faces of the inside and outside chambers where men are employed (Sec. 15). A report of these measurements must be sent to the mine inspector before the twelfth day of each month, for the preceding month, together with a statement of the number of persons employed in each district. (Sec. 16.)



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

The Chilean Market for Fuel

Changes Brought About by War and Increased Interest of American Capital in Chile Result in a Larger Demand for United States Coal

Since the opening of the Panama Canal has made the west coast of South America so much more accessible, these markets have attained a keener interest for American exporters. The Chilean market for fuel, in particular, has assumed a new importance. Before the war Great Britain dominated the import coal trade of Chile, one of the reasons being that England was the largest purchaser of Chilean nitrate, and boats going out from Liverpool to the ports of northern Chile for nitrate were willing to take cargoes of coal at such low rates that competition by American coal exporters was impossible.

Before the war little American coal had been introduced into the Chilean market, but during the war Chile turned to the United States to supply the fuel which could not be obtained from England. American coal and oil were successfully substituted for British coal, and a demand was established. In the future the advantage afforded by the Panama Canal route should enable American exporters to obtain freight rates on coal sufficiently low to compete with those from Liverpool. The large increase in the amount of American capital invested in Chilean copper, iron and nitrate will tend, under equal competitive conditions, to increase the demand for American fuel and to augment the amount of shipping between Chile and the eastern ports of the United States, which will in turn also tend to lower freight rates.

Import Trade During the War

Pre-war figures prove that under normal conditions Chile affords the most important fuel market on the west coast of South America. During 1913 the last year before coal exports from Europe were restricted, Chile's consumption of coal was more than 2,800,000 metric tons, about 55 per cent. of which was imported. Great Britain supplied about three-fifths of this amount; the Australian trade was increasing in volume; the United States supplied only a small portion of the total. The period of the war was characterized by a decrease in total coal imports and by a shifting of the chief source of supply from Great Britain to the United States. The 1914 imports were only affected to a slight degree, but during each of the years of 1915, 1916 and 1917 the imports of coal into Chile were less than one-third of the imports of 1913. During these years also the imports from the United States increased, whereas those from Great Britain were so greatly curtailed that by 1917 the relative positions of the two countries had been reversed and the United States was supplying more than 60 per cent. of the total imports.

Crude petroleum, the use of which dates from the comparatively recent introduction of the Diesel engine into the nitrate and mining districts, was imported principally from the United States before the war. During the normal year of 1913, the consumption amounted in approximately 400,000 metric tons, all of which was imported, but during the war oil was substituted for coal wherever possible, and consequently imports increased until in 1917 they amounted to more than 750,000 metric tons. The United States remained the chief source of supply until that time when petroleum was sent from Mexico rather than the United States because of shipping restrictions.

Only a small amount of coke was imported into Chile prior to the war, but these imports increased until in 1916 and 1917 they totaled more than twice those of 1913. The source of supply of imported coke also shifted during the war; in 1913 more coke was imported from Germany than from any other country, whereas in 1917 the United States supplied more than two-thirds of the amount imported.

The following table shows the chief countries of origin of the imports of coal, coke, and crude petroleum into Chile for the years 1913, 1914, 1915, 1916 and 1917:

Commodities and Countries of Origin	1913 Metric Tons	1914 Metric Tons	1915 Metric Tons	1916 Metric Tons	1917 Metric Tons
Coal:					
England	924,430	527,576	201,718	163,533	72,306
Australia	457,873	516,889	155,541	74,416	45,443
United States	98,979	143,404	51,375	165,457	288,424
All other	59,465	69,690	2,683	4,322	494
Total	1,540,747	1,257,559	411,317	407,708	406,667
Coke:					
German	23,746	20,031	25	....	....
England	13,207	9,588	27,994	54,492	25,480
United States	1,000	1,885	20,172	57,519	72,695
Another	8,381	15,407	1,960	165	21
Total	46,337	46,911	50,151	112,176	98,197
Petroleum, crude:					
United States	319,671	374,008	241,101	587,758	282,157
Peru	82,644	135,852	73,403	113,491	52,863
Mexico	....	....	24,356	54,022	422,842
All other	35	....	206	8	3,051
Total	402,350	509,860	339,066	755,279	760,913

Fuel Imports, by Ports of Entry

The handling and storage facilities of the port of destination are items of importance to the coal or oil exporter. In considering the Chilean market it must be remembered that practically all its ports are open and unprotected with facilities for handling only about 300 or 400 tons of coal per day and that storage facilities are limited. A few of the ports have oil-storage tanks and the necessary equipment for discharging oil from tankers anchored in the harbor directly into these tanks. The agents for a California oil company have oil-storage tanks at Taltal, Antofagasta, Tocopilla, Iquique and Valparaiso.

About three-fourths of the coal and two-thirds of the oil imported into Chile enter through two northern ports, Iquique and Antofagasta. Iquique is primarily an outlet for the nitrate fields of Tarapaca, with which it is connected by the Nitrate Railways. Antofagasta serves as an outlet for nitrate and copper districts and for exports from Bolivia, which are carried down to Antofagasta by the Antofagasta & Bolivia Ry. Valparaiso, the outlet for the industrial and agricultural section of central Chile, ranks third in imports of coal and first in imports of coke. Pisagua, Tocopilla and Taltal, nitrate ports of the north, import large quantities of coal and oil. Caldera and Coquimbo are primarily mineral ports and import coke.

Fuel Produced in Chile

South America is notably lacking in fuel resources. Chile has been the most important coal-producing country of the continent for many years, but the native product is very soft and is said to be about 20 per cent. inferior to good British Australian or American coal. All the coal mined except that coming from the Penco deposits produces a compact coke which, however, is not serviceable for metallurgical purposes.

Petroleum, water power, natural gas and firewood may be used as substitutes for coal. Chile is peculiarly fortunate in its possession of one of these substitutes, namely, its waterfalls, which, however, have not been utilized to any great extent up to the present time but will undoubtedly become an important source of hydroelectric power in the near future. Chile is not so well supplied with other substitutes. There have been numerous reports of petroleum but no oil is being produced. According to a Government report, forests cover more than one-fifth of the republic's total area, but much of this forest land is as yet wholly inaccessible and consequently firewood is not used in Chile as extensively as in Brazil or Argentina.

Despite the fact that importation of coal into Chile was cut to about one-third of the normal amount during the war, it was found impossible to increase native production because of inadequate transportation facilities. The following table shows the number of coal mines in operation during the period 1913-1916, the number of employees, and the gross production, which represents the total output of the mines, for the successive years of the period:

Years	Number of Mines	Number of Employees	Gross Production Metric Tons
1913	17	8,414	1,283,450
1914	17	8,105	1,086,946
1915	17	8,160	1,171,564
1916	15	9,252	1,418,119

Description of Coal Fields

The Chilean coal fields extend along or near the coast from 36 deg. south latitude into the Magellanic lands, the most important mines being at Coronel, Lota, Curanilahue and Lebu. In addition to these more important deposits, small fields, known as the Penco deposits, occur north of the Bay of Arauco in the bays of Coliumo and Talcahuano. There are also mines near Punta Arenas producing an inferior grade of lignite.

The mines at Coronel and Lota are owned by the Schwager Coal Co. and the Lota and Coronel Co., both Chilean concerns. These mines have workings below the sea in horizontal veins 1200 to 1400 meters from shore which a Government engineer claims will be difficult to exploit beyond 1.86 miles. Notwithstanding this limitation, the quantity of coal in sight for the future in these mines is estimated to be not less than 39,600,000 tons. The mines at Curanilahue are owned by the Compañía de los Ríos de Curanilahue, a Chilean company, and the Compañía de

Arauco (Ltda.), a British concern. This field is reported to be the most extensive one in the Republic, but has not been fully developed because of the lack of adequate transportation facilities. The reserve is calculated to be 120,000,000 tons. At present, the only outlet for the coal from these mines is afforded by the railway operated by the Compañia de Arauco, which runs north from the mines to Coronel, Lota and Concepcion. The principal mines in the Penco district are the Cerro Verde, the Lirquen and the Rosal. The coals of this district differ from the others of Chile in that they are more friable and produce pulverulent coke. The mines at the mouth of the Lebu River are said to be the oldest in Chile, but they have been difficult to develop because of the poor condition of the port of Lebu. These mines are the Errazuria, owned by the Compañia Curanilahue, and the Millaneco, now closed, and others belonging to the Compañia Victoria de Lebu.

In the following table givingthe imports of coal, coke, and oil by ports for 1917, the ports are listed in geographical order from north to south. The table shows the relatively large per cent. of the total fuel imports received by the northern ports of the Republic.

Ports of Entry	Coal Metric Tons	Coke Metric Tons	Petroleum Metric Tons
Pisagua	13,248	.....	52,389
Iquique	159,131	848	213,852
Tocopilla	16,890	10,173	130,897
Antofagasta	169,311	4,945	282,677
Taltal	17,594	14	59,451
Caldera	851	17,442	3
Coquimbo	5,386	15,933	.....
Valparaiso	18,305	48,063	17,832
All other	5,951	779	3,812
Total	406,667	98,197	760,913

According to the *West Coast Leader*, the profits of the two largest coal-mining companies have increased materially since the beginning of the war. In 1914 the balance sheet of the Lota and Coronel Co. showed profits of 23.4 per cent. and that of the Schwager Co. showed profits of 28.75 per cent. In 1917 their profits had increased to 56⅓ and 50 per cent. respectively.

The following table, taken from the Statistical Abstract of Chile for 1917, gives the names of the coal mines registered in the country, the owner of each mine, its location and the gross production for the year 1916.

Name of Mine	Owner	Location	Gross Metric Tons Production
Lirquen	Cia. Carbonifera de Lirquen	Penco	50,000
El Rosal	Cia. Minera de El Rosal	Penco	7,000
Lota	Cia. de Lota y Coronel	Lota	430,000
Buen Retiro	Cia. de Lota y Coronel	Coronel	43,752
Coronel	Cia. de Lota y Coronel	Coronel	11,269
Playa Negra	Cia. de Lota y Coronel	Coronel	12,186
Schwager	Cia. Carbonifera y de Fundicion Schwager	Coronel	385,124
Chiflon y Nivel	Cia. Carbonifera Los Rios de Curanilahue	Curanilahue	181,158
Victoria	Cia. Carbonifera Victoria de Lebu	Lebu	12,000
Colico	Cia. de Arauco (Ltda.)	Carampangue	36,589
Curanilahue	Cia. de Arauco (Ltda.)	Curanilahue	163,376
Amalia	Cia. Carbonifera Los Rios de Curanilahue	Lebu	46,000
Isabel	Sociedad Carbonifera de Mafil	San Jose de Marquinia	5,640
Porvenir	Comunidad Minas de Carbon Porvenir	Lebu	11,200
Loreto	Menendez, Behety y Cia	Punta Arenas	22,600

Measures Suggested to Increase Production

Notwithstanding the difficulty of increasing the coal production of the country without improved railway and port facilities for its handling, the Chilean Government has given no assistance to the development of the coal resources. The recent coal shortage and the attendant high prices resulted in a popular demand for more native fuel and an investigation by the High Commission, which recently made certain recommendations to the Government with a view to aiding the opening up of coal fields in the eastern part of the Province of Arauco. These recommendations include a geological survey of the region; the purchase and completion of the railway from Lebu to Los Sauces; the completion of the extension from Traiguen to Pua, and the construction of a further extension from Curacautin across the Andes; the survey and construction of port works at Lebu; and the survey and construction of a railway from Curanilahue to Los Alamos. The railway from Lebu to Los Sauces was begun by an English company, the Chilean Eastern Central Ry., which was unable to complete its construction because of lack of funds and is said to wish to sell out. The short branch which is recommended from Curanilahue to Los Alamos will connect the mines at that point with the port of Lebu. The construction of the short stretch from Traiguen to Pua, a station on the longitudinal railway, will connect the port of Lebu with the longitudinal railway. From Pua a short stretch is already in operation east to Curacautin, from which point the proposed route across the Andes to Zapala, Patagonia, is said to be much better than the present transandine route. At Zapala connection could be made with the Great Southern of Argentina for Bahia Blanca. The recommendation urges the opening up of these railways, because they will make possible the development of the adjacent coal deposits and will also enlarge the market for the product, since coal could then be shipped across the Andes for the use of the Argentine railways and in return cattle and grain might be shipped into Chile.

Fuel Consumption—Nitrate Companies Principal Consumers

The nitrate and mining companies and the railways are the principal fuel consumers in Chile. Professor Gonzalez estimates the amounts of coal normally consumed in various industries to be as follows:

	Metric Tons
Nitrate plants (including railways)	800,000
Railways	500,000
Shipping	450,000
Mining and metallurgy	150,000
Gas manufacture	150,000
Other industries	350,000
Domestic and other uses	100,000
Total	2,500,000

Nitrate is the most important export product of Chile and the nitrate companies are the largest fuel consumers of the country. The nitrate district lies in two of the Northern states, Tarapaca and Antofagasta, and the coal fields of Arauco and Concepcion are in the south. Since little nitrate is shipped to southern Chile, boats carrying coal to the nitrate district find trouble in obtaining a return cargo, and consequently freight rates are high. There is a ready market for the native coal in the industrial section of the central part of the republic, hence it is seldom sent to the northern markets. Within the last 15 years oil-burning Diesel engines have been installed and are now used almost exclusively for the production of power and electricity for lighting. During the war the use of fuel oil has increased so materially, both in the oficinas and on the nitrate railways, that certain Chilean newspapers have become alarmed at the degree to which the principal industry of the country has become dependent on imported liquid fuel.

The Chilean railways rank next in importance to the nitrate plants as fuel consumers. Whereas in Argentina the more important railways are controlled by foreign capital, in Chile, over 4500 kilometers of the total railway mileage in operation are under Government control, and less than 4000 kilometers are operated by private companies. The most important privately operated railroads, considered in respect to length and tonnage of cargo handled, are the Antofagasta & Bolivia and the Nitrate Railways, both of which lines are owned by English companies. The Nitrate Railways are not, as the name might seem to indicate, the property of any single nitrate-producing company, but are owned by the Nitrate Railways Co. and serve to carry the output of several companies to the ports of Iquique and Pisagua. In 1912 and 1913 over half the coal burned by the State Railways was imported; in 1915, 330,960 metric tons were used, all of native production. Even in normal times the Chilean Government usually expressed a preference for native coal. Before the war the foreign coal used by the State Railways is said to have come largely from Australia.

In spite of the longitudinal railroad, much of the traffic north and south goes by water rather than by land. According to Chilean statistics, 2678 steamships with a total registered tonnage of 6,262,698 entered all Chilean ports from foreign ports in 1917. During the same year the figures for coastwise vessels were 10,601 steamers with a registered tonnaged of 7,737,210. Coronel is the chief bunkering port of Chile. It has good anchorage for vessels in 6 to 12 fathoms, and cargo may be discharged into lighters of 20 to 50 tons. Near Coronel are Lota, a smaller coaling station, and Talcahuana, a naval base. The inferior coal found near Punta Arenas has been used to some extent for bunkering purposes, but has proved rather unsuccessful.

Power Used by Various Industries

The mining district of Chile is immediately south of the nitrate fields. Copper is the most important product, the greater part being mined by large companies controlled by American capital such as the Braden Copper Co., the Chile Exploration Co., the Santiago Mining Co. and the Andes Copper Mining Co. Among the mineral resources of this region, iron should also be mentioned. The Bethlehem-Chile Iron Mines Co. has recently purchased extensive holdings in Chile and has installed the most modern equipment for extracting and shipping the ore in large quantities.

The fuel to be used is necessarily one of the first problems to be solved in connection with the development of either copper or iron-ore holdings. The Braden Copper Co. owns one of the two hydroelectric plants now in operation in Chile and is building a second plant. It depends entirely upon the electric power generated by this plant. The Chile Exploration Co. has a power plant at Tocopilla, where electric power is manufactured for use at its reducing plant and for lighting and power at the mine. In order to insure an adequate supply of fuel for these boilers which are oil-fired, the company has built two oil-storage tanks, each with a capacity of 55,000 barrels. The Santiago Mining Co has only recently purchased its property and expects to install a hydroelectric power plant. The Andes Copper Mining Co. has not yet completed its smelting plant; its power plant will be located at Chanaral. The Bethlehem-Chile Iron Mines Co. has planned to use electric power in all operations from the mining to the final loading of the ore. The boilers to be used in generating this electricity are specially constructed so that they may use either oil or coal.

Chile has made more progress in manufacturing than any other west coast country of South America. According to figures compiled in 1913 by the Chilean census, the value of the production of all manufacturing industries for the year was $120,000,000 United States currency. This figure includes such industries as the manufacture of gas and electricity, alcohol and drinks, foodstuffs, ship construction, chemicals and drugs, as well as the strictly manufacturing industries. Santiago is the chief industrial center of the republic. Steam, electricity, and some gas, oil and hydraulic power are employed in the factories. Native coal has been used almost exclusively since the beginning of the war for the manufacture of gas, but prior to that time Australian coal was used to a large extent. The Chilean Electric Tramway and Light Co., of Santiago, owns a hydroelectric power plant.

Increased Cost of Fuel

The increased cost of production, scarcity of coal in England and the United States, and shortage of shipping space all combined to increase the price of imported coal in Chile. As the shortage of imported coal was not relieved by added production at the Chilean mines, the Chilean companies succeeded in increasing the price of their product proportionately to the increase in the imported coal. Before the war the price of Chilean coal had been just below that of imported coal. During the war, although there was no official combination of local mining companies, there was apparently an understanding based largely on the knowledge of terms at which rival producers would be willing to make coal contracts, and by means of this understanding the dealers were enabled to raise their prices until they approximated but did not quite equal the prices of imported coal.

Not only coal, but coal substitutes were scarce and high during the war. In the case of oil, which had been introduced into the nitrate fields because of certain advantages which it possessed over coal, a serious disadvantage, namely, the extra shipping space required, became more apparent during the war. Coal boats could return with cargoes of nitrate; oil tankers are of special construction and must return empty.

Rise in Fuel Prices

The following coal and oil quotations illustrate briefly the rapid rise in prices of fuel since 1914. At the beginning of the war Welsh coal was selling at the northern ports of Chile for about $8.51 per ton United States currency, English for $7.78, and Australian for $7.30. During the first months of the war the slump in the nitrate trade reduced the demand for coal, but by the beginning of 1915 the market had recovered and since that time there has been a serious coal shortage. The State Railways curtailed service and are reported to have used some wood for fuel. The Government attempted to relieve the shortage in the northern district, by allowing the use of naval transports for the carrying of coal north from Coronel and Lota. In December, 1915, Welsh and English coal was not quoted in the northern ports at all, Australian was selling for $10.95, United States for $11.68, and Chilean for $7.54. The closing of the Panama Canal in the latter part of 1915 practically cut off American shipments, and by the end of 1915 American coal as well as British was temporarily out of the market. In the early part of 1916 coal prices reached their maximum. Later during that year prices fell because of increased cargo space offered by the boats sent down from the United States to load nitrate. In January, 1917, current prices ranged from $15.80 to $17 for Australian, $13.38 to $14.58 for United States, and $12.15 to $14.58 for Chilean. According to *El Mercuria*, a Chilean newspaper, native coal was offered at $17.58 to $20.35 United States currency on March 30, 1919, and American from $18.50 to $19.43. Australian and British coals were not quoted. In February, 1919, Australian coal had sold for $18.75 per ton.

Before the war, petroleum importers fixed their price at 40 shillings ($9.73) per English ton while coal sold for about 25 shillings ($8.52). Immediately after the United States entered the war in 1917, oil prices began to soar. Despite contracts, imports were reduced 25 per cent. in volume and prices in the latter part of 1917 and the first half of 1918 reached 120 to 150 shillings ($29.16 to $36.45). An article in the London *Statist* for November 9, 1918, states that the nitrate companies calculated the cost of coal at their oficinas to be £6 ($29.19) per ton and petroleum to be £7 10s. ($26.50) per ton.

Will Frame Bylaws for Export Association

A meeting was held at the Machinery Club, New York City, on Thursday, Sept. 11, 12:30 p. m., at which it was decided to prepare bylaws for the conduct of an export association to deal in coal in foreign countries under the Webb-Pomerene Act. This meeting was called by the Coal Export Committee of the American Mining Congress, of which Henry M. Payne is chairman. James S. Callbreath, secretary of the American Mining Congress, presided.

Nothing was done by the Coal Export Committee so long as the National Coal Association continued actively to canvass the situation. It now being understood that the National Coal Association considers itself unlikely to consummate a plan that will be satisfactory to all its members, it seems to the American Mining Congress Export Committee that it is incumbent on it to take up the matter where it has been dropped. The Congress, while anxious in every way to assist this industry in forming an export association, has been little disposed to do anything so long as it appeared possible that the National Coal Association would form a definite working plan.

Feeling that mere discussion would arrive at no final issue, the committee decided to leave the matter in the hands of Allen Walker, of the Guaranty Trust Co., and Gilbert H. Montague, an attorney, instructing them to frame a suggestion on which an association in which large and small producers could participate to equal advantage might be formed, their stock, voting power and allotment of orders to be in proportion to output; care, however, being taken to give those corporations that had already entered into the foreign trade, and so established some degree of prior right, extra consideration with those companies with which they had already done business.

When this document is prepared it will be submitted to the full committee, and later it is intended to present the whole matter to a meeting of possible members of the association with a view to criticism and amendments. The question of standardization will probably be taken up at the same time, the Bureau of Mines participating, and every effort will be made to put the association on a basis which will be satisfactory to the Federal Trade Commission and to the exporters themselves, be they large or small. It is hoped that by avoiding in every way any exploitation of foreign customers and providing them with a product in every way in accord with specifications, a large trade may be built up based firmly on business integrity.

Those present at the meeting were James F. Callbreath, Dr. Henry M. Payne, Allen Walker, Gilbert H. Montague, George M. Dexter, National Wholesale Coal Association; Charles S. Allen, secretary, Wholesale Coal Association of New York; George S. Rice, chief mining engineer, United States Bureau of Mines, and R. Dawson Hall, managing editor, *Coal Age*.

H. Y. Saint, head of the Department of Coal Exports, United States Shipping Board, and John Callahan, traffic manager of the National Coal Association, wrote regretting their inability to be present.

Exports of Coal and Coke During July, 1919

The domestic exports of coal and coke from the United States by countries and by customs districts, and the bunker coal supplied to vessels in the foreign trade at specified districts, during the month of July, 1919, are given as follows by the bureau of Foreign and Domestic Commerce:

Country	Coal: Anthracite, Tons	Coal: Bituminous, Tons	Coke, Tons
Denmark	.....	7,695	...
France	.....	29 748	...
Gibraltar		5,953	...
Italy		167 559	...
Netherlands		77,812	...
Norway		32,887	138
Sweden		23,494	...
Switzerland		96,866	...
Bermuda		2,762	...
British Honduras		50	...
Canada	484,240	1 338 108	28,941
Guatemala	.....	108	8
Honduras		569	6
Nicaragua	.....	178	...
Panama			78
Mexico	205	5,824	6,741
Miquelon Langley, etc	20	.....	...
Barbados	35	11,833	...
Jamaica	.....	4,695	...
Cuba	2,659	75,085	20
Dutch West Indies	.....	3,027	...
French West Indies	.....	1,300	...
Dominican Republic	.....	820	...
Argentina		28,712	221
Brazil	294	54 595	...
Colombia	200	8,029	...
Ecuador	.....	2,948	25
Falkland Islands	.....	2,080	156
British Guiana	.....	1,807	...
Peru	.....	2,629	1,369
Uruguay	.....	7,775	...
Venezuela	.....	240	...
Dutch East Indies	.....	6,193	...
Russia in Asia	.....	3	...
New Zealand	.....	13,933	...
French Africa	.....	6,723	...
Italian Africa	.....	5,166	...
Total	487,653	2,027,206	37,703

Districts	Coal: Anthracite, Tons	Coal: Bituminous, Tons	Coke, Tons
Maine and New Hampshire	219	3,690	17
Vermont	2 264	10,314	217
Massachusetts	20	.....	...
St. Lawrence	161,229	192,117	4,488
Rochester	91,383	70,306	...
Buffalo	218,657	168,869	16,192
New York	4,983	2,847	283
Philadelphia	2,659	90,032	...
Maryland	...	232,927	1,269
Virginia	...	340,323	377
South Carolina	...	9,455	...
Georgia	...	3,451	...
Florida	...	3,331	...
New Orleans	...	915	92
San Antonio	201	493	627
El Paso	.....	2,648	756
Arizona	.....	2,670	5,378
Southern California	4	2	...
San Francisco	.....	1	...
Oregon	1	2	...
Washington	39	94	54
Alaska	.....	3	...
Dakota	1,247	2,083	194
Duluth and Superior	543	3,984	49
Michigan	117	61,436	5,898
Ohio	4,087	825,213	1,832
Total	487,653	2,027,206	37,703

BUNKER COAL

Districts:	Tons
Maryland	43,535
New York	290,013
Philadelphia	43,821
Virginia	144,832

The Coal Outlook in England

(From Our British Correspondent)

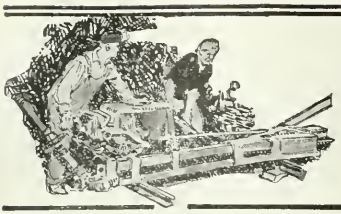
The question of the hour seems to be, Will the miner be magnanimous enough to provide us with the fuel we require for domestic and industrial purposes? For a long time past coal trade interests in the Metropolitan area and in the southern counties of England have been hampered exceedingly by the stringency of supply, especially as regards fuel for specific needs. Districts contingent to the coal fields may have fared better, but those at a distance have suffered from a shortage which, at times, has been exraordinary. Owners of private mine cars might have been expected to have the advantage as compared with others who are entirely dependent upon colliery and railway mine cars, but private cars have been ruthlessly and indiscriminately seriously delayed; indeed in some cases, some of the cars cannot at present be traced. Moreover, the system of distribution under the Controller has from time to time resulted in a certain amount of confusion and scarcity.

The distribution, to say the least of it, is uneven in point of quantity, and fuel has been allocated for purposes for which it was altogether unsuitable. Coal suitable for heating the baker's oven has gone for ordinary steam purposes, and hard steam coals have been assigned for domestic use. Emergency supplies have figured to a certain extent, but they do not appear to have given much effective or tangible relief to the trade, and the struggle still goes on, as it is absolutely necessary that at this time of the year merchants, dealers, railway companies and industrial concerns should accumulate a reserve in order to meet the exigencies of the winter movement. It is true that of late inland coal has been more plentiful owing to the suspension of exports from the Humber, but it is obvious that this can only afford temporary relief inasmuch as in the long run we must sell coal to the foreigner because we sorely need the money he pays for it.

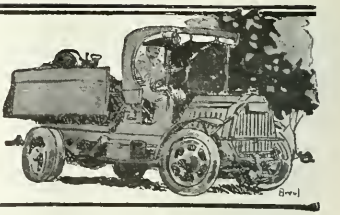
To crown all these troubles of the trade there comes the official announcement that the estimated reduction in the output of coal due to the reduction of working hours is 10 per cent., and that a further modification in the amount for household consumption will have to be made to meet the shortage, or it will be necessary to limit more strictly than at present the quantity allowed for export. In relation to the last-named point, the Coal Controller told a deputation of the Humber exporters and shippers that the lack of export coal was due entirely to the diminished output of the mines. His statement represents the crux of the whole matter, and it is in many ways confirmed by the evidence forthcoming at the Coal Commission day by day. The fact most patent is that with more miners in the pit the production is not increasing, but diminishing, and the trade and the country would like to know what it means, as the answer would certainly be interesting.

The reduction in the working hours of Belgian coal miners that came into force on June 1 has already resulted in a marked diminution of output, and this is delaying any prospect of a reduction in prices. The existing restrictions on export are also being criticized.

The average yearly output of coal mines in Bulgaria before the war was about 2,000,000 tons. This might have been considerably increased with better transport and organization. During the war the output of the Pernik mines alone was raised in 1916 to about 600,000 tons (50,000 tons per month) by the employment of large numbers of Serbian prisoners.



COAL AND COKE NEWS



What Happened in August

[The bracketed figures in the text refer to the number and page of the volume in which references to the matter noted may be found and should the reader desire further information he can obtain it in the place indicated.]

Aug. 1—The employees of the Locust Gap mine of the Philadelphia & Reading Coal and Iron Co. return to work [XVI, 283]—The Belleville, Ill., miners strike to recover fine previously levied [XVI, 284]—First commercial coal hoisted at big new mine of Bell & Zoller Mining Co., at Zeigler, Ill. [XVI, 343]—A wage increase is announced in the Pocahontas field of West Virginia [XVI, 284]—The eight-hour day goes into effect in the Pocahontas field [XVI, 284]—The operators of the Tug River field meet in Bluefield, W. Va., and adjust their scale of wages to that of Pocahontas field [XVI, 284].

Aug. 3—Seven local unions of United Mine Workers of America meet at Wilkes-Barre, Penn. [XVI, 372].

Aug. 4—President Keeney finishes conference with operators at Buckhannon and Adrian, W. Va., a new contract being signed by all but one company [XVI, 284].

Aug. 5—Sheriff J. W. Osborne, of Belmont County, Ohio, takes action at the Fort Pitt mine of the Central Coal Co., which permits the men to return to work [XVI, 383].

Aug. 6—A recount of the vote cast at a recent election of the No. 1 District of the United Mine Workers, at Scranton, Penn., starts under the supervision of Judge E. C. Newcomb, of the Lackawanna County Court [XVI, 283]—After this date production of coal is entirely suspended at mines on Chesapeake & Ohio R.R. pending settlement of shopmen strike on the railroad [XVI, 293]—Celebration is held by miners from Paint Creek, Cabin Creek and Coal River, in West Virginia, on occasion of the sixth anniversary of the organization of these fields by United Mine Workers [XVI, 330].

Aug. 7—An explosion occurs at the Weirwood mine of the New River & Pocahontas Consolidated Coal Co., in Fayette County, W. Va., in which seven men are killed [XVI, 294].

Aug. 8—The policy committee of the United Mine Workers reports it has prepared recommendations to be presented to the convention of the union in Cleveland, Ohio, in September [XVI, 283]—Executive committee of Bituminous Mine Inspectors' Association of Pennsylvania holds meeting at Harrisburg, Penn. [XVI, 342].

Aug. 10—John Brophy, president of United Mine Workers' District No. 2 wires President Wilson about labor situation in connection with Cambria Steel Co. [XVI, 329]—The second annual first-aid contest of the Pond Creek Coal Co. is held at Stone, Ky. [XVI, 445].

Aug. 12—The U. S. War Labor Board meets at New York City and formally ends its existence—The Yorkshire Miners' Council of England recommends a return to work, which is accepted by all but the men in the West Yorkshire section [XVI, 331]—Mine cave in West Scranton buries boy causing his death. Public action is taken in the matter [XVI, 340].

Aug. 13—Convention of United Mine Workers' District No. 12, is held at Belleville, Ill. [XVI, 331]—The Yorkshire miners in England vote to return to work. These 200,000 miners held out after the majority of the mine employees of Great Britain had returned to work on July 25.

Aug. 14-15—Shopmen of C. & O. return to work making it possible for mines to resume operation [XVI, 341]—Walker D. Hines sends letter to Vice President Marshall touching on congressional inquiry into coal situation [XVI, 267]—The Williamson, or Thacker, non-union field decides to advance wages and shorten hours to eight per day [XVI, 372].

Aug. 18—An explosion occurs in the Oakview mine of the Oakdale Coal Co., in Colorado, in which 18 men are killed [XVI, 385]—The C & O. moves empties to mines in its territory following resumption of work by shopmen [XVI, 383].

Aug. 19—Districts Nos. 1, 7 and 9, United Mine Workers, meet at Wilkes-Barre, Penn. [XVI, 372].

Aug. 20—Committee of Guyan, W. Va., operators appeals to manager of Eastern Car Pool for better car supply [XVI, 383].

Aug. 21—Employees at Plymouth district of Hudson Coal Co., Pennsylvania anthracite field, go on strike [XVI, 414]—The operators' association of the Williamson, W. Va., field meet to discuss wage situation [XVI, 455].

Aug. 22—The scale committee makes its report to the convention of United Mine Workers' District Nos. 1, 7 and 9, at Wilkes-Barre, Penn. [XVI, 412].

Aug. 25—President Wilson issues statement referring to threatened strike of railway shopmen [XVI, 431].

Aug. 26—Director General of Railroads Walker D. Hines issues statement (supplementing his statement of Aug. 14) concerning the coal car supply [XVI, 443]—Tenth annual first-aid contest of Susquehanna Collieries Co.—Wyoming Division—is held at Nanticoke, Penn. [XVI, 446]—J. D. A. Morrow gives important testimony before Senate committee conducting inquiry into the coal situation [XVI, 366]—A riot occurs at the Breckenridge mine of the Allegheny Steel Co. in western Pennsylvania [XVI 414]—Walter Nesbit, of Illinois United Mine Workers, issues ultimatum to striking locals to return to work or be expelled [XVI, 414].

Aug. 29—Some 1500 men of the Powderly and No. 1 collieries in Carbondale Penn., and 800 men of the Jermyn colliery go out on strike [XVI, 455].

Aug. 30—Fire destroys surface plant of Springside mine of Smith-Lohr Coal Mining Co., Pana, Ill. [XVI, 468].

New York, N. Y.

Electricity displacing steam at mines. Prominent electrical engineer's comments on advantages of electrical power on transportation lines and at industrial plants. One million dollars daily going to waste by use of steam rather than electricity in anthracite territory.

Some of the big anthracite coal mining companies are more or less committed to a policy of electricity; prominent among these are the Lehigh Coal and Navigation Co., and the Coal Department of the Delaware, Lackawanna & Western R.R. Quite recently the Susquehanna Collieries Co. announced its intention to expend a large sum in electrifying some of its plants in the Lykens Valley field, stating that the company expected by this change of steam to electric power, to turn the balance of operating account from loss to profit at such plants.

In this connection an address of W. S. Murray, electrical engineer, before the Bridgeport Chamber of Commerce, has considerable interest. His topic was, "One Way to Maintain Industrial Supremacy." He warned manufacturers that anthracite coal in the ground is limited and claimed that $1,000,000 daily is going to waste through improper means of providing power and suggesting complete electrification of transmission lines along the northern seaboard. Mr. Murray was the engineer in charge of the electrification of the New Haven railroad system, and not only enlarged on the practical working out of the plan on the New Haven but also other lines which use this form of power.

What is said about railroads may be said about industrial plants, related Mr. Murray, that where there is a clear saving of coal to railroads of four to one ratio, the saving between electric and steam drive in plants is as high as ten to one, with greatly reduced cost of maintaining electric vs. steam equipment. In the territory between Washington and Boston, extending inland 100 miles, there is a demand for 17,000,000 hp. Of this railroads require 7,000,000, and industrial plants the remainder. The anthracite mining companies are interested in cheaper power costs at the collieries, at industrial plants and on transportation lines as well.

Philadelphia, Penn.

Anthracite "independent operators" to bring suit in Federal Court of Claims. Made no profit under Fuel Administration prices. Test suit important to large number of both anthracite and bituminous operators. Interesting statement made by Dr. Garfield. If test suit is successful other suits probably will follow.

Certain independent anthracite operators of Pennsylvania—those companies other than the "railroad coal companies"—sustained such severe losses, so they assert, during the regime of the United States Fuel Administration that they will shortly begin in the Federal Court of Claims a test suit against the United States to determine (under the Lever Act) if the United States is not liable to damages.

It will be alleged that the company bringing the suit operated its mine during the entire period of the Fuel Administration control, and that (under the restriction of prices maintained by Dr. Garfield) the prices it was permitted to charge for its product were so low that it barely got back its cost of mining and preparation, thus making no profit whatever; whereas, if it had not been restricted in such a manner, it would have been able to make a just and reasonable profit.

The act of Aug. 10, 1917, in Section 25, provides: "In fixing maximum prices for producers, the commission shall allow the cost of production, including the expenses of operation, maintenance, depreciation and depletion, and shall add thereto a just and reasonable profit."

The test suit will determine the liability of the Government to a large number of coal operators, in both anthracite and bituminous fields, who, from patriotic principles, kept their plants going during the period of Federal control, although, it is said, they knew they were operating at a compulsory loss. The operators maintain that the conditions were fully known to the United States fuel administrator, but in spite of this he failed to remedy conditions.

When Dr. Garfield withdrew the maximum price and other restrictions on anthracite, as of Feb. 1, 1919, he made a statement in which he said that the cost of mining anthracite had been increased to such an extent, "that many of the companies were not receiving a fair return, and that some producers of necessary coal were actually sustaining a loss on the sale of coal at the Government prices." He also said that, "had the Fuel Administration's active control over maximum prices on anthracite coal been continued," the maximum prices would necessarily have been raised, possibly as much as fifty cents a ton."

If this test suit is successful, other suits will doubtless be brought, as many coal companies suffered severe losses, due to heavy increases in wages authorized or imposed by the Government, and to advanced costs in materials and supplies which had to be purchased at prices fixed by various governmental price-fixing boards, and then had to sell their coal at prices which did not cover these increases in expenses. The Fuel Administration declined to recognize as part of increased costs, any royalties

which were higher than an established figure set by them, and many coal operators had to pay royalties largely in excess of this sum.

The prices fixed by the Fuel Administration as permissible for the selling of coal were, in many cases, based upon the assumption that steam sizes of coal could be sold at certain schedule prices, which, as a matter of fact, were unobtainable and, theoretically, did not, therefore, yield to the operator the net returns, upon which the Fuel Administration calculated the intended revenue. The test action will be brought by Henry S. Drinker, Jr. Associated with Mr. Drinker will be William A. Glasgow, Jr., and Percy C. Madeira, Jr., of this city, and Douglass M. Moffat, representing coal companies having similar cases.

Charleston, W. Va.

Strike in Kanawha field causes loss of 75,000 tons of coal. Nearly every mine shut down for three days. Blockades at tide and the Lakes decrease car supply. Shortened production in New River field due to new wage contract in effect Sept. 1. Miners in thin seam section refuse to accept reduction in wages new scale provides.

There was general demoralization in the mining territory served by the Chesapeake & Ohio Ry. during the first week of September, except in the Logan district, because of rather widespread labor troubles, particularly in the Kanawha district. During the last three days of the week, practically every mine in the Kanawha field was shut down for a period of three days as the result of a strike in which approximately 10 000 men were involved, part of that number undertaking an armed invasion of another mining district, apparently in emulation of similar tactics in Illinois. As a result of the strike a'one in the Kanawha field it is estimated that there was a loss of 75,000 tons. Miners had no cause for complaint against Kanawha operators although the loss fell on the operators of that district. While of course there was little need for cars in the Kanawha section on Sept. 4, 5 and 6, had conditions been normal, the car supply would have been entirely insufficient, not being over 55 or 60 per cent. of normal. Blockades both at tidewater and on the Lakes were having the effect of slowing up the movement of coal both to the East and West, and at the outset of the second week of September an embargo was placed on the shipment of certain kinds of coal to the Lakes. Congestion at both lake and tidewater points was also believed to be a factor in decreasing the car supply. However, the indications were that some producers would be able to load a large tonnage during the second week for export and a strong demand was developing for steam coal in the high volatile fields. The volume of smokeless coal produced during the initial week of September was much less than that for the final week of August.

During the first week of September, owing to the three-day strike, the Kanawha district fell further behind and production was limited to two days for the entire week; possibly there was a 25 per cent. production the total output for the week, on a generous estimate, being 50,000 tons. While there was a continuance of the car shortage in the district, the supply being under 60 per cent., yet such a shortage was obscured largely because of labor troubles. Nearly every mine in the district was shut down. When operations were resumed at the mines on Sept. 8, between 50 and 75 per cent. of the miners were at work. Many of them were too footsore and weary to go to work and consequently there was not a large production at the beginning of the second week of the month.

Differences arising in connection with the new wage contract were responsible for a shortened production in the New River field at the outset of September; a number of plants were affected and produced little or no coal during the week. The new wage contract went into effect on Sept. 1 and since such companies as the McKell Coal and Coke Co., the Red Star, the Wills Branch and other companies had declined to accept the new agreement, with its provision for a check-off and a closed shop, the union miners at such plants failed to report for work following the general Labor-Day shut down. Production was also lost because of the refusal of miners in the thin seam section of the New River field to accept the reduction in wages the new scale provided. Cars were not as plentiful as producers desired, although not so many were required owing to labor troubles. Congestion at tidewater was still hampering shippers although a number of smokeless producers expected to be in a position to export a good deal of coal during the second week upon the arrival of vessels. Despite the congestion at the Atlantic seaboard, there were no embargoes in effect except as to Pools Nos. 7 and 46. Mines on the Kanawha & Michigan were affected by a car shortage on that road, production being only about 50 per cent. of normal.

Fairmont, W. Va.

Northern West Virginia fields load more coal in first week of September than during last week of August. Transportation better. Tidewater embargoes send coal to the Lakes. New England railroads accumulating coal for winter use. Heavy coal movement to New England.

Despite the fact that the operators of the Fairmont and other northern West Virginia fields had only five days in which to produce coal in the week ended Sept. 6—no coal being produced on Labor Day—loading in the Fairmont region at least exceeded that for the last week of August, when the operators had six working days. It is estimated in fact that the number of cars loaded in the Monongah division of the Baltimore & Ohio during the first week of September, was at least 300 in excess of the loading for the last week of August, and that conditions were the same elsewhere in northern West Virginia regions. Mines in that section were also swamped with cars during the early part of the week, after having had a rather lean supply during the previous week; but the mines were equal to the task and succeeded in loading all the cars supplied. This was true to such an extent in fact that yards in places were congested, demonstrating that the mines in the northern part of the state can load the coal, if supplied with the cars in which to load it. While the supply grew short toward the latter part of the week, still no mines were shut down because of any shortage of equipment. On the Monongahela Railway the supply of cars throughout the week was at no time over 50 per cent.

Embargoes debarred much coal from shipment to tidewater during the week, although a few cars were allowed to, go through to Curtis Bay and to St. George. Most of the coal from northern West Virginia for export was halted, however, pending the arrival of vessels. The tidewater embargoes caused an increase in shipments to the Lakes throughout the week, such business being picked up in order to make up for loss of tonnage to the East. That railroad companies operating in New England are beginning to accumulate a fuel supply for use during the winter has become apparent through the heavy shipments of railroad fuel to New England, there being a heavy movement of coal for that purpose out of northern West Virginia regions during the week.

Huntington, W. Va.

Logan district increases production in first week in September despite holiday, car shortage and threatened invasion of miners from other fields. Logan production in Aug., 1919, was 990,000 tons—400,000 tons less than in Aug., 1918.

Even though facing an invasion from an armed body of miners, the Logan district during the first week in September succeeded in materially increasing production despite the fact that Labor Day opened the week. Furthermore the mines of the field were put on an eight-hour a day basis on Sept. 1, so that the increase was achieved with less hours in which to work and with difficulties from the outside which might have been expected to demoralize Logan miners. The output was increased from 199,000 tons to 219,000 tons or 65 per cent. of capacity. Figures show that despite such an increase there was still a shortage of cars amounting to 27 per cent. or 91 941 tons, not a bit per cent earlier shortage which had resulted in a loss of 177,000 tons. The labor shortage only amounted to 1.54 per cent. The production loss of only 11,963 tons was due to Labor Day. During the second week of September transportation conditions were not so satisfactory, cars being scarce, production being cut down as compared with the previous week to a very appreciable extent.

Just how serious a car shortage there was in the Logan field during August is shown by the fact that only 631,424 tons were mined out of a possible total of 1,704,000 tons. In other words, only about 37 per cent. of a possible total was produced. Therefore, there was a production loss of 1,069,000 tons or about 62 per cent. Of the 62 per cent. loss, shortage of cars throughout the month was responsible for 57 per cent, or, 977,000 tons. In August, 1918, the production of coal in the Logan field was 990,000 tons so that it will be seen that August, 1919, production was almost 400,000 below that for the previous year.

Coal loading on the Chesapeake & Ohio R.R. system during the week ended Sept. 6 reached a total of 11,556 cars or approximately 577,800 tons, loading from the New River and Kanawha fields as well as the Coal River field decreasing and from the Logan field increasing. The movement for the previous week was 11,798 cars.

Bluefield, W. Va.

Serious shortage of transportation in Pocahontas field. Number of mines shut down in consequence. Little Pocahontas coal mined, due to lack of vessels at tide.

A total of 47,000 tons was sliced off the output of the Pocahontas region during the week ended Sept. 6 simply and solely because of a most pronounced shortage of cars. There had been a heavy loss during the previous week—139,000 tons—because of a car shortage, but when the loss jumped to 158,000 tons (during the week of the sixth) it became so serious that operators were alarmed, especially when it became necessary to shut down a number of mines. Operations were so seriously crippled that producers throughout the Pocahontas field made trips to Bluefield during the week in order to secure some relief if possible. Railroad Administration officials said the shortage was due to the failure of connecting lines to deliver empties, and the promise was given that an effort would be made to secure more empties from western lines. During the last week of August, production had reached 329,000 tons. The loss of 47,000 tons reduced the output to 282,000 tons. Other sources of loss were insignificant as compared with the car shortage. While Pocahontas operators have been continuing to ship to tidewater—although little Pocahontas coal has been mined owing to lack of vessels—producers expected to have at least a few vessels in time to move some production during the second week of the month.

PENNSYLVANIA

Anthracite

Minersville—Preparations are being made for the opening of a large new mine at Mt. Pleasant, in the Pottsville-Minersville district, Schuylkill County. Steps are now afoot to install the machinery, preparatory to a regular opening. The nearest operation in this district is the Glendower colliery of the Philadelphia & Reading Coal and Iron Co. These mines will likely send their product through Minersville by an extension of the Glendower trackage. The operation will afford work to hundreds of additional men about Minersville.

Pottsville—After a period of ten years fire has again broken out at the Pine Knot colliery, Heckscherville, near here. This fire was supposed to have been extinguished years ago. Mine Inspector M. J. Brennan and other officials have located the flames in the Red Ash seam between the fourth and fifth levels. The fire is not causing any smoke, but emits carbon monoxide; however, it is said no active section of the mine will be compelled to stop work. Every reasonable precaution has been taken to safeguard the lives of the miners, the portion affected being sealed up. This colliery belongs to the Philadelphia & Reading Coal and Iron Co.

Scranton—A squeeze of considerable proportinns in the Diamond seam workings of the People's Coal Co., underlying the 100 block of South Main Ave., is threatening a number of properties. The squeeze extends to South Hyde Park Ave. and practically condemns the proposed site for the new Junior High School. This site is said to have been offered to the Scranton school board for $50,000, including mineral rights in the two top seams. It is said by James B. Smith, city mine cave engineer, that the entire area will settle an average of four feet, despite the fact that gangs of workmen are engaged in "cogging" the seam to relieve the danger.

Hazleton—In a decision handed down here recently Charles P. Neill, of Washington, umpire of the anthracite conciliation

board, ruled that no agreements can be made between mine superintendents and committees of the union regarding wages or working conditions, which are not in accord with the terms of the contract as officially on file. The decision was made in the case of a lampman at the Blackwood colliery of the Lehigh Valley Coal Co. in the Schuylkill district. The lampman worked over the established eight-hour shift and when he asked for a higher rate than was paid him a satisfactory figure was set by the superintendent and the colliery committee. When the war allowance was to be applied the company claimed that it should be on the nine-hour basis, but President Golden, of the United Mine Workers of district nine, contended that this could not be done. He based his objection on the grounds that the compensation granted the lampman had been illegally set.

Bituminous

Waynesburg—It is reported that The Cumberland Coal Co., of Carmichaels, Greene County, Penn., has purchased from Levi Keener, of Morgantown, and F. H. Keener, of Willow Tree, W. Va., a three-fourths interest in 249.29 acres of coal in Greene County, Penn. The consideration was $115,915 15 and the price per acre was about $625.

West Natrona—The inquest into the riot at the mine of the Allegheny Coal and Coke Co. at this place will be held on Sept. 26. Twe persons were killed here on Aug. 26 when mine guards are alleged to have fired into a crowd of strikers. Federal, state and county authorities have been conducting separate inquiries in the matter. It is stated that each side now is ready to proceed with the inquest.

Uniontown — Reorganization of the Thompson-Connellsville Coke Co., since control was acquired by J. H. Hillman, Jr., of Pittsburgh, has resulted in the appointment of Harris Booker of Pittsburgh as general manager of the company's two Fayette County plants, with Thomas Tudor as superintendent of Thompson No. 1 and J. G. Young as superintendent of Thompson No. 2.

Idamar—Vernon R. Taylor has disposed of his coal holdings in Indiana County to the Empire Coal Mining Co. The new interest took control at once and will continue on the same extensive plans inaugurated by Mr. Taylor. The consideration was not given, but it was understood to be in the neighborhood of $500,000. The operation is known as the Dixon mine, and its present capacity is about 125,000 tons a year.

Pittsburgh—The report comes from a correspondent that the directors of the dissolved Pittsburgh Coal Co. (a New Jersey corporation), have been directed by Vice Chancellor Stevens, at Trenton, N. J., to wind up its affairs and to take charge of its assets in the interests of creditors, who are directed to present their claims and demands within six weeks beginning Sept. 10. The directors who perform this work are: James H. Beal, William Flinn, D. L. Gillespie, and F. J. Moyne, of Pittsburgh; J. C. Dysard, of Hollidaysburg, Penn.; W. H. Taylor, of Erie, Penn., and W. K Ficho, of Columbus, Ohio. This corporation was chartered on Aug. 31, 1899, with a capital of $2,000,000, which was increased later to $64,000,000 and decreased July 10, 1917, to $1,327,500, which latter amount represented the outstanding capital at the time of dissolution on June 3, last. The business of the company was that of holding stock of other corporations, said to be principally the Pittsburgh Coal and Iron Company.

WEST VIRGINIA

Fairmont—The tipple at what was formerly the Gaston, or mine No. 56, of the Consolidation Coal Co. at Watson, W. Va., was entirely destroyed by fire recently entailing a loss of about $6,000. The Gaston mine had been operated since about 1866 when it was opened by the late J. O. Watson and former Governor A. B. Fleming; it was only abandoned five or six years ago when the Consolidation company concentrated operations in this section. The tipple will hardly be rebuilt.

Charleston—West Virginia promises to be well represented at the first-aid and mine-rescue meet to be held by the Bureau of Mines at Pittsburgh on the first of the following month. It is stated that some 50 teams will attend from this state. It is further noted that 68 teams from the whole country has agreed to participate and about 300 are expected. It has been decided to limit the contests to full team events, and the prizes have been increased proportionately.

Charleston—There is a shortage of miners in West Virginia today of from 5,000 to 10,000 men according to figures made public by Thomas Cairnes, Federal Director of the U. S. Employment Service for West Virginia, notwithstanding statements recently made by J. B. Densmore, Director General of the U. S. Employment Service that thousands of miners are idle and that there is no labor shortage. There is also a shortage of miners in eastern Ohio. Nearly all the producing districts of West Virginia were represented at Washington when the senatorial investigation into coal prices was begun at Washington on Aug. 26. The state association was represented by President J. G. Bradley and Secretary W. H. Cunningham. Nearly all district associations held meetings in West Virginia the week before the senatorial probe began and discussed its various phases, directing proper officials to have all available figures ready for the use of the committee.

KENTUCKY

Hickman—River coal companies are slowing up their river operations southward, due to low water in the Mississippi, there being but six feet at Point Pleasant, 30 miles below here.

Echols—Donald McDonald, vice president of the Louisville Gas and Electric Co., was present at the opening of the community house here by the company. This mine is in Ohio County near the western end of the state on the Louisville & Nashville R.R. and the plant furnishes coal for the company's power plant at Louisville. The community house was erected for the use of the employees of the company. Mr. McDonald gave a good talk to those present at the opening of the house and drove home some pertinent thoughts for their consideration. Among other things he said: "Our company has built this community house at a time when nearly everything was hard to get. We have built it because we want to keep at Echols the very kind of people who are here now. We want to provide a place where men can gather in peace and comfort; where church services can be held; where Sunday school can be taught; where lodge meetings and all the various things that bring people into closer contact with each other can take place. If for any reason, the work of mining coal is delayed or made difficult, I want you to knew that the officers of the company have a keen interest in correcting every fault as soon as possible." Many of the larger and more progressive companies are approaching their employees along similar lines.

OHIO

Steubenville—A keg of powder was ignited in the powder room of the Warner Coal Co.'s Wolf Run mine at Amsterdam, Ohio, recently; eight men were injured, three probably fatally. The mine is 15 miles east of this place. Mine officials state that the accident occurred in the powder room where the men were preparing the powder for the day's work. A wire, it is said, set off one keg of powder and the blast following wrecked the house and hurled the men in all directions. The men, who were terribly burned, were brought to the Ohio Valley Hospital here in ambulances.

Columbus—A movement is on foot, with Pittsburgh men at the head of the organization, to build a railroad from Reeds Mills to Richmond, Jefferson County, Ohio. The proposed road will connect with the Pennsylvania at Reeds Mills, tapping rich coal territory. Following the construction of the line, development in that territory is expected to start actively.

After several months' collection and tabulation of data, tonnage figures for the proposed central route of the Great Lakes-Ohio River Barge canal project have been completed, showing the available tonnage of 51,147,326 yearly. The report shows that fully 20,017,000 tons of coal and iron ore would pass through the canal. These tonnage figures will be submitted to the War Department and Congress in order to get the central route adopted.

The Hazelton Coal Co., organized a year ago, has taken over the offices formerly occupied by the Columbus branch of the Lake Erie Coal Co., located in the Columbus Savings and Trust Bldg. Recently the company acquired the Gem mine, near Straitsville, which has a capacity of 800 tons daily. The company will also do a general jobbing business. F. M. Spencer is general manager in charge of sales.

The Schuler Coal Co., of Cleveland, will soon open sales offices in Columbus, in charge of Ernest E. Hazelton, formerly secretary of the Dean Coal and Coke Co. The mines are near Zanesville.

INDIANA

Evansville—The organization of the Mine Bosses' and Fire Bosses' Mutual Protective Association was completed at a meeting of about 50 mine and fire bosses held in this city. It will extend its membership over the entire state. It was organized with representatives from the coal fields in the districts of Evansville, Boonville, Newburg, Bicknell, Winslow, Oakland City, Petersburg, Fort Branch, Chandler, Buckskin and Vincennes. John C. Wright, Boonville, was elected president; George Bennedict, Winslow, vice president; William Henry, Boonville, secretary; H. J. Hargrove, Elberfield, treasurer; Arnold Costmeyer, Winslow, George Lutz, Buckskin, and John Randall, Bicknell, are the trustees; James Boyd, Winslow, guard, and John McCain, Chandler, guardian.

ILLINOIS

La Salle—About six years ago the Spring Valley Coal Co. closed down its plant at a small town near here, throwing some 400 miners out of employment. This action affected Seatonville—an adjacent town—to such an extent that its bank quit business and most of the stores discontinued. The miners' cottages here, untenanted and neglected, went to ruin and the town began to dwindle, both in population and importance. Special interest attaches to this section just at present as it was here that John Mitchell spent his early years.

Waukegan—The Waukegan Coal Co. of this place (in Lake County) has been incorporated with a capital of $100,000 to operate coal mines. The C. Reiss Coal Co. (through President Peter Reiss, of Sheboygan, Wis.) is the largest stockholder. Other stockholders are Peter Reiss, William A. Reiss and Clemens A. Reiss, all of Sheboygan, Wis; and A. A. Mirick, of Waukegan, Ill. It is said that the Reiss company, which owns all the large docks in Waukegan, and operates coal mines in Ohio and other states, is in line with its present policy to develop its own mines extensively rather than depend on other operators for their supplies.

Chicago—In view of the expressions heard from various parts of the country, the folowing notice to roads in the Northwestern region, by Regional Director Aishton, is of interest: "Previous instructions as to handling of coal cars are not producing sufficient relief, and there is a shortage of cars at mines with an increasing heavy demand for this class of equipment. This necessitates your personal active interest in following up prompt release and return movement to mines of all coal carrying equipment, returning foreign cars home without delay, moving them empty where there is no immediate loading to or in the direction of mines or home line."

MISSOURI

New Bloomfield—A movement to revive the mining of cannel coal in Callaway County, near the center of the state, has been inaugurated by T. L. Price of Jefferson City, who will reopen a mine at Holt Summit, where there is a 5-ft. seam.

St. Louis—H. D. Mepham, who recently purchased at auction sale the Illinois Southern Traction Co., announces that the line will be in operation between East St. Louis and Belleville in about six weeks for coal-carrying purposes, and later for passenger service. The road expects to do a large coal transportation business this winter, serving several mines either on its line or on spurs, six of which have been constructed to connect with as many mines. It is planned to extend the line ultimately to Duquoin, in the southern Illinois field. The line is expected to enter St. Louis over the free bridge under a permit, in lieu of a franchise. If suitable encouragement is given, the company will build a terminal in St. Louis.

UTAH

Salt Lake City—Senator Reed Smoot, whose home is in this place, took an active part in the discussion of the coal and oil lands leasing bill at Washington, when that measure was up in Congress. As the bill was originally reported, it was provided that each city in the states of the West should have a certain number of acres of coal land turned over to it; originally this acreage was only 320. Sena-

tor La Follette thought cities of from 100,000 to 150,000 inhabitants should be allowed 1000 acres, and those of more than 150,000 population should have 2560 acres. Senator Smoot cited his own home place —Salt Lake City—with an estimated population of 340,000, and declared that if this city filed on 320 acres of coal land, it could not work it out in 100 years. He continued, by way of explanation, that some of the fine thick seams in Emery County and in the adjacent counties included in the Wasatch basin that coal from 320 acres would last Salt Lake City for that length of time. Coal mines have been working in this basin for 30 years, sending coal into Montana, California and Nevada, and to every city in Utah. The coal taken from these mines during this time has hardly made a showing on the deposits in the Wasatch basin.

MONTANA

Roundup—Work is to begin shortly on the development of a coal mine on the Great Northern R.R. between Belmont and Broadview, near the line between Musselshell and Yellowstone Counties. The lessees are F. V. H. Collins Ralph G. Schaefer and Charles M. Bair, all of Billings, Mont., representing a group who are developing a mine near Carpenter Creek. The period of the lease is ten years, with the privilege of renewing for 25, and the lessees agree to expend $50,000 in opening and developing the mine, at least one-half of which must be expended the first year. The lease also provides an option whereby the plant may be bought for $55,000 any time within two years.

Personals

Earl Myers has recently been appointed sales manager of the Westmoreland Fuel Co., with office at Pittsburgh.

William H. Harris, district representative of the Colonial Supply Co., has moved his offices from 312 Federal Bldg. to 507 Stambaugh Bldg., Youngstown, Ohio.

H. P. McCue, who opened an office in the interest of the Peabody Coal Co., of Chicago, in Buffalo last spring, has resigned to go into business on his own account. **James Bonahan,** who formerly represented the company at Madison, Wis., has been appointed to succeed Mr. McCue.

A. A. Schneider, formerly with the Raw Materials Department of the Midvale Steel and Ordnance Co., and Cambria Steel Co., has been appointed manager of the newly created Raw Materials Division of the American Steel Export Company. Mr. Schneider will handle imports exports and domestic sales of certain metals, ores and coal and coke.

E. L. Sullivan has been appointed to represent the Green Engineering Co. in the Pittsburgh district including western Pennsylvania, eastern Ohio and western West Virginia. Mr. Green has been a special representative for the McDonough Regulator Co. for the past ten years and he has devoted all of his time to special investigations pertaining to the securing of more efficient boiler and furnace operation.

Charles E. Gradwell, of the firm of Gradwell & Phelis, Birmingham, England, will leave for China as soon as he places certain contracts in England. He has been appointed special buyer of scrap for the Hofmann-Sproul Co., of Philadelphia. This latter company handles scrap, new materials, second-hand specialties, chemical products, etc. The following men have recently joined the Hofmann-Sproul organization: E. R. Dowd, formerly with the Tioga Steel and Iron Co., and again with the Bethlehem Steel Co.; E. R. Cumbbell, formerly with the American Steel Foundries; Walter Maccallum, chemical engineer.

Obituary

Eben Briggs Thomas, for 15 years president of the Lehigh Valley R.R., died at his home in Morristown, N. J., on Sept. 4. Mr. Thomas was succeeded as president in February, 1917, by E. E. Loomis, and up to the time of his death was chairman of the executive committee of the board of directors of the company.

Edward L. Stephenson, president of the E. L. Sternberger Coal Co., died at his home in Clifton, Ohio, recently at the age of 57 years. In addition to his position at the head of the Sternberger company, at Jackson, Ohio, Mr. Stephenson had extensive busines intersts in the town at which the mines are located. During the war his application to change his name from Sternberger to Stephenson was granted by court. His widow and six children survive.

Coming Meetings

Coal Mining Institute of America will hold its annual meeting Dec. 3, 4 and 5 at Pittsburgh, Penn. Secretary H. D. Mason, Jr., Pittsburgh, Penn.

Alabama Safety Association will hold a field meeting Oct. 25 at Birmingham, Ala., at which first-aid and mine-rescue contests will be held. W. B. Plank, engineer in charge of the Mine Rescue Bureau at Birmingham, Ala., is chairman of the Board of Managers.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

American Mining Congress will hold its 22nd annual convention Nov. 17-21, at the Planters Hotel, St. Louis, Mo. Secretary J. F. Callbreath, Munsey Bldg., Washington. D. C.

The Bureau of Mines on Sept. 30 and Oct. 1 will hold a national first-aid and mine-rescue contest at Pittsburgh, Penn. Included in the events will be the dedication of the Bureau of Mines Building.

National Exposition of Chemical Industries will hold its first annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

The National Safety Council will hold its annual meeting Oct. 1 to 4 at Cleveland, Ohio. Secretary, S. J. Williams, Chicago, Ill.

Industrial News

Thornton, Ky.—A. C. Craft has leased coal lands on Thornton Creek, and will install new development.

Bluefield, W. Va.—A number of new houses for miners are under construction at the plant of the Ennis Coal and Coke Co. at Hiawatha (Mercer County) W. Va.

Baltimore, Md.—The Western Maryland R.R.'s coal pier at Port Covington was destroyed by fire recently. The pier—1000 ft. long—together with cars and quantities of coal were destroyed.

Bluefield, W. Va.—Recently the holdings of the Davy Pocahontas Coal Co. were sold by the receivers, Dr. W. R. Iaeger, of Ware Neck, Va., and Geo. W. Atkinson, of Baltimore, Md., for $40,000.

Paintsville, Ky.—The North East Coal Co., Henry Laviers, manager, has recently purchased the Fluhart Collieries Co's operation at White House, Ky., and has started considerable reconstruction work.

Grantsville, Md.—The Georges Creek Coal Co. is understood to be arranging plans to increase the capacity of its works from 150 to 300 tons daily. Harry E. Weber, Third National Bank Building, Cumberland, is president.

Philippi, W. Va.—Operations have been started by the Estella Coal Co. at its new plant near this city on the opposite side of the Tygarts Valley River. The company will find it necessary either to bridge the river or to construct a bucket conveyor system across it.

Beechwood, W. Va.—The local properties of the Consolidation Coal Co., known as the Beechwood mines, have been acquired by new interests, headed by George S. Connell and Joseph J. Buttermore, Connellsville, Pa. The new owners are planning for the operation of the mines at capacity.

DuBois, Penn.—At a meeting of the DuBois Coal Corporation, held at Reynoldsville, Penn., the following permanent officers were elected: D. M. Straitwell, of Reynoldsville, president; N. V. Cossaboon, Salamanca, secretary; Edward Montgomery, DuBois, treasurer.

Powhatan, W. Va.—Plans have been completed by the Mohawk Coal and Coke Co., on Tug River (McDowell County) with headquarters here, for the construction of a modern tipple. Col. L. E. Tierney is also the president of the Powhatan Coal and Coke Co. located on Elkhorn Creek, at this place.

Chattanooga, Tenn.—The Raccobh Coal Co., recently acquired by new interests, is arranging for the installation of new machinery and equipment at its properties, Raccoon Mountain mines, near Chattanooga, to increase the output to a total of about 300 tons a day. W. L. Weaver is in charge of operations.

Bluefield, W. Va.—The Carter Coal Co., located on Lewis Creek, in Russell County, Va., was sold at public auction. The company, it is said, brought $33,000, this having been the bid of W. R. Crenshaw, of this city. Mr. Crenshaw said that he was not at liberty to make known whom he represented.

Chapmansville, W. Va.—T. Truston Stiles, Jr., (Robson-Prichard Building) and C. R. Conner, Huntington, have recently completed negotiations for the purchase of coal properties located on the Guyan Valley R. R., comprising a total of 1105 acres. Plans are being arranged for the development of the property.

Chicago, Ill.—The Chicago Pneumatic Tool Co. announces the removal of its Cincinnati office from the Mercantile Building to the Walsh Building, where a service station with a complete stock of tools and repair parts will be kept. The announcement is also made of the appointment of Fred Gehbauer as special Navy Yard representative, with headquarters at the company's Philadelphia office.

Independence, W. Va.—The Pyramid Coal Co., of this place, has just purchased the property of the Irving Coal Co.—both of Preston County. It is the intention of the Pyramid company to improve and enlarge the plant of the property acquired, and catalogs from machinery and accessory houses will be appreciated. The mine of the Pyramid company is at Hardman, W. Va. C. D. Stewart is president.

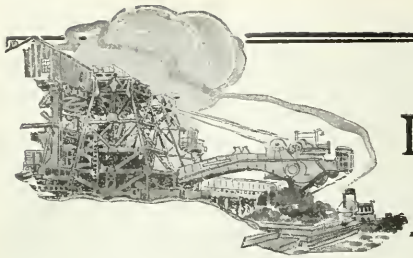
Bluefield, W. Va.—A new coal field on Mill Creek in the Pocahontas field will be opened for development through the building of a branch of the Kanawha, Glen Jean & Eastern R.R. up Mill Creek. Construction work on a mile and a quarter stretch of the branch will be started shortly and as soon as construction work is finished the Lee Coal Co. will begin shipping coal from this section.

South Milwaukee, Wis.—The Bucyrus Co., of this place, announces that it has opened a Cleveland office in the American Trust Bldg., Cleveland, Ohio. This office will be in charge of E. G. Lewis, formerly with the New York office of the Bucyrus company, and more recently president of the New Jersey Slag Products Co., Hoover, N. J. Mr. Lewis has had a long experience with contracting and excavation work of every description.

Wheeling, W. Va.—The Woodland Coal Co. has completed arrangements for the sinking of two shafts on Fish Creek, in Marshall County, with the C. L. Miller Co., of Scottdale, Penn. One of the shafts will be 181 ft. and the other 203 ft. deep. The sinking of the shafts in question marks the beginning of active operations on the tract of 3000 acres which the company has had under option for several years. The company was organized only a short time ago with a capital of $400,000. Arrangements have also been made for the construction of office buildings, miners' houses, etc. as well as for an electric light plant.

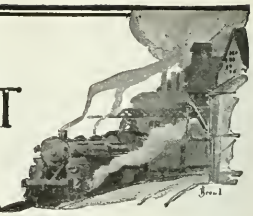
New York, N. Y.—The Worthington Pump & Machinery Corporation announces its purchase of the plant, patterns, accounts, patents and other assets of the Epping-Carpenter Pump Co., of Pittsburgh, Penn. The plant will be operated as the "Epping-Carpenter Works." Orders and contracts now in hand will be completed by the Worthington corporation and all further business will be for its account. Remittances should be made to and all correspondence should be addressed to the Worthington Pump & Machinery Corporation at the Epping-Carpenter works, Pittsburgh, Penn.

New York, N. Y.—Pulverized coal is finding application in many industries. The Garred-Cavers Co., of this place, reports that it has made contracts and issued licenses for the use of its process at a number of smelters, including the International Nickel Co., of Canada, Ltd., and the Tennessee Copper Co. The results of experiments at the smelters of these companies have been made public and more recently experiments have been carried out at a smelter in Peru with quite encouraging results. W. J. Hamilton, the consulting engineer of the Garred-Cavers Company, also reports the use of pulverized coal in blast furnaces.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Soft Coal Market Dull—Buyers Want Only Best Grades—Awaiting Miners' Demands—Lake Trade Active—Strong Demand for Domestic Sizes of Hard Coal —Egg and Nut Coal Now in Short Supply

THERE is no life to the soft coal market in the eastern section of the country. The demand for the steam sizes is even less pronounced than was the case last week. The larger consumers who contracted for their entire season's requirements are receiving their full quota every day, and other buyers exercise keen discrimination and accept only the most desirable grades. However, the present condition of the market has not resulted in any radical changes in price. In the Middle West territory there is a strong demand for prepared coal, though the inquiry for steam coal appears to have suffered a relapse.

Operators are not expressing any opinions at this time as to the demands being formulated by the miners now in convention at Cleveland, preferring to discuss the matter when all the demands shall have been presented.

The lake trade is rather active, although limited car supply is restricting lake shipments to a certain extent. The demand for coal from the Northwest is still good, and the movement will undoubtedly continue until late in November. Reports show that some congestion at the docks is hampering shipments, and dumping for the past three weeks are reported as being behind last year's figures.

There has been no apparent change in the anthracite situation. Demands continue strong for all the domestic sizes. Stove coal is more easily obtainable than egg and nut, which show signs of becoming scarce. Many of the early orders on the dealers' books have already been delivered, and if shipments of hard coal from the mines continue on the present basis no serious trouble is anticipated.

Shippers continue to report large demands from Canada, but not so much talk is heard of premiums being offered. Buyers there do not appear to be so eager as they were, as the supply of coal is becoming larger.

WEEKLY COAL PRODUCTION

The observance of Labor Day as a holiday in some districts and not in others renders difficult of interpretation the reports of coal production during the week ended Sept. 6. Production is estimated at 9,660,000 net tons, an absolute decrease of 7.6 per cent. compared with the week before. While the actual production went down, however, the rate of production appears to have gone up. Studies made in 1918 and 1917 indicate that considering the country as a unit Labor Day counts for only about 0.3 of an ordinary working day. Assuming that the same rate will hold true for 1919, the average production per working day during the week of Sept. 6 would be 1,823,000 tons, as high an output as has been attained this year. Whatever the precise level of the daily average, the conclusion appears warranted that production is at least maintaining the mark set in late August.

Anthracite production, like bituminous, felt the effects of the Labor Day holiday. The total output during the week ended Sept. 6 is estimated at 1,481,000 tons, a decrease of 465,000 tons, or 24 per cent., when compared with the preceding week. The drop in production was less, however, than that which accompanied Labor Day last year, when the week's output fell off 642,000 tons, or 28 per cent.

The slight decrease in production noted in last week's issue is now shown by the detailed reports of the operators to have been due to shortage of cars. The decrease would have been more noticeable had not the less satisfactory car supply been partially offset by more satisfactory labor and market conditions.

The labor shortage reported recently from Kansas, Missouri and Iowa is disappearing as the mines offer more continuous employment under the influence of stiffening demand. In Iowa, for example, losses of output attributed to shortage of labor decreased from 7.7 per cent. of capacity in the week of Aug. 23 to 3.0 per cent. the following week. Pennsylvania operators still report shortage of labor, but conditions improved slightly during the week in all districts except Westmoreland. Marked improvement in the labor situation occurred in Illinois, where, following the cessation of the recent strikes, losses due to labor fell from 20.5 to 13.6 per cent. of capacity.

The gradual resumption of industrial activity continues to be reflected in the quickening demand. Taking the country as a whole, losses due to lack of market were only half as great in the week of Aug. 30 as during the week before (1.8 per cent. as compared with 3.6 per cent.). Demand weakened somewhat in Ohio, in the high volatile fields of southern West Virginia and in the Hazard district in Kentucky, but in Harlan County, Alabama, Illinois and Iowa it was more active. "No market" has become the least important factor limiting production.

Reports of car shortage were more frequent than during the preceding week. Except in Ohio, Alabama and the Pocahontas field, the situation changed for the worse. For the country as a whole the percentage of full time capacity reported lost on account of lack of cars was 24.1 per cent. during the week of Aug. 30 as compared with 16.8 per cent. the week before. In part the change was more apparent than real. The car supply, instead of improving during the week of Aug. 30 became somewhat less satisfactory. At the moment, the principal obstacle in the way of increasing production is shortage in cars.

A 7 per cent. increase over the preceding week brought the production of beehive coke during the week of Sept. 6 to the highest mark attained since last February. The total output is estimated at 418,020 net tons as compared with 417,461 tons during the week of Aug. 30. Most of the increase occurred in Pennsylvania and Ohio. Producers in the Rocky Mountain district also reported decided gains.

The output of beehive coke is a sensitive business barometer. Although the rate of production is still far short of a year ago (448,020 tons as compared with 616,438 in the corresponding week of 1918), the steady increase which has now continued without interruption since last May is a significant indicator of the general resumption of industrial activity.

For the third time in succession, the tonnage of bituminous coal dumped at Lower Lake ports was less than during the corresponding week of 1918. Dumpings for the week ended Aug. 31 are reported as 669,484 net tons compared with 1,139,956 tons a year ago.

BUSINESS OPINIONS

Dry Goods Economist—So high are prices of better grades of women's garments that we are creditably informed that in some centers the demand for women's garments in the high-class specialty stores are beginning to show a decline. It seems clear that stores of this character will be compelled to lower their profit percentage, in order to meet the requirements of their clienteles.

Marshall Field & Co.—Current wholesale distribution of dry goods was very much larger than during the same week a year ago. Orders from road salesmen for immediate delivery showed large gains over the same period of 1918. Orders for future delivery are quite satisfactory. The number of customers in the house is approximately the same as during the corresponding week of 1918. Collections are excellent.

American Wool and Cotton Reporter—Although the wool market is still comparatively quiet, there seems to be a better feeling, more inquiry and more buying. Prices remain at practically the same levels, although in some cases concessions have been made by dealers to regular customers. Cancellation of export orders is going on to a considerable extent, because of the decline in the foreign exchange market. This situation is regarded as serious and is one of the most disturbing elements in the current domestic position.

Dun's—With the labor situation still disturbing and the future holding various elements of uncertainty, conservatism in business remains conspicuously present, though there is less hesitation than recently. Reviving activities in some lines which have lately been halting, while buyers awaited price concessions that have not been absent, give conditions a stronger appearance, and no inconsiderable impetus to manufacturing and distribution comes with the advancing season. The best feature, however, is the fact that prices of not a few commodities have fallen abruptly from previous extreme levels, and that in some quarters, at least, the crest seems to have been definitely passed.

Bradstreet's—With the advance of the Fall buying season and the activity engendered by active purchasing by retailers

from Western, Northwestern and Southern jobbers, there is a rather more pronounced tinge of optimism in the trade advices this week. This, of course, does not conceal the fact that in some big primary lines and markets at the East there is quiet, coupled with uncertainty as to the outlook for the rather more distant future, this having its rise largely in the continued unsettlement of labor, the threats of new strikes, the doubtful outlook in the exchange markets and the further shading of crop prospects, except of corn, indicated by the Government reports.

Atlantic Seaboard

BOSTON

Market heavy. Only scattered inquiry. Prices eased materially on all except highest grades. Cancellations become frequent. Coal over Philadelphia and New York piers also affected by conditions. Hampton Roads coals continue firm. Delivered prices strong for inland delivery.

Bituminous—The dullness of steam trade is even more pronounced than was the case last week. The market is heavy and salesmen are out canvassing for orders to take their operators through September. Even on fancy grades it is not impossible that shippers who have consistently declined business since June 1 will again look for spot orders within a few weeks. Labor and car-supply are much better in most of the districts and operators who were apparently able to start only a few cars each day are now snapping up to quota on every order they have. In other words, the market here has flopped back to the situation that prevailed early in the spring, and buyers are theoretically without interest in current quotations. The larger consumers, while still accepting deliveries, are shutting out the less desirable grades.

Inquiry is only scattering and conned to small tonnages. Buying of this sort comes mostly from small users who were not in position to make contracts early in the season. There are only a few cases where steam-users had prevision enough to delay purchases in anticipation of easier conditions in the fall. The drift was all the other way.

Prices the past few days clearly show the result of recent heavy output. Ordinary Clearfield from regions around Philipsburg have been quoted down to $2.40 within a few days and this is quite a notable drop from the $2.85@2.90 level that obtained only a few weeks ago. "D" vein coals have eased off from $3.20 at first hand to $2.90@3.00 and further concessions are looked for. The low-ash, low-sulphur specialties from favored sections in Cambria County are still held at a high range by the discriminating purchases of factors who purchase for off-shore or bunker use, but it is quite likely that these grades also will show some recession in price in another fortnight.

A considerable volume of coal has been coming forward on open orders and on sales of this kind cancellations have latterly become frequent. There is also a tendency to complain of quality and there never was a season when the average buyer was so well informed as to mine origins as is the case today. There is something of a tendency on the part of operators to over-ship, and more than a few cases have been heard lately where this has been a practice greatly to the inconvenience of the consignee.

While until quite recently the demand was active and strong for good grades available at the piers for dumping, the current market both at Philadelphia and at New York has shown the effect of depressed prices all-rail. The level of quotations has dropped 20c@30c. since Sept. 10, and further reductions may be expected. The demand for export has not been steady, and both in New York harbor and on Long Island Sound there has been a slump in inquiry.

Contrary to reports on coals of different origin, the demand for Pocahontas and New River at Hampton Roads continues strong, with no sign of softer conditions later. Coal is coming down from the mines in good volume and the piers are being worked to capacity. Even now there are instances of demurrage on coastwise steamers, but apparently consignees at this end make no complaint so long as the coal is forthcoming. It is one of the strange features of this market this season that at the same time that Pennsylvania coals are being turned down because the territory all-rail is generally over-supplied there are still buyers who have so pronounced a preference for the high-grade coking coals that they are willing to pay extraordinary differentials to get the fuel they feel is best suited to their use. More than $2 differential is being paid at certain points by steam-users who maintain that attitude of discrimination.

Current quotations of bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F. o. b. mines, net tons...	$2.40@2.85	$2.90@3.35
F. o. b. Philadelphia, gross tons.....	4.55@5.05	5.10@5.60
F. o. b. New York, gross tons.....	4.90@5.40	5.45@6.05
Alongside Boston (water coal), gross tons.....	6.65@7.15	7.20@7.75

Georges Creek is quoted at $3.70 per net ton, f. o. b. mines.

Pocahontas and New River are quoted at $6.00 @6.50 per gross ton f. o. b. Norfolk and Newport News, Va., in response to export demand. There continue practically no sales for coastwise shipment. Ocean Providence these grades are quoted at $9.00 @9.25.

Anthracite—The retail trade has less snap, especially in the cities. It is still warm weather, and while there are a good many cellar bins to be filled between now and November a lot of progress will be made the next 30 days. Due to desperate measures taken by dealers in certain ports the receipts latterly have been in larger volume than during any similar period since February. At Providence, R. I., for example, figures for the five months' beginning Apr. 1 show receipts that compare very favorably with other years. Among those well-informed the impression is gaining ground that the coming winter is not likely to see the serious shortage that was feared. The present difficulties with miners in the Delaware & Hudson and Delaware, Lackawanna & Western sections of course have their bearing, but there is by no means the anxiety in trade circles that was evident a month ago.

NEW YORK

Demand for domestic coals easier. Egg size is the shortest followed by stove and chestnut in the order named. The smaller sizes are quiet. The bituminous market is quiet. Buying is slow and there is plenty of coal at the piers. New England buyers urge quick deliveries. Consumers discriminate as to quality. Lower prices expected as a result of Congressional inquiry.

Anthracite—The strike of the mine workers in the Wyoming region left no impress upon the local market. There seemed to be no reduction in the tonnage received here and the report of the Railroad Administration shows that more coal was dumped over the local piers than in the previous week.

There has been no apparent change in the situation as regards the domestic sizes. Demands continue strong for all the larger coals. Stove is in better supply than egg, which dealers now designate as the really short size. Chestnut is moving rapidly, but better along the rails than in this market. Pea is in good supply and moving easily.

The local market is in fair condition. Demand is steady but not pressing, and retail dealers are seeing daylight so far as orders are concerned. Most of the early orders have been delivered and if shipments are maintained on the present basis no serious trouble is anticipated. A few days of cool weather will increase the demand on the retail dealers, but these new orders will be mostly of ton or less-than-ton orders and will be easy to deliver.

Shippers continue to report heavy demands from Canada, but not so much talk is heard of premiums being offered. With the pressure easing off and the supply of coal becoming larger, buyers are not so anxious for quick shipments and are willing to take chances in getting the coal through in a reasonable time. What is most feared now is transportation difficulty or an exceptionally severe winter.

The retail dealers in New York City are not complaining. They are in most instances receiving fair shipments and some are said to have good stocks on hand. Egg coal is the shortest, the pressure on stove being easier.

Considerable chestnut has been absorbed by the local dealers, although New York City has never been looked upon as a market for that size.

The smaller sizes are quiet and demand is slow. Buckwheat is being taken care of by the producers, who are storing large quantities. Rice and barley are long and quotations for lots that must be moved are easy.

During the seven days ended Sept. 12 there were 5540 cars of anthracite dumped at the local railroad docks as against 4886 cars the previous week, an increase of 654 cars.

Quotations for company, white ash coals, per gross tons, at the mines and f.o.b. New York tidewater lower ports, follows:

	Mine	Tidewater
Broken	$5.95	$7.80
Egg	6.35	8.20
Stove	6.60	8.45
Chestnut	6.70	8.55
Pea	5.30	7.05
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—This market is quiet. Demand has dropped because, some shippers say, buyers believe that lower prices will result as the result of the Congressional inquiry into the coal industry. The largest consumers here are nearly out of the market except for small lots. Contract coals are being readily taken and this causes a shortage of the better grades which continue to be in good demand.

Inquiries here have taken a sudden drop. Buyers are discriminating as to quality of coal offered and are not willing to take anything offered.

However, the present condition has not resulted in much change in price quotations. These for spot coal at the mines show a few small changes from last week while the quotations on pool coals indicate several changes.

Reports brought here from the Central Pennsylvania fields indicate some unrest among the workers but not sufficient to make the employers believe there will be any serious trouble this winter. Labor continues to be short and judging from the number of foreigners applying for passports at the New York Custom House is not likely to increase in the near future. The mines are not working near full time, but the car supply, especially along the Pennsylvania, shows a slight improvement.

Buying by the railroads is reported as heavy and considerable tonnage is being taken care of in this way.

Dumpings at the local railroads piers during the week ended Sept. 12 were 5570 cars of bituminous as compared with 5340 cars the week previous, an increase of 230 cars.

There is considerable coal in the various pools and quotations for coal, f.o.b. at the pier range about as follows: Pools No. 1, 9 and 71, $5.55@$5.90; No. 10, $5.15@$5.35; No. 11, $4.90@$5.10; and Nos. 18 and 41, $4.80@$4.90.

Quotations for spot coals, net tons, at the mine range about as follows:

	Spot
South Fork (best)	$3.25@$3.50
Cambria (best)	3.00@ 3.25
Cambria (ordinary)	2.70@ 2.90
Clearfield (best)	3.00@ 3.25
Clearfield (ordinary)	2.70@ 2.90
Reynoldsville	2.85@ 2.90
Quemahoning	3.25@ 3.50
Somerset (medium)	3.00@ 3.25
Somerset (poor)	2.65@ 2.75
Western Maryland	2.65@ 2.75
Fairmont	2.50@ 2.65
Fairmont ¾ in.	3.10@ 3.25
Latrobe	2.75@ 2.90
Greensburg	2.75@ 3.00
Westmoreland, ¾ in.	3.50@ 3.75
Westmoreland run-of-mine	3.20@ 3.35

PHILADELPHIA

Anthracite trade very active. Seasonable weather keeps dealers busy. Heavy tonnage in cellars. Stove, nut and egg most in demand. Premiums offered for favored sizes. Prediction of plenty fuel by winter. Strike has not yet affected this territory. Dealers in prosperous condition. Pea fast becoming a problem. Steam coals still quiet. Some buckwheat sold off. Bituminous eases slightly. Light price shading. Fairmont holds strong despite embargo.

Anthracite—With seasonable weather again prevailing the market is assuming a tone of regularity. There continues to be much pressure for delivery, especially since most of the vacationists have opened their homes and want coal. The fact that there is a strike of mine workers in the upper field has also affected the consuming public here.

It is believed it can now be said with some degree of assurance that there is little chance of a fuel famine locally this winter.

The great pressure exerted by the dealers at this time is believed in 90 per cent. of the cases to be for the reason that they are anxious to fill every piece of business that has come their way. The great strain continues to be on stove and nut, and from the information we can gather the amount of unfilled stove orders is in no way decreased, as the largest percentage of the new business is for this size. Many people when they find they cannot get stove express a willingness to substitute nut, but the time has long since passed when this can be done, for nut is almost as hard to get as stove. The yards have no stocks of these sizes whatever, and the point has been reached where the dealers in order to make deliveries in certain instances very readily pay premiums to individual shippers for a few cars of the above sizes.

The only size that is plentiful now is pea, and it must be admitted that this size is fast becoming a problem for all concerned. With the retailers they have been taking in pea all summer so as not to lose any of the larger sizes. Many of them have now reached the point where they are beset to find storage room for any more. This is particularly true of those concerns who have not been accustomed to store heavily on this size. Even some of the bigger dealers are beginning to feel the pressure, too. This is shown by quite a number of advertisements appearing in the local papers whereby the retail men are urging the public to take in pea coal at this time.

Some of those in the trade profess to believe that unless the strike in the upper field is settled very quickly it will likely have the effect of making the market for domestic sizes tighter than ever. While no tonnage from the affected district is ever shipped into this territory, yet the local coal comes into competition with that district in other territories and it would have the tendency to increase the premiums on certain sizes and in this way take tonnage from this district. There is also the possibility of the trouble spreading and thereby directly affecting this market, and it is this feature that has kept orders coming into local retailers in goodly number recently.

The steam trade fails to display any particular activity. Buckwheat is the only size that is being called for in any particular volume, and even this is not sufficient to absorb the production. There is much free buckwheat on the market and jobbing houses are able to procure it at prices around $3.15@3.25, although the companies rigidly maintain their price of $3.40. It is believed, though, that the turn of the road in steam sizes is not far off, as both rice and barley lately have shown some tendenly to quicken; at least inquiries are in greater number.

Bituminous—In the bituminous market there has been just the slightest tendency to easing off at times. This it is believed to be due to better car supply, at least in the Pennsylvania regions, where the average has been close to 70 per cent. recently; and in addition the rail movement has been good. Were it not for the fact that many big users delayed stocking up till late in the season, it is believed the market would be filled with coal. However, the desire to increase stocks is growing, but even this demand has not been such as to stimulate the price situation, and there has been a slight shading off in this respect. It is also noticeable that strictly brokerage houses have lately had a heavier supply of better grade coals to offer. For weeks past the commission men have had very little better than Pool 18 coal to offer, but recently they have appeared with fair stocks of Pool 10.

The Fairmont coals have held their own remarkably well, for with the embargo against this fuel at the Baltimore piers local houses confidently expected that a heavy tonnage would come on this market at reduced prices. As a matter of fact more than one broker took a chance at making sales in anticipation of lower prices and are now having the greatest difficulty to cover their commitments, and in some instances have done so at an actual loss.

The prices per net ton in this market are about as follows at this writing:

Georges Creek Big Vein	$3.30@3.40
South Fork Miller Vein	3.30@3.40
Clearfield (ordinary)	2.90@3.10
Somerset (ordinary)	2 90@3.00
Fairmont lump	3.20@3.30
Fairmont mine-run	3.00@3.10
Fairmont slack	2.50@2.60
Fairmont lump (ordinary)	2.95@3.00
Fairmont mine-run (ordinary)	2.70@2.80
Fairmont slack (ordinary)	2.50@2.65

BALTIMORE

Congestion of coal at tide due to insufficient vessels to handle big export flow causes continued embargoes. Market a little weaker as to price of steam coals. Hard coal men decide not to advance August prices.

Bituminous—A great rush of coal to tide, which came with more liberal car supply and as a result of the immense export business offering or closed, has caused a congestion at the pier approaches which has necessitated an almost uninterrupted embargo against shipments to either Curtis Bay or Canton. The number of vessels reporting for the first week of September was far below requirements, although a total of 65,985 tons were dumped into foreign carriers. This record, if maintained, would be sufficient to roll up a total for the last four months of the year that would make 1919 the banner export year in the history of the trade. As a matter of fact, there is every prospect of greatly increasing the present run.

The only pool open most of the time recently has been No. 9, which handles coal largely on local account. The market was naturally a little weaker under the congestion, especially as to steam fuels. Pool 71, recently holding stiff at $3.75, is now offering to the trade anywhere from $3.40 @3.75, with $3.50 about the average. Other steam pools are bringing nine basis to the trade about as follows: No. 9, $3.30@3.40; No. 10, $3@3.20; Nos. 11 and 18, $2.75@2.80; No. 34, $2.35. Gas coals hold pretty well to the figures of a week since, although there were probably some sales of three-quarter low sulphur below the accepted average of $3.50. Medium sulphur held around $2.75@3, while run-of-mine continued at $2.35. A move to ask reopening of the Locust Point pier of the Baltimore & Ohio and the Port Covington pier of the Western Maryland has been halted, in part at least, by the burning last week of the latter structure, causing a loss of about $700,000. It is now planned to build a new steel pier in its place.

Anthracite—Members of the Baltimore Coal Exchange have decided not to advance prices before the first of October at least on steam sizes. Many dealers had felt that the premiums now being paid on independent coal of from 75c. to $1 or even more a ton, would warrant a higher price at once in order to bring back the gross margin of profit to some dealers to the figures allowed by the Fuel Administration during the war. Others pointed out that the September sales as a rule are light, and that there would not be any great effect on income as a result of a September increase. It was then decided to permit the entire question to remain open for further discussion when the conditions to prevail in October become more certain. Meanwhile dealers here complain that certain popular sizes are short.

Lake Markets

PITTSBURGH

No opinions on miners' convention. Car supplies still poor. Production unchanged. General market steady with fancy prices occasionally paid.

Coal operators of the Pittsburgh district refuse to express any opinions as to the demands being formulated by the miners' convention in Cleveland, feeling that the serious discussion that must occur later in conference makes it undesirable that any opinion should be expressed at this time.

The situation as to car supplies is not visibly improved, and production continues as formerly at between 55 and 60 per cent. of mine capacity, with labor supply estimated as sufficient for a 75 per cent. production if sufficient cars were furnished. Orders on books, it is claimed, would admit of an even heavier production than 75 per cent. if there were sufficient supply of cars and of labor.

Lake shipments continue at about 15 000 tons a day from the district, or much less than earlier in the season, and will show further decreases before the end of the month. Supplies for the line trade do not appear to be any more adequate than formerly, as while shipments are larger demand is also greater.

Occasional sales are made of small lots of spot steam and gas coal at prices above the general market, which remains quotable as follows: Steam coal: Slack, $2.10@2.30; mine-run, $2.50@2.60; Gas: Slack, $2.20@2.40; mine-run, $2.50@2.70; prepared sizes, $2.60@2.80, per net ton at mine, Pittsburgh district.

TORONTO

Conditions show little change. Shipments from mines slightly increased. Deliveries still much in arrears. Bituminous not much in demand.

About the only change in coal market conditions during the last few weeks is a slight increase in the volume of anthracite shipments arriving from the mines. This however is not sufficient to enable dealers to overtake delayed deliveries, which are still much in arrear. The effects of the strike at the mines have not as yet made themselves felt, but unless a speedy settlement is arrived at, dealers anticipate a serious shortage. There is plenty of bituminous on hand to supply the demand, which continues comparatively light.

Quotations for short tons are as follows:

Retail	
Anthracite, egg, stove, nut and grate	$12.50
Pea	11.00
Bituminous steam	8.00
Slack	7.00
Domestic lump	10.00
Cannel	11.50
Wholesale f. o. b. cars at destination:	
Three-quarter lump	6.25
Slack	5.15

BUFFALO

Somewhat sagging bituminous market. Prices quite uncertain. Pittsburgh stiffening on account of car shortage. Anthracite still moving well in spite of strikes at both ends.

Bituminous—Jobbers call the trade unsatisfactory, though they are all selling a fair amount of coal. Of late the car shortage has been becoming worse. The prospect is that the shortage will last right into the winter. If it does, it is hard to see how the supply of coal can be kept up or the prices kept down.

Everybody in the lake shipping trade is eager to see the strike at Duluth ended, but it hits the bituminous trade much harder than it does the anthracite, for this port could rush enough coal forward late in the season to meet the shortage there if the strike does not last an improbable length of time.

Bituminous prices are much as usual. Slack has run up in price, showing that it is taking the place of mine run. Quotations: $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for three-quarter, $4.20 for mine run $4.10 for all slack, $4.60 for smokeless, $5.70 for Pennsylvania smithing, $6.75 for domestic coke, $5.75 for breeze coke, all per net ton, f.o.b. Buffalo.

Anthracite—The conditions do not change much. Consumers are asking for more than is to be had, but shippers and distributors think a good average amount has been put into cellars and are inclined to take an unconcerned view of the outlook. Lake shipments keep up better than might be expected. No very exact estimate can be made of the through rail-line trade, but it is said to have suffered considerably on account of the demands from the other branches of the trade.

CLEVELAND

Curtailed car supply has reduced receipts of bituminous coal in northern Ohio to the bare demands of consumers. With the strike of dock workmen at the head of the Great Lakes still on, the lake trade is virtually dead for the present. Operators here insist they have no fears of a strike of mine workers Nov. 1.

Bituminous—Efforts of the larger steam-coal consumers to "get ahead of the game" are proving fruitless, for southern and eastern Ohio operators are able to bring in just enough coal to meet current demands. This is the condition despite the fact lake shipments are nil just now. The mines are undermanned due not to any but steady departure of aliens for Europe, but even these short forces are not furnished with enough cars to keep them going more than 60 per cent. of the time.

Prices continue firm, but have not advanced. For this the operators take credit, saying they are keeping down prices in the hope they may help break the "vicious cycle" of rising commodity costs. On the whole, bituminous coal prices here are just about where they were when Government control ended, with $2.35 ruling for slack and mine run and $2.60 for prepared sizes. At the lowest point of the decline following the signing of the armistice, slack and mine-run dropped to $1.20 and prepared sizes to about $2, showing the recovery in the latter less than in the two former grades. Domestic bituminous coal prices,

however, are constantly being scaled upward by the retail dealers.

Uppermost this week in the Cleveland market is the convention of the United Mine Workers. All indications point to the expected demands—a 6-hour day and 5-day week.

Pocahontas and Anthracite—Supplies of both grades continue far under normal, and retail dealers are unable to make deliveries under two weeks. Prices that have not been advanced are firm and likely to be boosted soon. Forked Pocahontas has been marked up 50 cents, to $10, delivered.

Lake Trade—Most operators believe the lake season is about over. Efforts to man the docks at the head of the Great Lakes with strike breakers are not proving very successful, and shipments are about 50 per cent. of normal. In the early part of the season upper lake dock interests failed to move coal off the docks, while now they are unable to move it off the docks or unload vessels. Shipments now are about 350,000 tons under what they were at this time last season. Shipment of coal via railroad from the Indiana and Illinois fields will be the only way out for upper lake coal consumers, it is believed.

Prices of coal per net ton delivered in Cleveland are:

Anthracite:	
Egg	$11.75@11.90
Chestnut	12.00@12.20
Grate	11.75@11.90
Stove	11.90@12.10
Pocahontas:	
Forked	9.50@10.00
Lump	8.75@ 9.00
Mine-run	7.50
Domestic bituminous:	
West Virginia splint	8.00@8.25
No. 8 Pittsburgh	6.60@6.90
Massillon lump	7.70@7.95
Cannel lump	7.85
Coshocton lump	6.85
Steam coal:	
No. 6 slack	4.60@4.80
No. 8 slack	5.40@5.50
Youghiogheny slack	5.25@5.50
No. 8 ¾-in.	5.70@6.00
No. 6 mine-run	4.75@5.00
No. 8 mine-run	5.20@5.45

DETROIT

Demand for steam coal remains rather sluggish; anthracite supply is not attaining adequate volume.

Bituminous—In the steam-coal division of the bituminous trade orders are coming more slowly than they should, jobbers say, if the manufacturing and industrial plants of Detroit are to be assured of an adequate supply of coal for winter needs. It is expected the developments in the mine labor situation may exert an influence on some of the backward buyers, tending to bring about a broader market.

Despite the sluggish aspect of the steam coal trade in Detroit, jobbers are encountering an active demand from customers outside, and this business is absorbing stock, which the jobbers say should be held in Detroit to build up winter reserves of the local consumers. An impression seems to have been created among some of the Detroit buyers that there is a plentiful supply of bituminous and that they will be able to get all the coal they may need at lower prices before winter sets in. The prospect of a strike of mine workers, in the opinion of the jobbers, is likely to provide the stimulus that will accelerate buying.

Meanwhile, the matter of car supply is steadily attaining a place of increased importance as a factor in supply.

Smokeless coal, owing to the demand from the East, is difficult to find in Detroit. Mine-run is held at $2.75@3 a net ton, f.o.b. mines. Hocking domestic lump ranges $3.25@3.50, Hocking egg holds around $3 and mine-run ranges from $2.25@2.40, with slack selling at $1.90@2. Four-inch West Virginia lump is quoted at $4, two-inch lump $3.75, mine run $3 and slack $2.25@2.50. Quotations on Jackson Hill are placed about $1 above those for Hocking.

Anthracite—Household consumers are awakening to the necessity of preparing for winter, and there is a fairly active demand for anthracite, which is revealing to many of the would-be buyers that the outlook is not altogether pleasing. Retailers say they are encountering difficulty in having their orders filled and that shipments are slow in arriving, while stocks in yards are so low as to arouse apprehension of a short supply.

COLUMBUS

The Ohio coal trade continues rather active in every department. Lump and screenings are the strongest sizes, while mine-run is only lagging slightly. Retail trade is especially active in view of heavier buying on the part of consumers. Prices continue strong.

The feature of the Ohio coal trade is the demand for both prepared lump and small sizes, which are selling rapidly in every locality. Screenings, which have been quite slow for some time, recently assumed considerable strength, with the result that buying is active in steam circles. Reserve stocks of small sizes are not large, and many of the consumers are hurrying to get under cover before the situation becomes tighter. With the miners meeting in convention in Cleveland, talking of a higher wage scale and shorter hours, large steam users are getting anxious as to supplies for the winter. Quite a few contracts for screenings have been closed recently, and there is quite a boom in that class of business. Mine-run is not quite so active as screenings, but this is not believed to be permanent and little of that grade is going begging. Railroads are using a larger tonnage, and this is helping the mine-run situation. On the whole the steam trade is more active than formerly, and prospects are for a continuation of the activity.

The domestic trade is active also with buyers in the market in larger numbers than formerly. Many of the contracts booked by retailers early in the season for delivery after Sept. 1 are now being looked after, and this is taking a large tonnage. New business is also coming in well and there is a general tendency among householders to buy now in view of the uncertainty of the future. Pocahontas is quite scarce and little is arriving in central Ohio. Splints are also becoming more scarce, and this is throwing the burden of demand on Hocking and Pomeroy grades. Practically no mines in the southern Ohio field are now idle because of lack of orders. Business is sufficient to keep all going, only limited by car supply and labor. Retail stocks are only fair and many are making strong efforts to increase stocks before the first cold snap. Retail prices are firm at the higher levels and the range is quite wide.

The lake trade is rather active, although limited car supply is restricting lake shipments to a certain extent. The demand from the Northwest is still good and the trade will undoubtedly run into late November. Reports show that some congestion at the docks is holding up a free movement.

CINCINNATI

Fuel supplies slow in coming in and dealers are worried over outlook.

Cincinnati coal men say that the coal situation insofar as it affects their business at this time is a serious one, and one that is growing more alarming as time goes on. They say it is almost impossible to get anthracite or smokeless coal, what little there is drifting into this market being of no consequence. Only one firm is advertising the fact that it has anthracite for sale at $10.50 a ton, but in limited quantities. Soft coal is also scarce. The demand in the past few weeks has grown steadily, and unless something is done real soon there is every likelihood that those who put off buying their coal are going to find themselves handicapped for lack of the fuel this coming winter.

The situation is due to the railroad facilities, the shortage in cars in the Kentucky, West Virginia and Ohio fields showing little improvement, if any, during the past week. Operators in the Ohio district especially are complaining about the car shortage and are fairly begging the Railroad Administration officials for cars in which to haul their product, so as to keep their mines going, there being every evidence that unless the cars are forthcoming at work five days out of the week they are going to seek other employment, which would complicate the situation more than ever.

Retail coal prices were advanced officially at the Chamber of Commerce last Saturday. Smokeless lump and egg coal was quoted at $7.75@8.25 a ton, against $7.75@8 last month. Smokeless run-of-mine was put up 25 cents a ton, to $6.75@7.25 a ton. Coke was advanced 25 cents to 50 cents a ton at $10@10.25.

The advances in the prices served to stimulate the demand from all sources. Much coal is needed for the local market and every effort is being made by the operators and dealers to get it here.

LOUISVILLE

Prospects of better distribution of cars, with some relief from present shortage of cars. Prices firm with steam coal in strong demand at slightly higher prices.

Promised relief has been given the Kentucky operators in more equitable distribution of cars, officials of the Railroad Administration having promised to divert more cars from the South to the Kentucky and Tennessee fields. For some time past cars from the Kentucky and Tennessee fields into the South have been routed by direct route back to the car pool territory, with the result that the supply reaching the operations in the territory of the Southern Appalachian Association has been the smallest shown in any section of the country.

Kentucky operators are doing just slightly better than running two days a week at the present time, mines being oversold and refusing business in most cases. Retailers report a dull demand due to the weather, but are stocking some little coal, and expect an active demand about Oct. 1.

There is a good demand for gas coal, which is moving into various sections for utilities and byproducts plants. These buyers have become scared and are buying mine-run freely. There is still a good movement from mines to the Lakes and to the Northwest. There is also some railroad buying. Southern movement is slowing up fast, as the district is fairly well supplied. It is reported that there is now a very fair export demand for gas coal, with inquiries coming from numerous countries. The Harlan operators are exporting some coal through Savannah and Norfolk.

PITTSBURGH

Market somewhat more active account poor car supply, which is holding production below requirements of the trade. Inquiry for low and medium grade steam coal better, due to inability of consumers to get full supply of best grade fuel. Domestic very active, but none to be had.

This district is at present unable to supply sufficient coal to take care of the demands of the trade, due to the inadequate and uncertain supply of equipment being furnished the mines, many operations being idle several days a week on account of no cars for loading. Consumers are being forced to buy some of the low and medium grades of steam coal recently, the allotment of cars at operations producing the better grades of fuel not being sufficient to allow an output commensurate with the demand for the higher quality of coal. Railroads as a whole have little surplus coal and some of them have already been in the market to supplement the tonnage being received on contracts. Quotations have made no change recently and range about as follows per net ton mines: Big Seam mine-run, $2.30@2.60; Pratt, $2.85@3; Black Creek and Cahaba, $3.45@3.85.

While there is only occasionally a car of domestic coal obtainable in the spot market, almost any price is being offered, premium of 50c. to over September schedule being paid.

Coke

CONNELLSVILLE

Slightly easier appearance in market, but prices not lower. Consumption sharply increased in past few weeks.

The coke market is a shade easier, though minimum prices are hardly quotable at any lower level. As for some time past there is a delicate balance, the least excess of demand over supplies making the market very strong while the accumulation of only a few cars on track gives the market an easy appearance.

There have been several cases in the past fortnight of furnace interests being compelled to buy prompt coke in the open market because shipments against contracts were not up to requirements. Investigation by the Journal has showed that the operators were doing their best and no suspicion is entertained that any operators are selling on the spot market coke that they should be delivering on contract.

Consumption of Connellsville coke is much greater than a few weeks ago, as a number of furnaces, normally tributary to the region, have gone into blast. Struthers blew in week before last, and Ella, Claire and Hannah last week. Hannah is a stack of the Republic Iron and Steel Co., whose byproduct plant at Youngstown supplies the Hazelton furnaces, while Atlantic and Hannah must use Connellsville coke. The company has a Connellsville operation but had to buy coke for Hannah because it

could have produced the additional coke at its own ovens only by curtailing coal shipments to the byproduct plant, which would then have had to buy coal. It was regarded better to buy coke than coal, this reflecting the tight condition in the coal market. Connellsville coke is bringing only the coal value plus the bare cost of coking.

Foundry coke continues in good demand, with offerings far from plentiful, and box-car shipments very hard to secure. We quote spot and prompt at $4.75 for furnace and at $6@6.50 for foundry, per net ton at ovens.

The *Courier* reports production in the Connellsville and Lower Connellsville region in the week ended Sept. 6 at 263,742 tons, an increase of 21,347 tons.

Buffalo—The coke trade has not materially changed. Furnaces are taking a good amount and are running at more than average speed, with prospect of getting all the iron ore down by lake that is needed. Since the resumption of shipments after the end of the strike an effort has been made to make up for lost time. Prices are strong at $7.60 for 72-hour Connellsville foundry, $7.25 for 48-hour furnace and $7 for off grades, per net ton, f.o.b. Buffalo.

Middle West

GENERAL REVIEW

Strong demand for prepared coal in Middle West. Operators are coöperating in the benefit both of themselves and the general public. Labor situation improved.

There is a strong demand for prepared coal in the Midwest territory. This demand is increasing in strength from day to day, and will probably lead to a stampede on the part of the buying public within a short time. Steam sizes appear to have suffered a slight relapse during the past week. Illinois screenings are selling today at from $1.75@2.20 per ton f.o.b. mines according to the quality of the coal, and the district in which it originates. It is confidently expected that the steam market will strengthen very soon, as the car supply is growing worse from day to day and the labor situation is far from satisfactory. It is also predicted that a great many large users of steam coal will have to close their plants later in the season because they have neglected to store an adequate amount of coal, or lacking the knowledge of the real conditions in the coal industry have misjudged the situation and failed to cover their requirements by contract.

The question of prices on domestic coal deserves some mention in this review. As stated before, the demand for prepared sizes is great. In spite of this, operators and distributors have been maintaining their prices at very reasonable levels. For instance, Franklin County prepared coal is selling at from $3.15 to $3.25 per ton f.o.b. mines. High-grade Indiana coal is bringing the same prices, while the Springfield district and other less favored fields are having no difficulty in getting from $3 to $3.15 or perhaps more for their domestic sizes. The only offenders in the price question appear to be certain small eastern operators who have been shipping some of their coal into western Iowa and Nebraska. We understand from a reliable source that prepared coal has been selling on a basis of $5.50 mines in the territory just referred to.

The tendency on the part of the operators to coöperate rather than work at cross purposes was further shown this week by the combination of some mines in the Springfield, Ill., district. This combination is bound to work a benefit, both from the standpoint of the buying public and the coal industry itself. The Springfield district for a long time consisted of a number of small mines that were engaged in a career of self-destruction by their price-cutting methods. Since 1917, however, these mines have been brought together until now there are three or four large companies that practically control the field. This works as a benefit to the public as the coal buyers have a more reliable and satisfactory source of supply, and as a benefit to the coal industry as it has done away with a number of irresponsible companies that broke the market and fought for one another's business with price-cutting methods, at the first sign of a weak market.

The labor situation we believe is improved in southern and central Illinois. We understand that the I.W.W. or the Bolshevik element among United Mine Workers has met with little success. Several mines are reported still idle after the visits of the band of radicals who started out some time back on a march through the mining districts. It is thought that President Farrington, of the Illinois unions, has the situation in hand.

CHICAGO

Domestic coal in great demand. Steam inquiry has fallen off.

As usual, the market in Chicago is similar to the market in the Middle West, except that perhaps it is intensified to some degree. Domestic coals are in great demand, and even in greater demand than in the country, but steam coals have slumped to a larger extent. Upon looking over the situation, one is impressed with the very marked improvement over conditions in the market as short as a month ago. At that time good southern Illinois coal was selling at from $1.25@1.40 per ton, in some instances, while now it is impossible to get this coal at figures below $1.90, the favored price being $2.05 for coal that is anywhere near good. The reason for this marked improvement is, first, a number of manufacturers who have been holding off have now come into the market, and have come in strong; second, the car supply in practically all of the producing fields is very poor; and third, the labor situation is causing considerable worry.

The prices of coal in the Chicago market are as follows:

	f.o.b. Mines per Ton	Rate to Chicago
ILLINOIS		
Southern Illinois Franklin, Saline and Williamson Counties		
Prepared sizes	$2.45@$3.25	$1.55
Mine-run	2.30@2.75	1.55
Screenings	1.90@2.50	1.55
Central Illinois Springfield District		
Prepared sizes	2.25@3.00	1.31
Mine-run	2.00@2.50	1.31
Screenings	1.75@2.05	1.31
Northern Illinois Thin Vein District		
Prepared sizes	3.10@3.60	1.24
Mine-run	2.90@3.00	1.24
Screenings	2.05@2.85	1.24
INDIANA		
Clinton 4th Vein District		
Prepared sizes	2.40@3.25	1.27
Mine-run	2.35@2.60	1.27
Screenings	1.90@2.20	1.27
Brazil Block-Lower Vein	3.75@4.25	1.27
Knox County—5th Vein		
Prepared sizes	2.40@3.45	1.37
Mine-run	2.20@2.40	1.37
Screenings	1.70@1.95	1.37
EASTERN COAL		
New River and Pocahontas		
Prepared sizes	4.75@5.50	2.60
Mine-run	3.75@4.00	2.60
West Virginia Splint		
Prepared sizes	4.00@4.50	2.60
Mine-run	3.50@3.75	2.60
Hazard, Ky.		
Prepared sizes	4.25@4.50	2.45
Mine-run	3.00@3.50	2.45
Screenings	2.20@2.50	2.45
Harlan Field, Ky.		
Prepared sizes	4.25@4.50	2.45
Mine-run	2.65@3.50	2.45
Cannel	4.00@5.50	2.45 @ 2.60

MILWAUKEE

Coal market quiet, with prices steady. Some uneasiness felt in regard to the outlook for the coming winter.

The coal market is quiet, with prices steady. Small dealers find it hard to fill orders because of the scarcity of the popular domestic grades of anthracite—stove and nut. Shippers say the movement by rail to the interior would be better if cars were more plentiful. There is a steady flow of cargoes by lake, including both hard and soft coal. Milwaukee has escaped dock trouble thus far. Two cargoes which arrived recently came from Duluth-Superior. The coal was originally shipped from Toledo to Duluth, but owing to the strike at the latter port the vessels were ordered to Milwaukee.

Notwithstanding that a good supply of coal is in sight at the present time, some Milwaukee dealers are advancing pessimistic predictions and warning consumers to protect themselves against a possible famine next winter by ordering coal while it can be had. As one dealer puts it: "I am afraid this will be the worst winter since the strike of 1891. Not only is there a shortage of production of all grades, but the strike in the anthracite region promises further complications." Furthermore, he says, dealers have not been given an opportunity to stock up during the summer season, and that Illinois jobbers, who in the past have been insistent solicitors at this season of the year, have suddenly ceased to cultivate the field. It is generally admitted that if there is to be a serious turn in the situation here it will not develop until after the close of navigation.

Cargo receipts thus far this season aggregate 579,840 tons of anthracite, and 2,109,161 tons of soft coal, a gain of 165,644 tons of the former and a loss of 234,866 of the latter, compared with the record for 1918.

The municipal coal yard at Eau Claire, Wis., is doing business, but owing to difficulty in procuring supplies, only Franklin County, Illinois, coal is dealt in at present. This is being retailed at $8 per ton.

ST. LOUIS

Mines still on strike in Mt. Olive and Standard fields, with little coal on the open market. Trouble gradually bettering. Car supply unusually bad. Demand easy, excepting on country calls. Local business quiet.

The local situation is an extremely easy one, everything considered. The public is not clamoring to any great extent for coal but taking it as it comes in to the dealers. The supply of Carterville is far from sufficient, but is satisfactory in view of the unusual circumstances in the Illinois field. The industrial situation in and around St. Louis is below normal, and for that reason there is not the demand for steam coal that is usually heavy at this season in other years. In a general way the local situation is perhaps better than in any of the larger cities in the country.

In the Standard field the mines are still idle on many of the roads, while here and there a few of them have resumed, with a shortage of men. The marching miners camped at Marissa for a few days and sent a detachment on to Benton in Franklin County, where they were not received with any marked degree of hospitality. They are appealing to the miners in the Williamson and Franklin County field, but with no effect. On the main line of the Illinois Central, from Coulterville north, they have the mines pretty well shut down. On the Baltimore & Ohio, the Southern, the Louisville & Nashville, and Vandalia they are also idle, as a rule. In the Mt. Olive field they have resumed operations in most of the mines, but Livingston quit, and north of that place there has been some disturbance. From there they got into the northern field in the vicinity of Livingston, and the sheriff of Macoupin County met them and told them what the law was on any disturbances that might occur. That rather took the starch out of the leaders, but they were still reported as being encamped somewhere in that district.

There is an unusually good demand in the country for Standard and Mt. Olive coal, but there is so little of the Standard that it is going at premium when it will go out of St. Louis. The lump is selling at from $2.75@3 with mine-run at $2.25@2.40 and screenings $1.75@2, with 2-in. lump at about $2.50.

The Mt. Olive field, producing nearly all of its tonnage, is still sticking to its regulation price of about $2.40 on the St. Louis business for domestic sizes and $2.85@3 for outside business. The car supply is fairly good in the Mt. Olive field.

In the Standard district the Mobile & Ohio is the only road with any supply of cars at all. The Illinois Central is in bad shape in the Carterville field of Williamson and Franklin Counties there are no labor disturbances, but the car supply is seriously affecting the tonnage. The roads have let up somewhat on their demands for coal, especially on the Iron Mountain, and more commercial coal is moving out; but the car supply is so poor on the Iron Mountain and Illinois Central that the tonnage is about one-fourth of what it should be. The car supply on the Burlington is best, with the Chicago & Eastern Illinois following.

The demand for screenings is a little light, but the other sizes are sold up for as far ahead as three months in some cases. Similar conditions exist in the Du Quoin field. The railroad tonnage out of all these fields is above the average for this season.

There is no anthracite coming in and no smokeless, and nothing from Arkansas.

COAL AGE

Volume 16 New York, September 25, 1919 Number 13

Our Problems and Theirs

By R. Dawson Hall

EUROPE'S difficulties arise largely from the number of the idle rich and the numberless passably well-to-do who are well content to live on their small incomes. This idleness embraces a far larger proportion of the population in Europe than in the United States, where men of no occupation are in general restricted to the "hobo" class. In Europe profits are not unusually high. It is not the size of these profits, but the use that is made of them that is the cause of many of the ills of that continent.

If the profit of industry is returned to industry, if it is expended judiciously in perfecting the enginery of production, thenthat profit assists in adding to human wealth and human happiness. Many are the capitalists who spend a meager one or two per cent. of the large incomes they receive from industry, while five or perhaps ten per cent. more is lost in unprofitable business ventures. This latter loss is unfortunate to them and to us, but it is inevitable. One cannot always foretell just where money will be profitably invested. The waste in Government construction is immensely larger. Look, for instance, at our public roads worn out in a short span of years, and the Erie Canal, which has never earned a dividend.

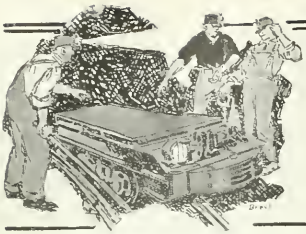
All the other profit of the man with capital goes into the development of the Nation's resources. It appears as houses, railroads, factories and equipment. It forges the implements of progress. Without it we should stand still and live as in past centuries. That part of the profits of industry that is private profit, in the sense of being expended for personal comfort or pleasure, is small; and the percentage decreases with the aggregate size of the profit taker. The really large holders of stocks convert little of what they receive to their own uses, while the small holders, unless wage earners, so convert nearly all.

Unfortunately, in Europe the rich and a large part of the middle class, especially the women, are non-producers. For the most part they expend on themselves all that they make. If they fail to do so, they are somewhat freely condemned by the working classes, who believe that expenditures of all kinds are good for trade and therefore for labor.

The workers rejoice when property is destroyed, as by a fire or a flood, provided the catastrophe does not lay off men. They argue that it will take hours of labor to replace the property destroyed. There is more excuse for this reasoning in Europe than here, for what is not expended in Europe for replacement is quite apt to be paid out for luxury; but it is not so in the United States, for the cost of rebuilding would merely be deducted from the expenditure to be bestowed on some entirely new construction that would expand industry.

A belief exists in Europe among those who have wealth that trade is the natural function of one of lower intelligence, subjecting the man who enters into it to all manner of disconcerting contingencies and commandeering one's whole attention and service. Yet more it is the general thought that to take anything with seriousness, to put one's whole effort into anything, is a trifle plebeian. A reserve of energy, the European declares, should always mark a man of distinction. The strength of his hand, the brilliance of his brain and even the depth of his emotions must be hidden. He looks with disapproval at the American who says he seeks "results." The European gentleman does not want results; to him they are at best vulgar things. The war has shaken his assurance as to that matter, but he is still only in doubt.

The European trouble is not in the division of profits. It is in the misuse of them. Let us beware of the time when our exuberance decays and we also lose our interest in industry as an ultimate end. Culture is a delightful goal to envision, but production is the only thing that can afford that material gratification that workingmen are today demanding. It is useless to talk of a "new day," a day of material satisfaction, as have the wealthy of Europe, unless we all, by our industry, are willing to work for it. When the people of the United States, both wealthy and humble, fail to do their part in the creation of wealth, the country must needs be impoverished regardless of the equality by which that wealth is distributed.



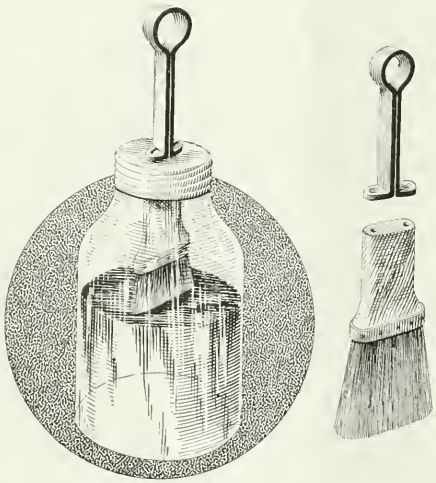
IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Handy Shellac Container

By Charles H. Willey
Concord, N. H.

Users of shellac know that if the brush and the liquid are not kept in an air-tight vessel, the shellac will not only harden but the brush will be ruined as well. A cheap container for the shellac and the brush can be made from a zinc-cover screw-top Mason jar, as shown in the illustration. A flat brush is cut off near the



CONTAINER PRESERVES BOTH SHELLAC AND BRUSH

lower end of the handle, and a handle of $\frac{3}{8}$ x $\frac{1}{16}$ in. strap iron is bent into the shape shown. By means of wood screws the brush and handle are secured to the cover in the manner indicated. The container will be found to be perfectly air-tight.

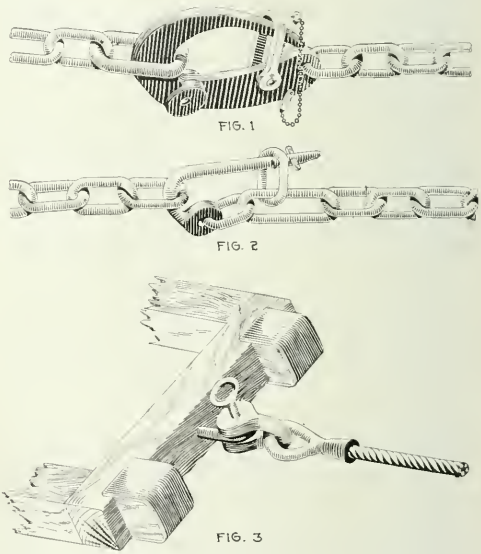
Coupling Hooks for Slopes, Planes and Rope Haulages

Coal Age of Aug. 7 contains a diagram of a self-uncoupling hook for use in hoisting and haulage. The accompanying illustrations show three different types of hooks designed for this purpose and now in use in the anthracite and to some extent in the bituminous region, on main and tailrope haulages, also slopes and planes.

The hooks shown in Figs. 1 and 2 are used mainly on main and tailrope haulages. Fig. 3 is a hook almost universally used by several companies on slopes and planes.

The arrangement shown in Fig. 3 embodies a small clevice provided with a pin attached directly to a rope cone. The pin, however, is larger at the lower than at the upper end. The holes are so proportioned that the pin will lift out of the lower one but will not pass through the upper one. The chief advantage of this coupling lies in the ability of a triprider or headman to uncouple the trip at the head or foot while the trip is in motion whenever the engineer gives him a little slack, and his ability, especially at the head, to throw the rope easily to one side.

As soon as the engineer gives a little slack, the pin, which is then loose, is easily pulled up, the large end catches in the upper side of the clevice and the weight of the clevice and socket are then held by this large end



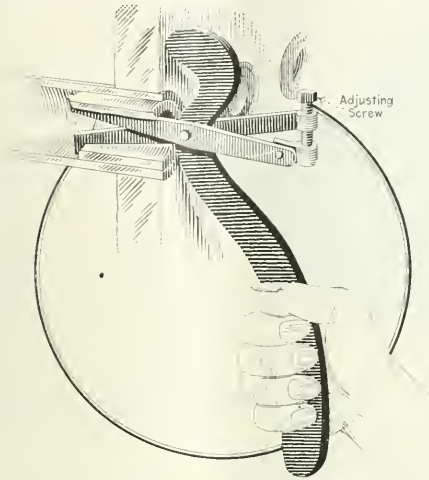
FIGS. 1 TO 3. DIFFERENT KINDS OF SELF-UNCOUPLING HOOKS FOR USE IN HOISTING AND HAULAGE

of the pin. Throwing this whole contrivance aside is a simple matter. This clevice should in all cases be attached to some stationary object on the car so that it cannot be upturned, as might be the case if it were attached to a chain. In this latter case, of course, the pin would drop out and the cars uncouple.

The operation of the hooks shown in Figs. 1 and 2 is self-explanatory. They are designed for use with chain connections where it is necessary to have an attachment that will remain secure in all positions, yet one that will permit easy and rapid disconnection at any point along the travel of the trip.

Boiler Ferrule Extractor

Some time ago I had occasion to renew a lot of ferrules on the fire ends of the boiler tubes in a battery of boilers. To expedite the work I made a ferrule



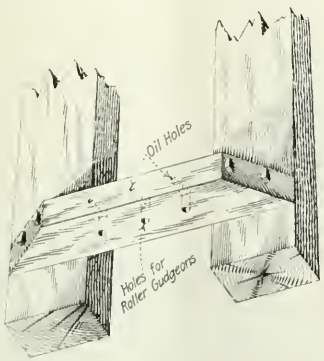
DETAILS OF A SIMPLE FERRULE EXTRACTOR

extractor from odd stock somewhat like the one shown in the illustration. The device is so simple to construct that it needs no elaborate description.

Three-in-One Roller Brackets

By Ralph W. Mayer
California, Penn.

Rope haulageways are usually provided with wooden rollers, with a diameter of 6 or 8 in. These are placed between the track rails and carry the haulage rope, preventing excessive wear upon it. The rollers are provided with ½-in. gudgeons about 6 in. long extending



ROLLER BRACKET THAT DOES THE WORK OF THREE

from either end and upon which the roller turns. The roller is supported at either end by a bracket, made of wood and having a hole bored in it to act as a journal bearing for the roller. Oil holes are bored from the top of the bracket to the bearing hole so that the roller may be lubricated.

The brackets are made from 6 x 4-in. timber and are long enough to reach across two adjoining ties. Each of their ends is sawed off diagonally, or beveled, and two holes bored in the beveled portion for spikes to fasten the bracket to the ties. Usually, as soon as the bearing in the wooden bracket becomes worn, the roller will not turn and the bracket has to be replaced.

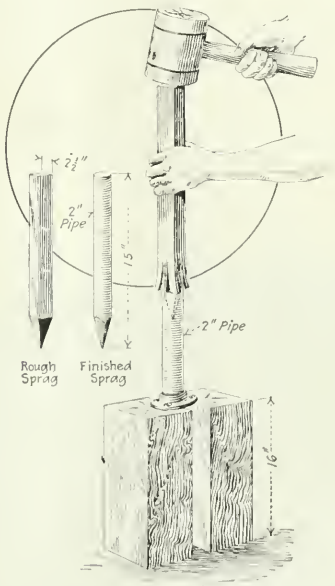
One large mining company has made one bracket do as much work and last as long as three did by the old method. It adopted the extremely simple expedient of making three holes, or bearings, for the roller in each bracket instead of the single bearing formerly provided. As soon as one of the holes, or bearings, becomes worn out the roller is shifted to the second bearing, and when this is too badly worn the roller is again shifted to the third bearing. This is the work of but a few minutes for the trackwalker when he oils the rollers. It saves much time in replacing brackets and cuts the cost of new brackets to one third of the former amount.

A Simple Sprag Cutter

By W. E. Guller
Panama, Ill.

At many mines sprags are still made with a hatchet. The accompanying diagram shows a simple device by the aid of which sprags may be fashioned much faster and more easily.

The illustration is self-explanatory and needs no ex-



SIMPLIFIES THE MAKING OF SPRAGS

planation. Any diameter or length of pipe desired may of course be used. The height of the wooden block should be at least 1 in. greater than the length of sprag to be formed, so as to permit the easy removal of the sprag after it has been driven through the pipe.

Roche Miette Mountain, elevation 7500 ft., immediately west of No. 2 tunnel of Jasper Park Collieries. Shows excessive erosion.

Mines of the Jasper Park Collieries, Limited, at Pocahontas, Alberta

By J. H. McMillan
Pocahontas, Alta.

THE chief mines of the Jasper Park Collieries, Ltd., are situated at Pocahontas, Alberta, on the eastern slope of the Rocky Mountains. They have main-line connections with the Grand Trunk Pacific and Canadian National railways, which roads take the entire output of the mines for use on the locomotives operating on the mountain divisions. The camp is beautifully situated among the foothills overlooking the Athabasca River, which at this point forms itself into a series of lakes. Being included within the boundaries of the Jasper National Park, the authorities in charge of the park make it compulsory that the grounds adjacent to the mine and camp be kept free from objectionable accumulations, and as mines go, the general surface conditions might be considered exceptionally good. The coal field is most interesting and presents many and varied obstacles which are not at all common to coal mines of western Canada, with the exception of those in the Crows Nest Pass district. The rock formations of the Jasper and Crows Nest Pass coal fields have much in common; the Jasper district, however, has been subjected to much more and severe fault-

VIEW OF THE TOWNSITE, JASPER PARK COLLIERIES, LTD., ROCKY MOUNTAINS IN BACKGROUND

ing with the result that mining conditions are anything but favorable.

The rock formation adjacent to the Jasper Park collieries is complex, and within comparatively short distances it is possible to identify strata ranging from the Devonian measures through to the Recent. The consolidated rocks, all of which were deposited previous to the great intrusion that produced what is now known as the Rocky Mountains, consist of a series of beds lying unconformably on each other and ranging from the Devonian to the Upper Cretaceous, the latter being the coal-bearing measures. The Cretaceous formation, being comparatively soft in structure, has been almost entirely eroded from the higher ridges, which now consist chiefly of Devonian sandstones and dolomites. The coal field has been badly faulted, particularly to the east of the mines along the Fiddle Creek basin, where the Devonian sandstones make contact with the Upper Cretaceous shales. Considerable faulting has also occurred to the west, where the Cretaceous coal measures make contact with the Carboniferous shales, while a little further along on the higher ridges further west the Jurassic shales are to be seen lying immediately against the Devonian limestones. The coal-bearing strata at Pocahontas, measured from the conglomerate ridges forming the east and west arms of

MACHINE, BLACKSMITH AND CARPENTER SHOPS AT THE JASPER MINE

the anticline, are a little over 2000 ft. in thickness and contain five workable beds with an approximate total of 36 ft. of coal.

The anticline referred to runs in a southeasterly direction from Pocahontas and terminates at a point about 5 miles from the camp, where a heavy cross fracture running almost east and west completely cuts off the coal measures.

Beyond this point the strata are badly broken and no coal of any account has as yet been found. Erosion has completely carried away the coal-bearing measures of the Cretaceous period, and what coal has been found appears to belong to the Carboniferous.

Prospecting has been confined chiefly to the measures overlying the conglomerates. The measures below the conglomerates are cut in various places by mountain streams, but not sufficiently deep to determine whether or not commercial coal is to be found at depth. The management, however, is satisfied that workable beds exist below the conglomerates and several drill holes will be put down at various points on the property with a view to determining this point.

From a geologic standpoint this portion of Alberta might be termed a regular student's paradise. Every conceivable form of fault known to mining can be found, and the different strata clearly correlated. From an

PORTAL OF NO. 2 TUNNEL, JASPER MINE

operating standpoint, however, the position of mine manager is one perpetual round of puzzles and worry.

The coal beds found on the property of the Jasper Park Collieries, Ltd., are of excellent quality, a series of samples taken from the outcrops having given the following contents:

	Per Cent.
No. 2 or Tunnel Seam:	
Moisture	00.99
Volatile	20.46
Fixed carbon	74 52
Ash	4 03
Total	100 00
6-ft. Seam, West of Tunnel:	
Moisture	1 65
Volatile	24 68
Fixed carbon	71 02
Ash	74 03
Total	100 00
No. 4 Seam:	
Moisture	1 34
Volatile	22.91
Fixed carbon	68.51
Ash	7 24
Total	100 00

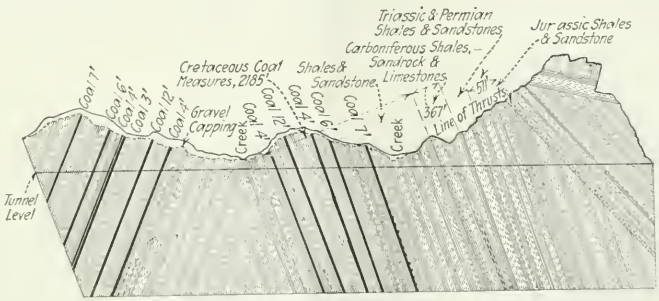
These samples, together with others that have been taken from time to time, show fine coking qualities.

The majority of the beds so far located have no structure whatever. This combined with a heavy thrust from the footwall and severe outbursts of gas, make mining conditions anything but favorable and comparatively expensive considering the advantageous position of the seams. The average pitch is about 65 deg., though in places the measures assume all angles up to vertical. A series of local faults running diagonally across the pitch interferes greatly with the grades. These become more marked with depth. The coal falls

POWER PLANT OF THE JASPER MINE

by gravity from the working faces, and in order to maintain a running grade it is necessary, when these faults are encountered, to go back down the pitch and regrade. Owing to the absence of structure, it is impossible to mine direct on the full pitch, or to take out the entire bed between the hanging and foot walls. Accordingly, angles or stalls are driven diagonally across the pitch and only a small portion of the bed taken out in development, and this immediately against the hanging wall.

These angles are roughly of a right-angled triangle in cross-section, the upper or pitch side or rib being 6 ft. high, while the hanging wall and floor come to a point on the low side. The width of the angles is generally about 8 ft. On the upper levels, where the coal is inclined to be damp and consolidated, this method is somewhat modified and much more coal taken out during development. The maximum area of cross-section is about 48 sq. ft. on the upper-level angles. Owing to the friability of the coal in general, the angle system of mining is the only method by which the seam now being developed could be worked, and even under this



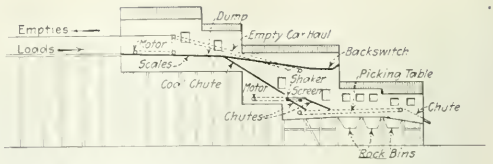
CROSS-SECTION OF STRATA, SHOWING FORMATION

system considerable difficulty is experienced in extending the development places owing to the excessive gas pressure from the footwall. This pressure is caused by a false footwall, varying from 3 to 10 ft. in thickness and containing a thin seam of coal which lies immediately against the main footwall rock, and which apparently holds considerable gas under abnormally high pressure.

As the development angles and levels advance, this pressure produces bumps which, though not as destructive as those occurring in the Crows Nest Pass coal field, are at times quite serious and play havoc with the angles or levels in which they occur. The bumps referred to are accompanied by heavy flows of methane, and owing to the heavy pressure produced the coal is ground into a veritable powder.

Lagging is constantly kept at the advancing angle faces, and on the first indication of a bump the places are lagged off so that should a run take place the cavity produced will be kept relatively small. Once the gas bleeds off the pressure drops and makes it possible to reopen the places and continue advancing. Instances are on record, however, where the lagging failed to withstand the pressure with the result that hundreds of tons of coal came away and filled the intake airways, making it necessary to withdraw the men until the gas bled off.

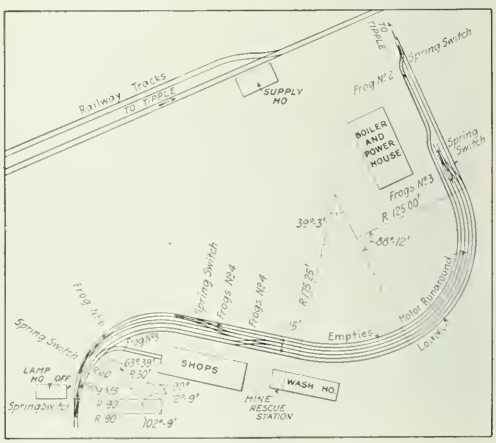
Where conditions are such that it becomes necessary to adopt the angle method of mining, care has to be



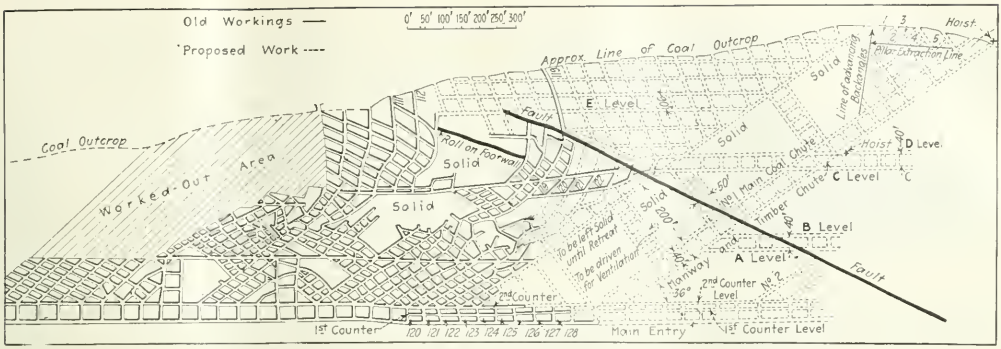
NEW TIPPLE OF THE JASPER PARK COLLIERIES

taken that the cross-cuts between the angles break through directly opposite each other. Otherwise in the extraction of the pillars there is a possibility of much coal being lost and the work of extraction being rendered extremely dangerous. The system heretofore employed at the Jasper Park collieries has been to develop extensively and block out the ground as the angles advanced. Doing this naturally gave the false footwall a chance to break and incidentally brought on or aggravated the thrust coming from the footwall side. The angles were also turned off the upper counter, and before breaking through on the surface—a distance of over 1100 ft.—the lower part of the angles and the cross-cuts between gave considerable trouble and were a constant source of expense. Frequently an angle would have to be stopped until the chute was ripped and regraded and new rib posts placed on the high rib. The cross-cuts and pillars were also constantly under repair, and if left too long before being extracted it became necessary to make entirely new roads into the pillars. The danger of a creep is always present; the hanging wall is a hard siliceous shale and only breaks over a large area. To offset this, however, the false footwall sloughs off as soon as the pillars are extracted and drops down with the pillars, thus forming a fulcrum against the live workings and the gob, and reducing the possibilities of creep when the hanging wall breaks.

The method of mining just described has been found unsatisfactory and will be abandoned. Instead of advancing several angles at once and blocking out the pil-



PLAN OF TIPPLE TRACKS, JASPER MINE



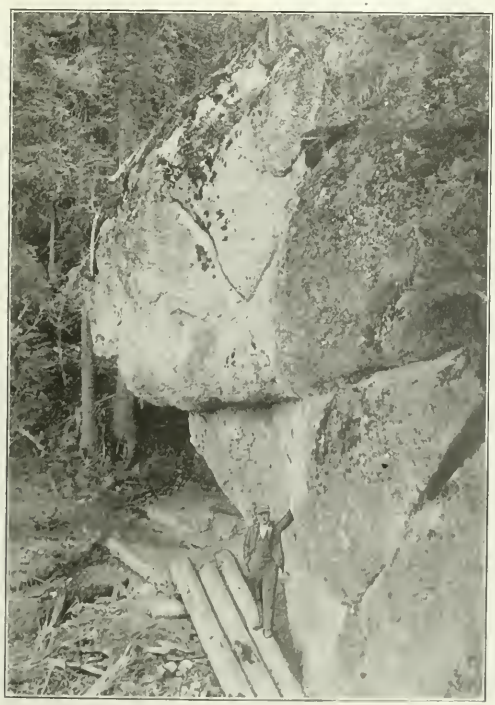
SHOWING PROPOSED NEW METHOD OF WORKING THE NO. 2 MINE

lars as the angles advance, a modified panel method will be established and the blocks left intact until the two main angles extended from the main entry to the surface are completed. These main angles will be from 200 to 300 ft. apart; the outside angle will be used as a main coal road and the inside angle as a manway and timber raise. Small air hoists will be placed at different points on the timber raise with a view to eliminating the old system of packing timber by hand, which was inefficient and extremely trying work.

When the main angles are completed, back angles will be turned, commencing at the top or outcrop, and as soon as a back angle breaks through on the gob outside the pillars will be immediately extracted. By following this method the footwall pressure will confine itself to the gob and the pent-up gases allowed to escape direct into the return airways. It is also presumed that the release of the gas in the gob will materially reduce the thrust from the footwall in the back angles advancing below. This should eliminate the bumps that formerly occurred. Extracting the pillars as soon as the back angles break through should also give a greater recovery from development and should considerably reduce the cost of maintenance. There will be practically only the two main angles to keep in repair, and being in solid ground these should not give much trouble.

Should it be found that the distance between the main entry and the surface is too great to be worked in one lift, the ground will be divided into three lifts and one kept in advance of the other—the top lift being in the lead. (Plans of the workings to date with proposed extensions are showin in the diagram at the head of this page.) The main entry is 8200 ft. long and all haulage is done by compressed-air locomotives, three 8-ton Porter compound machines being now in use. The mine cars have a capacity of 2½ tons, and 20 cars comprise a trip. One locomotive attends to the chutes inside and delivers the loads at a parting 2500 ft. from the portal of the tunnel, from which point they are transferred to the tipple by the locomotive operating the outside run. The third locomotive is kept available in case of a breakdown.

The tipple is modern in every respect and is capable of handling 1500 tons per day. The loads pass over a Philips automatic cross-over dump and then to a lower level from which point they are caught by a grab chain and elevated to the empty track, where they gravitate to the tunnel entrance. Trackage is provided on the tipple for 200 loads, and all dumping is done on the morning shift.



SHOWING MASSIVE CONGLOMERATE LYING IMMEDIATELY UNDERNEATH THE COAL MEASURES

The power and boiler house is constructed of concrete throughout. The power plant consists of one steam-driven Ingersoll Rand air compressor capable of delivering 2000 cu.ft. of air at 900 lb. pressure, also two Electric Machinery Co.'s six-cycle, three-phase alternating-current generators of 75 and 184 kw. respectively, both of which are coupled direct to high-speed Robb-Armstrong engines. The tipple machinery, machine, carpenter and blacksmith shops are operated entirely by electricity while a lighting system is provided for all buildings at the mine, as well as the miners' cottages and the townsite. Electric power is also supplied the company's Miette mines, situated at Bedson on the Canadian

DEPARTMENT STORE, POST OFFICE AND GENERAL STORE

National Ry. The latter mines have been closed down for some time but will reopen again early in the fall.

The steam plant consists of a battery of four Leonard & Son's return tubular boilers, with a total of 600 hp. The coal used at the boilers is brought direct from the tipple bunkers to the boiler house by conveyors.

The company has built a department store on the lower townsite, also an up-to-date hospital and schoolhouse on the upper townsite adjacent to the miners' cottages. Altogether 80 three- and four-roomed cottages have been built which rent at $9.50 and $13 per month respectively, including water and light. Suitable garden plots are also attached to each cottage. The climate is exceptionally healthful and the camp free from sickness. At some distance from the camp there are some hot sulphur springs which are noted for their curative qualities.

The Jasper and Miette properties controlled by the Jasper Park Collieries, Ltd., consist of 7219 acres of coal lands lying adjacent to the Grand Trunk Pacific and Canadian National railways. The company also controls 900 acres of surface rights consisting of timber limits and townsites.

The estimated content of coal in both properties is approximately 15,000,000 tons. To date only 1,000,000 tons have been mined, and that from the No. 2 seam.

Plans for extensive development are now being prepared. These include the opening up of Nos. 1, 3 and 4 seams recently prospected by diamond drill. The structure of the Nos. 1 and 4 seams is comparatively good; the walls are composed of sandrock, and conditions in general are favorable for extensive mining. The production from the latter seams will more than double the former output, and at no distant date the camp of Pocahontas will doubtless be one of the most progressive in northern Alberta.

Dedication of Bureau of Mines Buildings

With practically all plans completed for the dedication of the Bureau of Mines buildings and the fourth national first-aid and mine-rescue contest, members of the different committees on arrangements in Pittsburgh are awaiting the results of their labors. Through the financial assistance of the Chamber of Commerce, an elaborate 64-page souvenir booklet will be given each visitor to the bureau building. The cover of the booklet contains a two-color reproduction of a medallion of Joseph Austin Holmes, through whose creative imagination the Bureau of Mines buildings have been constructed.

The booklet contains many illustrations of the different phases of work being done at the station as well as descriptions of the coal-mining, mine safety, fuel, electrical, mechanical and chemical departments, and includes other coal and miscellaneous analytical laboratories. A program covering the three-day activities is in the fore part of the booklet as well as a list of the prominent mining men who have served on the various

JASPER MINE TIPPLE, WITH MOUNT ROCHE MIETTE IN BACKGROUND

arrangement committees. The booklet will be used in conjunction with the inspection trips through the buildings.

Guides will be available for the visitors at the commencement of ceremonies proper at 8:30 a.m. Monday, when the Bureau will be thrown open. They will remain on hand during the ensuing three days. The event will not be in the nature of a holiday for the employees, as they will remain at their posts and carry out the regular routine of the day that the guests may be able to see the station as they would see it during any other day of the year.

Starting on Sunday, Sept. 28, the receiving committee will meet the incoming visitors at the Fort Pitt, Schenley and William Penn hotels. On the following day, at 10:30 a.m., the dedicatory ceremonies will be held in the rear of the main building with Director Manning presiding. Dr. S. B. McCormick, Chancellor of the University of Pittsburgh, will give the invocation, following which an address of welcome by Hon. E. V. Babcock, Mayor of Pittsburgh, will be responded to by Hon. Franklin K. Lane, Secretary of the Department of the Interior. Horace B. Winchell, President, American Institute of Mining and Metallurgical Engineers; John L. Lewis, President, United Mine Workers of America, and Hon. William C. Sproul, Governor of Pennsylvania, will comprise the list of other notable speakers. The handing over of the keys to the building by Secretary Lane to Director Manning will close the dedicatory ceremonies proper, following which luncheon will be served in the Bureau buildings.

Trip Will Be Made to the Experiment Mine of Bureau of Mines

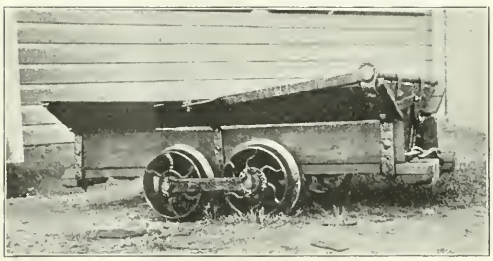
Monday afternoon will be taken up with a trip to the experimental mine at Bruceton, where a coal-dust explosion will take place. Special trains will handle the visitors out to Bruceton from the siding near the Bureau buildings. In the evening, a meeting under the auspices of the Chamber of Commerce will be held in Carnegie Music Hall. An organ recital by Dr. Charles Heinroth, of the Carnegie Institute of Technology, will precede a moving picture entitled "The Story of Coal," in which a great many of the experiments in use at the Bureau will be demonstrated.

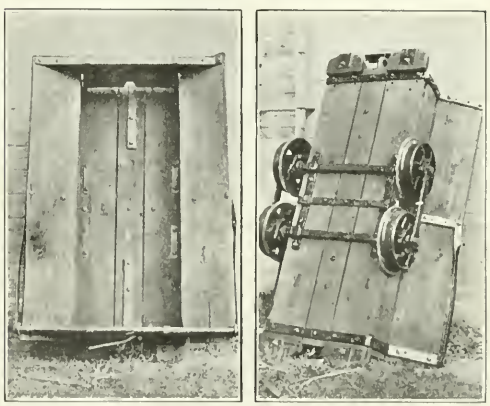
On Tuesday morning, Sept. 30, the elimination mine-rescue contest will be held in a special gas gallery at Forbes Field, and in the afternoon, the elimination first-aid contest will be held at the same place. First-aid teams from fifteen states have been entered so far that include Washington, Kansas and California. The ten mine-rescue teams making the best scores will enter the final contest on the following morning for the national cups and prizes. The twenty first-aid teams surviving the elimination contest will compete Tuesday afternoon for the national cups and prizes. One of the features of the elimination first-aid meet will be the awarding of prizes to the champions of each state. These prizes will be independent of the results of the final contest, and have been arranged for through the generous co-operation of the business men of Pittsburgh, companies and manufacturers of national importance in the mining industry. Major M. J. Shields, of the American Red Cross, will be chief judge.

Following the first-aid contest on Tuesday afternoon will be a coal-dust explosion in a wooden gallery at Forbes Field. The evening will be devoted to a pageant, glorifying the mining industry, which will likewise be held at Forbes Field. Wednesday, Oct. 1, will be given over to the final mine-rescue and first-aid contest during the latter part of which Director Manning will announce the awards of the Joseph A. Holmes Safety Association. A repetition of the previous day's coal-dust explosion will follow the first-aid finals. The evening will be given over to a smoker by the Chamber of Commerce, during which the team prizes will be awarded to the respective winners.

An Old Mine Wagon

The accompanying illustrations are of a mine wagon more than 30 years old, from Clearfield County, central Pennsylvania. This wagon was recently found in old workings of the Glen Richey No. 1 Mine of the Rembrandt Peale interests, which was the first coal operation of Rembrandt Peale, that mine being opened in 1882 and afterward abandoned. During the present





VIEWS OF AN OLD MINE WAGON FOUND IN AN ABANDONED OPERATION

year this mine was reopened and this old wagon found in the workings in an excellent state of preservation. It could be used today for hauling coal if necessary. The wagon is 5 ft. 10 in. long and 3 ft. 6 in. wide, with a capacity of 12½ cu. ft. It is typical of the type of mine cars used in central Pennsylvania low-seam operations in the early days. It is an interesting relic to the pioneer coal operators of central Pennsylvania and is now on exhibition at the St. Benedict offices of the Rembrandt Peale interests, St. Benedict, Pennsylvania.

Coöperation Between Firebosses and Assistant Foremen

Existing statutes and practices in Pennsylvania permit an apparent conflict or overlapping of the duties of fireboss and assistant mine foreman. This may be the occasion of much friction, discord and inefficiency. All of this may however be obviated through mutual understanding between all of the officials concerned

By A. T. Dickson
Roscoe, Penn.

THE Pennsylvania mining law adopted in 1911 made a wise provision concerning the safety of the miner, when it required the mine foreman or his assistant to visit every working place where men are, or ought to be, at work, at least once every day. Previous to 1911 the law only required a visit to the working places by the foreman or assistant foreman every alternate day, even where no firebosses were employed.

Comparisons are odious, but compare the present conditions with those prevailing previous to the enactment of the present law. Today the Pennsylvania statutes require two examinations by the fireboss of every part of the mine under his charge, and also a visit to each working place daily by the mine foreman or his assistant. The law therefore insures two visitations daily by certified officials while the men are at work.

The present law more than tripled the required number of visits and examinations over the old measure. Still there was room for improvement, and when the Pennsylvania compensation law went into effect common-sense and self-preservation of financial resources by the coal companies stepped in and made another revolutionary change by employing sufficient assistant mine foremen to insure in some cases four visits each day by the assistants to each working place while the men were at work. This radical change resulted in placing at some of the mines, especially those carrying their own insurance, as many or more assistant mine foremen than there were firebosses.

Change in Conditions Brought New Relations

These improved conditions as to the safety of the miner brought about peculiar relations between the firebosses and assistant foremen, not so much as to their lawful duties, but in regard to their general duties. Under the old law the fireboss after his first examination was employed in doing odd jobs about the mine such as laying road, building doors, digging ditches, etc. Others made a second visit or examination covering the section of the mine under their charge and had full responsibility for that section, both as to safety and supervision of the work therein. After the fireboss' shift was done he went home. This was generally about eleven or twelve o'clock. For the rest of the day no one visited the working places. A comparison of the past with the present seems to indicate that some progress has been made toward securing the safety of the men working in the mines.

The fireboss in the old days was not in doubt as to what his duties were or what the employer demanded of him, and since many of the firebosses who presided then are still on the job, perhaps in the same capacity, they find that they are employed principally in the interest of safety to the employees of the mine. It seems, however, that the old custom of engineering the work on the section is hard for some of the firebosses to get away from, and for this reason there is a good deal of friction between the firebosses and assistants at some mines, since there is seldom any intelligent standard of duties set down to guide the fireboss as to what is required of him aside from his lawful duties.

This causes much confusion, and the fireboss and assistant foreman instead of working hand in hand as they should sometimes find themselves in the dark as to who is responsible for this and that, each one trying to shift the responsibility onto the other. The fireboss and assistant foreman ought to get together and have a thorough understanding so there will be a spirit of cooperation between them.

Some firebosses labor under the impression that when they have found the section free from gas they have done their duty, but the law requires that they examine all portions of the mine under their charge for all dangers, and tacitly implies that they shall see as far as possible that the lesser perils are removed immediately upon discovery when it is practical to do so. Any sensible man knows that the coal companies do not operate their mines just to keep men in employment, consequently, they do not employ both firebosses and assistant foremen to pay them wages, but that they may coöperate in the interest of all.

The fireboss is on the section for only a few hours after the arrival of the miners, and therefore cannot do justice to the miner or the company in having complete charge of a section or the placing of men. When there were no assistant foremen the firebosses had full charge of their respective sections and were not at a loss as to how to proceed. They placed the men and looked after the sighting of the rooms and entries, marked off breakthroughs, and were required to engineer all the work on their sections in the absence of the mine foreman, who often would not be on the section for months at a time.

But now that the assistant has come onto the scene he assumes the major portion of duties which formerly devolved upon the fireboss. There is however no clearly defined classification of special duties that draws the line where each official's duties begin and end. Shall

the assistant sight the entries and rooms or shall the fireboss? Shall the assistant inform the cutters when to start breakthroughs or shall the fireboss?

Some mine foremen have a printed set of rules setting forth the work and duties of motormen, snappers, drivers and other workmen; these are handed to the employees or placed in conspicuous places. This is certainly a commendable plan, but how many foremen have printed rules for firebosses and assistants which distinguish between the duties required of each?

Suppose a mine foreman or some other official in visiting a section notices here and there a room which according to law requires a breakthrough, and draws the attention of the assistant to such places, telling him that there ought to be cutthroughs in those places. "Well," says the assistant, "the fireboss looks after the breakthroughs. Ill tell him about it."

Now it may be customary for the fireboss to look after the breakthroughs, but the law requires the mine foreman or his assistant to see that they are made at required distances. If an entry or a room gets off sight, who is going to be held responsible? These are minor details, yet they concern the safety of the men. It is generally over such a point as this that friction is generated between the fireboss and assistant foreman.

The fireboss on making his first morning examination has the best chance to see whether or not the working places are in a safe condition. If not, he has only to fence the places off that he considers unsafe, and the assistant foreman will then see to it that the places are made safe or penalize the miner by stopping his turn or sending him home for a day or two.

In many instances the assistant goes into a place soon after the fireboss has examined it and finds the miner working under conditions that are anything but safe, which conditions the fireboss carelessly overlooked. He calls the attention of the miner to this and the miner replies that "the fireboss didn't say anything about it." The assistant gets "riled" at this and exclaims: "I want you to know that I am saying something about it. The fireboss ain't running this."

Later the assistant asks the fireboss why he didn't fence the place off, telling him that he had to stop the man's turn. The fireboss replies, "Oh, I thought you would be around in a little while and you could do as you pleased about it."

The assistant's action in this case reflects upon the fireboss, and the fireboss gets sore at the assistant. The assistant now has the dislike of both the fireboss and the miner, because the miner thought that if the fireboss had no fault to find with his place the assistant should not have. Conditions are thus just the reverse of what they should be.

The fireboss should remember that his second examination is just as important as the first one, and if he finds the miners working under unposted or improperly posted slate or any other condition that he thinks is dangerous or contrary to custom, he should fence such places off and report them on the record book. This will clear him in case anything should happen. When an assistant notices a condition that is not necessarily an immediate danger, he should consult with the fireboss and have him fence the place off on his first examination the next day. The miner will more willingly put his place in shape when he finds it is fenced off. A little coöperation like this will produce prolific results.

A fireboss who had just started on a certain job had a friendly talk with the assistant. The former said: "You and I have charge of the section and are both responsible for the safety of the men under our charge and the condition of the section. If on your examination you find any places that you think unsafe, put a danger board up. Use your own judgment as to the safety of the places, and I'll back you up, but do not take a board down again unless I give you permission." The fireboss and assistant then and there came to a thorough understanding upon all the details of their work. They decided who would look after breakthroughs, sight the places, place the men, start new rooms, etc. When any new condition would crop up they would hold a consultation. Thus each official knew exactly where he stood in relation to his duties. This is true coöperation.

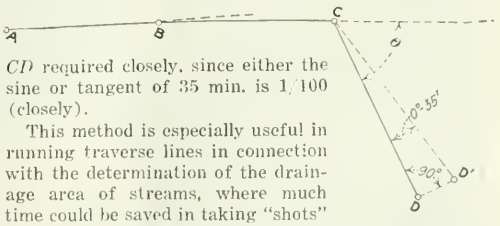
A Good Way to Make a Rough Survey

In a recent issue of the *Engineering News-Record* appears an article by John H. Sawkins, of Schenectady, N. Y., in which he presents a method of computing the distances, on any course to be surveyed, based on the fact that the sine of 35 min. is very closely 0.01, and so a course 100 ft. long would show a divergence of exactly a foot if an angle of 35 min. were turned from the correct direction.

He states that by setting a flagpole along the line of divergence, using a cloth tape to measure the distance from the station, and multiplying the length thus obtained by 100, the correct length of the course can be ascertained with as much accuracy as can be attained with a stadia reading. It is also much quicker, especially in rough country.

The method is suggested by the accompanying sketch and is as follows: Let *ABCD* be a portion of a transit traverse line, the *directions* of the lines *AB*, *BC*, *CD*, etc., being determined by deflection angles, as usual. The *lengths* would be found as shown for line *CD*, the 35-min. method being employed for that purpose. With the transit at *C*, backsighted on *B*, the telescope is plunged and the point *D* (being selected by the front flagman) is sighted on deflection angle θ being recorded to the right.

The front flagman then approximates a line *DD'* at right angles to *CD*, and the transitman increasing or decreasing angle θ by *35 min.*, lines in the flagman, who moves the flag along *DD'* to some point at *D'*. Except for unusually long sights the line *DD'* is short, and the approximation on the right angle *CDD'* introduces little error. The flagman measures *DD'* with a cloth tape, and this length times 100 gives the distance



CD required closely, since either the sine or tangent of 35 min. is 1/100 (closely).

This method is especially useful in running traverse lines in connection with the determination of the drainage area of streams, where much time could be saved in taking "shots" several thousand feet along the ridge line or divide. It is impossible to take "shots" a mile or more in length by stadia, unless an inconvenient length of stadia rod is used.

The A. E. F. University

The sharp contrast presented between the civil-life position and the army rank of the enlisted men who composed our forces during the recent war was brought out strongly when it came to finding instructors for the American Expeditionary Force University. This impromptu university, which was in existence at Beaune, Coté d'Or, France, from March till June, 1919, had 7000 students enrolled in all the courses and a faculty of more than 600, eighty per cent. of whom were men in the service. The other 20 per cent. were mainly Y. M. C. A. men.

The majority of the instructors in the A. E. F. University were officers, though the enlisted men ran them a close second. A "buck private" possessing a Ph.D. degree taught a course in the geology department, and a mining engineer from Salt Lake City, who was a Corporal of Marines, taught the course in ore dressing in the mining department.

In Fig. 1 is shown the faculty of the mining department. From left to right the men are: Hugh Archbald, Captain Infantry, mining engineer, Scranton, Penn.; E. C. Dietrick, Captain Engineers, civil engineer, Tucson, Ariz.; Alfred C. Lane, professor, Tufts College, Boston, Mass., head of the Department of Mining, A. E. F. U.; Horatio C. Ray, Captain Engineers, professor of metallurgy, University of Pittsburgh; Jacob E. Rypinski, Corporal Marines, mining engineer, Salt Lake City, Utah. It can thus be seen that the faculty was drawn from all over the country.

Fig. 2 shows part of the equipment that was used in the teaching of mineralogy. When the university was started, it occupied a bare building that was originally intended for a wartime hospital. Outside of a few camp chairs, there was nothing. Dr. Lane, who was the head of the department and taught the course in mineralogy, hustled around to obtain specimens. The University of Dijon, an old French institution, kindly lent him a large collection of hand specimens. M. Changarnier, curator of the museum at Beaune, personally possessed a large collection of minerals and fossils. Many of his specimens he presented to the mining department. All these, in addition to a number that were purchased by the University in Paris, made quite a decent collection for the teaching of mineralogy.

Equipment for instruction was one of the things which were lacking, as this takes time to accumulate

FIG. 1. FACULTY OF MINING DEPARTMENT

FIG. 2. PART OF THE COLLECTION OF SPECIMENS USED IN THE TEACHING OF MINERALOGY

in any school for metallurgy and ore dressing. There were no books that could be given to the students, and so the courses had to be drawn from the practical experience of the faculty. Perhaps the very lack of books gave to the instruction a freshness that never can be duplicated.

The town of Beaune is situated in a part of France in which considerable mining is carried on, so that the students of the A. E. F. U. were taken on tours of inspection to many kinds of mines. They saw fluorspar, oil shales, gypsum, iron, building-stone quarries, and particularly coal mines. The coal beds of eastern-central France are much faulted, so that the mining conditions are difficult. In consequence, the chance for instruction in mining was greater. The region round Beaune is also very interesting geologically. Specimens were brought back from all the trips made by the students, so that by the time the University closed quite a collection had been gathered toward starting a small museum.

Captain Archbald taught the course in mining; Captain Dietrick had the course in surveying; Professor Lane, mineralogy; and Corporal Rypinski, the course in ore dressing. As the principle underlying the instruction at the University was to let the student study anything he wanted, there were many pupils who would not ordinarily fit into a regularly scheduled college course. Instruction had to be adapted to suit them. One student, who put himself down as a "pocket hunter," a sergeant who had been several years in the regular army, got a lot out of the course in mineralogy, though he knew no chemistry or trigonometry. Another, who stated a desire to sell high-grade mining stock after the war, took the course in mining. A third, who had been a locomotive engineer, pushing empties into a coal mine, through the courses offered got a start toward becoming a mining engineer.

The A. E. F. University was not a finished institution, but it probably did a good work under a special situation, and one which in all probability will not occur again for some time.

Advantages Claimed for Pulverized Fuel

By Mark Meredith
Liverpool, England

The subject of pulverized fuel is attracting increasing attention in Great Britain. Foremost among the advantages claimed for this system are (1) complete combustion, each particle of fuel being surrounded by air and undergoing almost instantaneous combustion; (2) the use of a minimum amount of air owing to the approximation of the fuel to the form of gas—thus a 20 per cent. excess air becomes possible, as compared with 50 to 200 per cent. in the case of solid fuel furnaces; (3) the consequent higher temperature of combustion; (4) reduction of loss of heat through the diminished volume of waste gas; (5) minimum amount of unburnt carbon down to one-half of 1 per cent., as against 4 to 5 per cent. in many furnaces fed with ordinary solid fuels; (6) the decreased labor attaching to ash removal; (7) the maintenance of a less oxidizing atmosphere; and (8) the utilization of low-grade fuels not otherwise serviceable in modern types of furnaces, leading to economy of fuels of higher calorific value.

It may be urged that, sooner or later, the direct combustion of coal, and consequent loss of byproducts, must cease in this country, this being, however, largely dependent upon the report of the Fuel Research Board's experiments now in progress, and that the changes necessitated by the introduction of the new system would hardly be justified. Assuming that such prohibition eventuates, it is still urged that pulverized fuel should be the last example of direct combustion to go. Further, the fact that the system is applicable to coals of low grade unsuited to present furnaces, and that such utilization is a direct step toward coal conservation, justifies the hope that what has presumably been an undue delay in this development in this country by reason of war conditions may now give place to the introduction of the method. Even if coal carbonization on the large scale obtains in the near future, it is still claimed that pulverization will be applicable to a coke containing 10 per cent. of volatile matter, such as results from low temperature carbonization with recovery of fuel oil.

The extension of the method in America may be judged from its application to steam boilers, locomotives, openhearth puddling, and reheating furnaces, in soaking pits, for annealing, brass melting and other purposes. The production and maintenance of a nearly neutral atmosphere at once leads to a reduction of scale formation in billet heating, and to a considerably increased life of annealing boxes.

More recently pulverized fuel has been used in admixture with fuel oil, a suitable mixture containing 70 per cent. of oil and 30 per cent. of powdered coal, the mixture being applied without any change of burners or combustion areas.

Legal Department

Right to Rescind Coal Sales Contract—The general rule of law that right of one party to a contract to rescind because of the other's breach of some provision of the agreement may be defeated through the former being in default, too, was applied by the United States Circuit Court of Appeals, Eighth Circuit, in the late case of Carter vs. White Oak Fuel Co., 257 Federal Reporter, 54. Defendant contracted to make monthly deliveries of coal to plaintiff during a certain period, plaintiff agreeing to pay by the tenth of each month for coal delivered in the preceding month. Only partial deliveries were made the first three months. Plaintiff did not pay within the time required by the contract, but did pay each month for coal received the preceding month. The third payment was not made until the 22d, although defendant had given notice that no more fuel would be delivered unless payment should be made by the 10th. No further deliveries being made, plaintiff sued for damages. The defense was that the contract was rescinded for plaintiff's default in paying for the coal as payments fell due. Plaintiff replied that there had been an extension of the time for payment, by mutual agreement. Affirming judgment in plaintiff's favor, the Circuit Court of Appeals says: "The verdict establishes the fact that at the time the defendant attempted to terminate the contract, and when it declared that it would proceed no further under it, it was itself in default of performance of an essential covenant of the contract, because it had failed to deliver the agreed amount of coal the plaintiff was to receive in August, September and October. The right to repudiate a contract for the default of the other party thereto cannot be exercised by a party who is himself in unexcused default of performance of an essential covenant thereof."

Coal Washing on Concentrating Tables*

By J. B. Morrow
Dawson, N. M.

IN COAL-WASHING practice with tables, the largest efficiency mainly has been secured in the treatment of the fines from $\frac{5}{16}$ in. in size down to dust. It has always been a relatively simple matter to effect a clean separation of the coarser sizes, thereby offsetting the loss from the fines, especially when they were not present in the feed in large amounts.

In the Dawson practice, in 1908, there was only five per cent. of material under $\frac{5}{16}$ in. in the raw coal to the washer, but with improved screening facilities the percentage of fines was greatly increased, at times running up to 30 per cent. The loss of fine coal in the waste then began to be a serious factor in the operations.

In 1906 some experimenting had been done with a Wilfley table by T. H. O'Brien and, while good results were obtained, its small capacity precluded the use of this machine on a commercial scale. In 1911, when the problem of the fines began to get troublesome, further experiments were made, using a larger-deck Wilfley. The results secured were so satisfactory that a plant was constructed with 24 tables, their average capacity being between five and six tons per hour.

At the time of remodeling the plant some consideration was given to the feasibility of crushing all the coal to $\frac{5}{16}$ in. and washing it over tables, but the large floor space necessary, together with the added expense of drying all this fine material, made it appear advisable not to crush below $\frac{3}{4}$ in, at which point separation tests had shown that an appreciable saving could be made.

The material is first handled on a three-compartment jig which makes a clean coal, a clean reject and a middlings product. The middlings consist of coal mixed with bone, slate, etc. These are crushed to $\frac{5}{16}$ in. and under, and together with the hutch material is sent to the tables for further treatment.

Average Results for a Month

The average results for last month gave a washed coal with 12.5 per cent. ash and a tailings with 53 per cent. ash. The separation tests on the raw coal show that a tailing product with 55 per cent. ash is the cleanest product that can be made for a 12.5 per cent. ash washed coal.

It is the practice to permit any manufacturer to install his table and run it in competition with the others. So far five different makes of table have been tested. The main difference in these tables lies in the head-motion and in the shape of the decks.

The chief virtue of the table as a coal cleaner lies in its sensitiveness to adjustment and full visibility of the process, together with the ease with which the quality of the product may be varied. The variables as they affect practice are as follows: (1) Length of stroke, (2) revolutions per minute, (3) lateral inclination, (4) longitudinal inclination, (5) dimension and spacing of riffles.

As an illustration of what can be accomplished on a machine of this kind, the figures that follow show the result of a test run made on an Overstrom-Universal table. This device has some features in which it differs from all other tables.

*Paper presented before the spring meeting of the Rocky Mountain Coal Mining Institute, Salt Lake City, Utah.

The head-motion consists of an unbalanced pulley driving loose on a shaft rigidly attached to the table deck, this motion being limited by a fixed stop on one end of the stroke and a cushion spring at the other, thus doing away with all eccentrics, cams and toggles.

There are no bearings under the deck, but it is supported from the floor frame by laminated wooden springs which allow the table to swing lengthways as an inverted pendulum, the motion being in the arc of a circle, the riffles also being laid out in arcs practically parallel to the line of motion.

The supporting legs are inclined slightly backward toward the head-motion, causing the table to rise on its forward stroke. On account of the method of imparting reciprocating motion to the table, it will automatically increase or decrease the stroke with a heavier or lighter feed.

Feed to Table a Hard Proposition

The feed to the table, which consisted of jig hutch and reground middlings ranging in size from $\frac{3}{8}$ in. down to fine sludge, is a harder proposition to handle than the primary coal on account of the concentration of the bony matter, some of which will only have a small differential in specific gravity to distinguish it from the rock or coal.

The tonnage handled was five tons per hour, having a composition, as shown by the specific gravity separation, of

46	per cent. coal at	48.0 per cent. ash
54	per cent. coal at	11.3 per cent. ash
100	per cent. feed	28.2 per cent. ash

The results obtained were:

49	per cent. clean coal with	11.6 per cent. ash
40.6	per cent. clean rock with	48.7 per cent. ash
10.4	per cent. middlings with	27.5 per cent. ash
100	per cent.	27.66 per cent. ash

This is equivalent to a recovery of 91 per cent. of the coal. If the middlings were put in with the waste, it would give 51 per cent. waste with an ash of 44.1 per cent. as compared with 48.7 per cent. in the theoretical separation, carrying 10 per cent. of recoverable coal.

In practice, these middlings from the primary machines are again treated on a table using a shorter stroke and lower riffles and the final waste from the mill contains an average of 5 per cent. of recoverable coal, or, expressed in another way, 99 per cent. of the recoverable coal in the feed is reclaimed.

Superior Oil in Air Compressor

When an inferior oil is used in an air compressor, it will in some cases deposit so much carbon on the outlet valves that they stick and do not perform their proper function. The rapidly running air compressor then churns the air in the cylinder around so often that at last the heat reaches the "firing point" of the oil, and the oil is then ignited, causing the wreck of the machine. Oil for an air compressor should have a high flash point, be easy running and at the same time have sufficient body to lubricate the hot inside surface of the air cylinders. The quantity used should be as small as it is possible to employ and yet assure adequate lubrication of the rubbing surfaces.

Sez Uncle Sam

Written Expressly for Coal Age
By RUFUS T. STROHM

"A LOT of folks has got the blues
From readin' in the daily news
That every week, ships sailin' east
Take back two thousand men, at least,
That used to labor in our mines
An' help to build our railroad lines;
But as fer me, I'm cool an' ca'm,"
Sez Uncle Sam.

"THESE fellers don't belong to me,
An' more than that, the country's free;
So, when a workman trails his nose,
It's no one's bizness where he goes;
Besides, ef these dubs sail away
Because they hate the U. S. A.,
I'd say that I'm in luck, by damn!"
Sez Uncle Sam.

"EF they jes' hanker to git back
Among the ruin an' the wrack,
Where death goes stalkin' to an' fro
In hand with famine—let 'em go!
I hope they git a stomachful
Of all this socialistic bull,
An' anarchy ad nauseam,"
Sez Uncle Sam.

"THEN, mebby, when they're good an' sick
Of places run by Bolshevik,
They'll want to come back here again
To live with honest, decent men;
Well, then, perhaps they may git by—
Ef I've not raised the bars too high!
That's jes' the sort of guy I am,"
Sez Uncle Sam.

Selection of Power for Mine Service

Effectiveness of a Mine Power System Depends Upon Method of Distribution Selected—All-Direct or a Combination of Direct and Alternating Current Are Alternatives Usually Encountered—The Latter Offers Many Advantages

By E. Steck
Clinton, Ind.

THE output and economical working of a mine is dependent on the kind of power used for its operation. Whether alternating or direct current or a combination of both is to be used depends on the size of the mine, the equipment above and below ground, the length and location of the entries, and the location of the coal.

The only kinds of current used in Illinois and Indiana are 275-volt direct and three-phase, 60-cycle alternating. Where power is generated the general practice has been to install a 275-volt direct-current generator. Where the mine has a small capacity, say up to 1000 tons per day, and the coal is hauled over entries on each side of the mine, there is no serious objection to using direct-current generators located on top near the shaft. This is also true where power is purchased at 2300 volts alternating current and a motor-generator set or rotary is used to convert the power for underground operations to 275 volts direct current. In case of purchased power the motors above ground can be 440-volt, three-phase, 60-cycle alternating current. Such motors require less attention than do direct-current machines, and the maintenance charges are less. With large tonnages and extended territories the problem becomes more complex.

Take as an example an entry where the parting is back 5000 ft., laid with 55-lb. rail well bonded, and the average amperage is 800, with 275 volts on top at the generators and 250 volts on the bottom. Average voltage at the parting to be 200.

$$\textit{The drop in rails} = \frac{10.5 \times 800 \times 5000}{1{,}150{,}000} = 36.5 \textit{ volts}$$

Two 55-lb. rails well bonded are taken to be equal to 1,150,000 circ.mil of copper. This leaves only 13.5 volts drop allowable on the trolley and feeders. Equalizing the decrease, or allowing 25 volts drop over the trolley and feeders and the same over the rails and feeders, the cross-section of each would be

$$\frac{10.5 \times 800 \times 5000}{25} = 1{,}680{,}000$$

The feeder along the rail would be 1,680,000 — 1,150,000 = 530,000 circ.mil. The feeders along a 4/0 trolley would be 1,680,000 — 211,600 = 1,468,400 circ.mil. The weight of these feeders are about as follows:

One 500,000-circ.mil bare cable along track, lb	7,570
Three 500,000 circ.mil., weatherproof, along trolley, lb	28,500
Approximate cost	$12,000

The cost of feeders, neglecting the cost of installation, is prohibitive. The practice of the average operator would be to install only one 500,000-circ.mil feeder cable along the trolley and none to help out the rail. The voltage drop in this case will be:

$$\textit{Drop in rail} = \frac{10.5 \times 800 \times 5000}{1{,}150{,}000} = 36.5 \textit{ volts}$$

$$\textit{Drop in trolley and feeder} = \frac{10.5 \times 800 \times 5000}{211{,}600 + 500{,}000} = 58.5 \textit{ volts}$$

The total drop thus is 95 volts.

The voltage at the parting will be: 250 — 95 = 155 volts. Power doing useful work = 155 ÷ 275 = 56.5 per cent. Power wasted in transmission = 275 — 155 ÷ 275 = 43.5 per cent. Eight hundred amperes at 275 volts = 220 kw. Useful power equals 56.5 per cent. of 220, or 124.2 kw. Wasted power equals 43.5 per cent. of 220 or 95.8 kw.

If the power on the entry is costing $1000 per month, or $12,000 per year, the cost of useful power is $6780 while that of wasted power is $5220.

The speed rating of the locomotives is based on 250 volts at the motors and is 6 miles per hour. At 155 volts the speed will be 155 ÷ 250 × 6, or 3.7 miles per hour.

It can readily be seen that with 275-volt direct-current service, and with the foregoing conditions, that either an excessive investment is required or the cost of operation will be extremely high because of the wasted power and the slowing up of the machines.

The installation of a motor-generator set or rotary at the parting, together with another source of direct-current power at the shaft, will place the point of lowest voltage halfway between the shaft and the parting. Suppose the haulage locomotive takes 400 amp., then the drop in the rails and 4/0 trolley with 4/0 feeder will be as follows:

$$\textit{Drop in rail} = \frac{10.5 \times 400 \times 2{,}500}{1{,}150{,}000} = 9.1 \textit{ volts}$$

$$\textit{Drop in trolley and feeder} = \frac{10.5 \times 400 \times 2{,}500}{211{,}600 \times 2} = 24.9 \textit{ volts}$$

Thus the total drop is 34 volts.

The minimum voltage between the shaft and parting will be 250 — 34, or 216 volts. Five thousand feet of 4/0 weatherproof feeder costs approximately $1000. Consequently, with the same amount of power as in the first instance the feeder cost is reduced $11,000 and the voltage drop reduced 50 — 34, or 16 volts.

This scheme can be worked out so that motor-generator sets or rotaries of suitable size can be located in various sections of the mine so as to take care of the requirements of gathering motors, cutting machines and haulage locomotives handling that section. Also a source of direct-current power should be available near the bottom to handle the load created by the haulage locomotives between the bottom and the partings.

Where only direct-current is available all the motors on the surface as well as the cutting machines must be direct current. Such motors require more copper for distribution than do alternating-current machines and

the maintenance costs are higher because of commutator and brush troubles. The cutting machines being farthest from the source of electrical supply will have the lowest voltage. If 200 volts is maintained at the parting the voltage at the face, because of the operation of the gathering motors and cutting machines, will be still less. Take as an example an entry back of a parting where there is in operation one gathering locomotive and three cutting machines. The distance from the parting to the face will be assumed as being 1500, rail 20 lb. bonded on one rail, and 2/0 trolley. The average amperage will be about 150.

$$\textit{The drop in the trolley} = \frac{10.5 \times 150 \times 1{,}500}{133{,}079} = 17.7 \textit{ volts}$$

$$\textit{The drop in rail} = \frac{10.5 \times 150 \times 1{,}500}{212{,}500} = 11.1 \textit{ volts}$$

The total drop is thus 28.8 volts.

One 20-lb. bonded rail equals 212,500 circ.mil of copper.

Referring to the instance above where 155 volts were available at the parting we will have 155 — 28.8 = 126.2 volts at the face. Even with all the feeders along the trolley and rails there will only be 200 — 28.8 = 171.2 volts at the face. With such a low voltage at the face the gathering locomotives and cutting machines will have greatly reduced capacities. With alternating-current energy and a motor-generator set the voltage at the face would be increased because 250 volts would be available at the parting and the machine load would be taken off the direct-current service and placed on alternating-current service. Consequently, the voltage at the face would be as follows with an average of 90 amp. required by the locomotive:

$$\textit{Drop in trolley} = \frac{10.5 \times 90 \times 1{,}500}{133{,}079} = 10.5 \textit{ volts}$$

$$\textit{Drop in rail} = \frac{10.5 \times 90 \times 1{,}500}{212{,}500} = 6.7 \textit{ volts}$$

The total drop would thus be 17.2 volts. Therefore the voltage at the face for the gathering locomotives would be 250 — 17.2 = 232.8 volts.

The accompanying table shows a comparison of the possible results here discussed. Condition A is a typical installation. The locomotives are operating below capacity. With the same output, if condition C is maintained only 72 per cent. of the main haulage locomotives, 50.5 per cent. of the gathering locomotives with the same percentage reduction in motormen and tripriders, and 55 per cent. of the cutting machines will be necessary. Or if the same equipment is retained the increased capacity will be as follows: Haulage locomotives, 39 per cent.; gathering locomotives, 98 per cent.; cutting machines, 82 per cent.

Item	System	Minimum Voltage on Hauling Locomotives	Minimum Voltage on Gathering Locomotives	Minimum Voltage on Machines	Per Cent. Rated Output at Min. Voltage: Hauling Locomotives	Per Cent. Rated Output at Min. Voltage: Gathering Locomotives	Per Cent. Rated Output at Min. Voltage: Machines
(A)	4/0 trolley 1 500,000 circ.mil. feeder	155	126.2	126.2	62 0	50 5	55 0
	55 lb. rail no feeder						
(B)	55 lb. rail 1 500,000 circ.mil. feeder	200	171.2	171.2	80 0	68 5	74 5
(C)	Motor-generator set at parting Alternating-current cutting machines	216	232 8	220 0	86 5	100 0	100 0

Voltage on top, 275; voltage on bottom, 250; entry to face 2/0 trolley and 20 lb. rail, one rail bonded; rated voltage of locomotive motors, 230; rated voltage of machine motors, 220

From the foregoing it is readily seen that proper voltage should be maintained at the various motors so that for a specific output the number of locomotives and cutting machines as well as the operating costs will be kept to a minimum. To determine how to maintain this voltage it is necessary to make a thorough study of the location of the various territories, the tonnage to be taken from each and the future development of the mine. It is then necessary to lay out a system for generating and transmitting power so that the cost and the distributing charges will be a minimum.

Heat-Treated Gearing for Mine Locomotives

Gearing represents a highly important item in the chain of equipment, parts and supplies which, when linked together, tend to make continuous mine operation possible. Too much attention cannot be given to this fact. This is not only true insofar as locomotive equipment is concerned, where much time is required to replace broken gears or pinions, resulting in serious delays to haulage systems, but it is also true of all other gearing in and about mining operations.

So far as gearing is concerned, the delays most commonly experienced can only be successfully combated by using a superior grade of material. Case hardening was the first step in this direction, and although it proved to be quite a success as compared with untreated gearing, it was not the best treatment for mine service, because the glass-hard surface with soft core or center, while ideal from the viewpoint of wear alone, did not have the necessary toughness to withstand the severe shocks and stresses to which mine gearing of all descriptions is continually subjected. Consequently extensive research and experimental work was necessary to perfect a treatment better adapted to mine conditions.

Two important points must be considered by the mine operator when selecting the type of gearing best suited for his purpose. This is especially true of locomotive gearing. These are hardness and toughness; one is just as important as the other. It is not wise to select a gear or pinion with great surface hardness and soft core, capable of giving long service, if steady and continual wear were the only consideration, but unable to withstand the shocks incidental to mine service. Neither should there be selected gearing tough to the point of successfully eliminating breakage, but without the surface hardness necessary to insure long service, from the viewpoint of wear.

The ideal is a combination of the two. This has been obtained in a specially heat-treated gearing; the treatment being founded solely upon these two objects and known as Nuttall BP grade when applied to forged steel and NP grade when applied to steel casting.

To better appreciate the benefits to be derived from the installation of treated gearing that will show results at the end of the year, the following record should be carefully noted:

A Baldwin-Westinghouse mine locomotive equipped with a 35-hp. motor operating over a 5000-ft. haulage road with two maximum grades of 2½ per cent., around a 75-deg. curve, hauling full trips up grade, covered 4000 miles per year hauling 100,000 tons of coal during that time. A BP pinion in this service gave 100 per cent. results for a period of five years, and was not entirely worn out when removed.

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Proper Ballasting of Mine Tracks

TOO MANY mine managers and foremen seem to put up with the material they have, and to regard the ills they face as inevitable if a remedy is not close at hand. Few things are more deplorable than the condition of the mine tracks where the bottom under the coal is soft or becomes indurated and pasty provided there is enough water to keep it in that condition. There are few places where a good rock ballast—not shale but sandstone or a hard limestone—would fail to improve the roads and so prevent the breakage of electric bonds, the brooming of rails and trip derailments. A suitable rock is, however, not always handy and must be obtained from outside or from strata in the mine well above the coal. At one small mine near Du Bois, Penn., a good curbstone was taken out of the workings, and many other mines there are that have rocks equally massive which would make a good support for the ties when broken to suitable size by a sledge or crusher.

Other mines have no stone within the workings, but lots of hard stone on the surface of the ground. Many years ago a mine at Avondale, Penn., along the Red Bank Creek, made its long mule haulage feasible by using the field stone with which the farms of the neighborhood were covered. The farmers were glad to haul it off their fields to the mine, receiving for it a sum of money which did not pay for the loading, nor indeed for all the cost of hauling, but which satisfied a farmer who had an otherwise idle team of horses that were eating off their heads in the barn, and who had, moreover, a farm having a lower production than normal because of the rock slabs with which it was inconveniently strewn. After building wide and high stone fences and adorning every remaining stump with a cairn of rock, there was still enough stone left to make the sale of it attractive even at a dollar a load, especially if the haul was everywhere down hill.

The stone being tested by years of exposure had every particle of clay and shale with which it had been pitted frozen or washed out. The rock left was durable and well suited for ballasting. Being small, it was, without much breaking, well adapted to tie support.

There are many mines which would have their tracks in better condition if some of the rock brought out or some of the rock readily quarried on the hills were broken by a crusher and used for ballast. The crusher might be installed outside or driven by a motor inside; perhaps the former arrangement would in most cases be best, for it gives more headroom, is convenient to the needs of the whole mine and provides the stone for any outside concreting work or for any highway roadwork that may be needed.

In fact there are many parts of the country where the coal mines are the only possible sources of road metal, and it is a pity that more of it is not produced by that agency, where, indeed, the company charter permits it. When the land is covered with a thick deposit of fine glacial drift or with shale or loess the highroads must be metaled with rock brought a long distance unless some mine arranges to provide the necessary material, which unfortunately it cannot always do.

A crusher, desirable as it is for the making of good tramroad ballast, might not, in some mines, seem to have uses enough to justify its installation, but consideration of its possible uses as a source of stone for road building and concreting, on the property of the company and elsewhere, might quite logically turn the balance in its favor. A crusher with a mill will, moreover, readily make sand for locomotives and also for concrete work. A crusher is a handy tool around almost any coal mine, as in the making of concrete the breaking of stone by hand under a hot sun is a job men do not want, and if they accept it, it is heartbreaking to see with what lack of zeal they go about the work.

Eight hours of work is all too great a strain after a night of gambling, but no healthy man who has had a full eight hours' sleep is unequal to doing a full eight hours of strenuous labor. Whatever hours are to be shortened, no one should undertake to deduct so much as a minute from the eight hours that should always be devoted to recuperative slumber.

Stripped Coal Should Be Carefully Prepared

STRIPPED coal like culm-pile coal is suffering quite a little by the practice, established during the war, of selling all coal in a given district, however impure, at an equal price regardless of its quality. There is some coal with thin covering that is discolored and soft. Such coal, which is stripped at little expense, is not the equal of coal under somewhat heavier cover. This inferior coal can be sold locally for domestic use at less than the regular price. Some persons are recognizing the difference by offering this poorer coal at about one dollar less than the price for coal mined by underground methods.

Coal under somewhat deeper coal is neither discolored nor soft and it does not have to be placed on the market at a lower price than is put on coal mined by regular methods, provided the coal is handled with equal care. There is no reason why it should not have an advantage, as the coal is overmined in the roof instead of undermined in the coal and there is no "bug dust" to be disposed of, as there is no undercut made.

But care must be taken to completely remove the overburden, the top dirt being cleaned away by pick and shovel, and the remainder of the dirt swept off by a wire broom. With such care the overburden does not mix with the coal. An ounce of equal precaution will prevent the bottom also from becoming mixed with the product.

Where, however, the fuel has to be sold in competition with coal that has gone over a picking table or which is washed and crushed and washed again, the stripped coal should be similarly treated. Perhaps it only has to compete with a roughly cleaned product but one which is well screened. In that case care must be taken to size with equal precision the stripped coal.

At quite a few plants in eastern Ohio all these precautions as to picking, crushing and screening are being put into operation. Such plants are more than upholding the value of stripped coal, whereas pits where "everything goes" are destroying its reputation. The prejudice against rusty coal is often not well founded, but, though it may be almost as good as the unstained variety, the market is not willing to grant that as a fect.

The open way in which the coal is mined by stripping gives the miner much advantage in removing impurities. The light of the sun favors more careful inspection of binders and partings, and consequently there are some reasons why the coal should be better, even where not washed or hand picked. If however, it is loaded clean down to the floor by a steam shovel and receives no further treatment, one cannot expect that it will have a good appearance or be free from impurity when it reaches the market.

During the war we deplored the lack of education, technical and other, the first because it hampered the inventive genius needed to win the conflict, the second because the uneducated men made soldiers who were hard to manage and foreigners who lacked comprehension of our government, purposes and language. The war now being over, are we going to starve our technical and other scholastic institutions by inadequate donations on the one hand and insufficient school taxes on the other?

How to Sell Coal Abroad

THE OTHER day a man made his appearance at the offices of *Coal Age* and informed one of the editors that he desired to purchase 20,000 tons of coal for export to France. He openly stated that the firm he represented was a large exporting concern which had hitherto not handled coal at all. When he was asked what kind of coal he desired, and for what purpose it was to be used, he replied that he had no idea at all, as the telegram he had received contained no specifications of any sort. His parties wanted coal, but the nature of the fuel they were seeking they did not take the trouble to indicate.

It is quite possible that there are many people in France and elsewhere who have been in the habit of buying from one special firm for a number of years and feel that the coal which they have been furnished has met their entire requirements, or at least has seemed to meet them satisfactorily.

When they come to deal with a foreign country like the United States, they think that all that is necessary is to send in an order for coal just as they have been in the habit of doing in the past through their French dealer. In that case they may have been accustomed to say not even so much as that the new consignment of coal shall be precisely the same in quality as the one they have been receiving. They have relied on the dealer to see to that.

It will be very hard to deal with people having such an indeterminate idea of their requirements, such as is here indicated. It would appear necessary that an agent should go and visit the plant and find out just exactly the type of coal that they have been receiving in the past, if any business is to be done with them on a satisfactory basis. It will always be very hard for a small company to do business of this kind abroad, and it will never be able to satisfy the buyer until there is a combination of sellers in the United States that will be large enough to supply agents in Europe to go to the various would-be purchasers and discover the precise type of coal which has been used in the past, or possibly will ascertain what coal will best suit the equipment that the European factory has installed.

There are, of course, a number of purchasers in European countries who clearly understand the nature of the coal that they desire, but they will come only with trepidation into the American market until they know the names of the firms which can supply the kind of coal that they seek, unless they can obtain that coal through an export association with a reputation for good service. We need a classification of coal that will enable the foreign merchant to send in his order telegraphically, merely mentioning the type of fuel and the condition in which it is to be received, whether as run-of-mine, lump, nut, egg or slack. The standardization of coal should therefore be the subject of a careful inquiry. The product of the United States should be classified in a broad, yet practical, manner and the types or classes formed should be named, lettered or numbered as G. H. Ashley, until lately geologist in charge of the Eastern Section of the Coal Fields, of the United States Geological Survey, has already tentatively done.

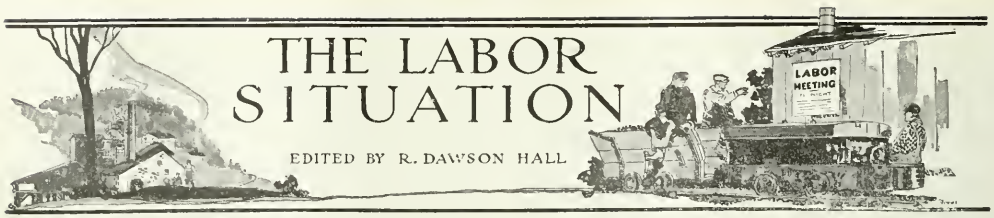
It is absolutely necessary to have a standard, and that standard must be based not on the character of the coal as found at the mine, but on the character of the coal as it is likely to be delivered on the car. It is also necessary to take into careful consideration how the methods of sampling followed by our European purchasers differ from those which are in vogue in this country.

There is rarely a large export demand for a non-standardized article, for such a product can only be sold on previous reputation; and it will be readily understood that where a buyer is not obliged to deal with a foreign merchant he will endeavor in every way to secure his wants at home because of the extreme difficulty of buying from a man at a distance, and from one whose reputation is not established.

Nothing will fix the character of the American coal producer so much as a strong export association having an absolutely fearless inspectional service and one that will see that the coal is in every way up to specification, as to analysis, thermal value and temperature of ash fusibility.

In this country it has been found extremely difficult to ship apples across the continent, or for any great distance, except where there was a large degree of standardization and unless the producers of the fruit were protected against the unscrupulous by a large producers' association that would guarantee that the apples shipped would be in accordance with standards, or would at least maintain the reputation that the field had gained as a result of careful inspection of its product.

What is necessary when selling apples within the confines of America is needed with regard to coal when it must be shipped abroad. The operators must combine not so much to fight the combination of foreign buyers as to be able to go to them with an adequate selling organization backed by standardization and integrity. Certainly if we are going to continue our trade in normal times we shall need to make provisions of this character.



General Labor Review

Remarkable is the dilatory conduct of affairs at the meetings of the United Mine Workers of America. "Killing time" seems to be the principal occupation of the delegates. The death of John Mitchell and his funeral had something to do with the delay and so perhaps also had the labor troubles in various parts of the country. But neither of these seem to account adequately for the slowness of the proceedings. The labor leaders have a large amount of work on their hands, not only the meeting with the operators on Sept. 25 at Buffalo, but the big labor conference at Washington on Oct. 6. There is need to clear the boards as soon as possible so as to be ready for other and perhaps more strenuous work.

The President has named the 22 men who are to represent the public at the National Labor Conference and who will serve with 22 labor men and 22 representatives of employers. They are Bernard M. Baruch, of New York, the former chairman of the War Industry Board; Robert S. Brookings, of St. Louis, former chairman of the Price Fixing Committee of that organization; John D. Rockefeller, Jr., Judge Elbert H. Gary, of the United States Steel Corporation, Dr. Charles W. Eliot, president emeritus of Harvard; Charles Edward Russell, of New York; John Spargo, of Vermont; O. E. Bradfute, of Xenia, Ohio, president Ohio Farm Bureau Federation; Ward Burgess, of Nebraska; Fuller R. Callaway, La Grange, Ga., a cotton manufacturer; Thomas L. Chadbourne, of New York; Charles G. Dawes, of Chicago; H. B. Endicott, of Milton, Mass.; Paul L. Feiss, of Cleveland; Edwin F. Gay, dean of the Graduate School of Business Administration, Harvard University; George R. James, of Memphis, Tenn.; Thomas D. Jones, of Chicago, Ill.; A. A. Landon, of Buffalo, N. Y.; E. T. Meredith, of Des Moines, Iowa, editor of "Successful Farming"; Gavin McNab, of San Francisco, Cal.; L. D. Sweet of Carbondale, Col. and Louis Titus, of San Francisco.

Two Socialists Among the Public's Conferees

In this list are two socialists, C. E. Russell and John Spargo. The latter during the war resigned as a member of the National Executive Committee of the Socialist party. H. B. Endicott is an officer of the Johnson-Endicott Shoe Co., at Binghamton, N. Y., who has been conspicuous as an arbitrator in Massachusetts labor disputes. Thomas Davis Jones is president of the Mineral Point Zone Co. and a director of the International Harvester Co.

The session of the United Mine Workers of America on Monday, Sept. 15, was of a piece with those preceding it—a mere marking of time. President A. McAndrews of the Tobacco Workers' Union representing that body and also the Label Trade Department of the Federation of Labor addressed the delegates on the importance of buying nothing without noting first whether the union label is attached to the article purchased. He also endeavored to line up the delegates against the reformers, who would rule out tobacco as they had already abolished alcohol. The rest of the day was wasted in a fruitless quarrel about the exclusion of delegates from unions who were under the ban of the administration for violation of contracts.

The quarrel was carried over to the following day, Alex Howat, the president of district 14, Kansas, being the advocate of the contract breakers. His talk made little or no impression, the vote being 1704 to 288 against the seating of the Illinois delegates. Had the insurgent mine workers been in his district, Mr. Howat would have sustained them. As a result Kansas continually has abortive strikes which keep the men in perpetual penury and do absolutely nothing to raise the wage scale or better conditions for neither Kansas nor Illinois can afford to have such a high scale or such onerous conditions as will shut them out of all markets, but the farmer markets adjacent.

Everyone of the Kansas strikes is a mere battling against a stone wall. It hurts the Kansas miners' hands, without the wall being conscious of the bombardment. The mural environment of the Kansas miners is not a ring of unkindly operators but the encircling pressure of economic law. The price of coal can be put at any level but if put too high the coal will be neither mined nor sold. The Kansas miners are slowly learning that Alex Howat's plan of striking against signed agreements results merely in impoverishment. Harry Fishwick, vice-president of district No. 12, Illinois, declared himself ready to prosecute any one who alleged that money had been misappropriated by the Illinois district union.

International Mine Workers Mark Time

To keep the crowd interested, Miss Rose Sullivan organizer of the Telephone Operators' Union spoke in the afternoon, as did also Mother Jones who came to present the cause of the steel workers. The "Fraternal delegates" Martin J. Flyzik and Lee Hall, then gave an account of their trip to the convention of the International Union of Mine, Mill and Smelter Workers, at which convention W. D. Ryan, of the United States Bureau of Mines, and E. P. Marsh, Labor Mediator of the Federal Government, both took part. The delegates emphasized the community of interest and sentiment between metal- and coal-mine workers but did not definitely recommend amalgamation.

A memorial service in honor of John Mitchell was held at St. John's Cathedral, in Cleveland, at 8 a.m. Tuesday, the 2000 delegates marching from the convention hall to the cathedral.

On Sept. 17 the question of a continuance of the affiliation with the American Federation of Labor arose. Those who were backing the separation were not merely seeking that the miners' union should "paddle its own canoe," but sought to amalgamate the United Mine Workers' organization with the "One Big Union," which is practically the same as the Industrial Workers of the World. The radicals in the union regarded the matter as a determining element. If they could break with the American Federation of Labor, they felt that they could ally themselves with the advocates of "direct action" and the "universal strike." A rupture with the A. F. L. meant a recognition of Bolshevism by the United Mine Workers of America.

Mine Workers Sustain American Federation

The resolution was introduced by the local union of Washoe, Mont., where the I. W. W. are more than ordinarily strong. The first part of the resolution found fault with the salary of Samuel Gompers, which is $10,000 a year. Delegate Morgan, of Illinois, said the services of that notable were "not worth the money." The chairman of the resolutions committee said that any corporation would pay Gompers five times as much for such abilities as he possessed.

When Secretary Green defended the A. F. L he shouted to the convention, "Will we withdraw?" "No!" was the deafening reply. There was doubt how the convention

stood. Secretary Green said that Mr. Gompers had protested against the salary given him and said on the floor of the A. F. L. convention that, "it will be misunderstood and misinterpreted." "Despite that," said Mr. Green, "the delegates voted President Gompers the salary, although he did not want to take it."

But why continue the story of these sessions through the maze of their inconsequence. On Friday, Sept. 19 an amendment to the Constitution was made, under which the six-hour day, instead of the eight-hour day, was made one of the aims of the organization. It would be absurd to specify in the Constitution that eight hours was the goal when the union was endeavoring to press for a six-hour day.

"Take It or Leave It" Is To Be the Dictum

The mine workers believe that the pressure of the operators and the public will compel the represenatives of the union to modify the demands when the scale conference comes about. They are determined that their representatives shall be steeled against argument, public wrath and conscientious scruples by instructions of the convention to the effect that the operators will have to agree to all the demands laid down. If the purpose of the convention materializes in a resolution it will forbid the union leaders to accept anything less than all that is demanded when the final tentative wage scale is made.

The strike in the northern anthracite region, as was reported last week, came at last to an end. On Sept. 14 the mine workers of the Delaware, Lackawanna and Western R.R. Coal Department, refused even to listen to National Organizer D. M. Fowler and Board Member James Gleason, who represented the administration of District No. 1. The men thus discourteously dismissed declared that they would ask for the revocation of the charters of the locals on the ground that they had left the mines for an illegal strike, and then would not listen to the arguments of those who sought their return.

But on the following morning, Sept. 15, the Hudson Coal Co.'s men all returned to work, agreeing to submit their grievances through the district president. The D., L. & W. men's strike was started more or less out of sympathy with the Hudson company's men, and now the original strikers had returned to work and their sympathetic friends were out on strike, and, what was more, had just begun to feel fine and fit. They had just dismissed the union envoys when the discouraging news came.

Confidence gave way to dejection. The union had won in that part of the region where it was really weakest. The most bitter of the insurgents had collapsed, and the strike was lost. On Sept. 17 the D., L. & W. mine workers went back to work. The new grievance committees are insurgent bodies that bode only harm for the mine workers.

Cornwell to Quizz Both Operators and Men

While an investigation is to be made of conditions in the Guyan field, about which so much has been said by United Mine Workers, there is at the same time to be an inquiry equally thorough to determine and fix the responsibility for the assembling of a mob of armed men and for the leading of them toward the Guyan coal field. This was indicated by Governor John J. Cornwell of West Virginia in a telegram sent by him to Acting President John L. Lewis, of the United Mine Workers at Cleveland on Sept. 11, in reply to a telegram received from Mr. Lewis. While the United Mine Workers insist upon an investigation of Logan conditions it will be observed that so far as any official request goes they are fighting shy of an investigation of the uprising organized in the Kanawha region during the first week of September.

Mr. Lewis telegraphed Governor Cornwell from Cleveland, Ohio, Sept. 10, 1919: "The International Organization of the United Mine Workers of America joins President C. F. Keeney of District 17 in demanding that an investigation of the conditions and treatment of the miners of the Guyan Coal Fields be made at once."

Governor Cornwell's response on the same day was as follows: "Replying to your wire of the 10th; on the ninth inst. I wrote President Keeney a letter advising him of my intention to promptly institute such an investigation as you suggest in order that he and your organization might be prepared to assist. On the same afternoon I told him personally of my intention and that the letter had gone to him. That investigation will be thorough, and coupled with it will be an investigation equally thorough, to determine and fix the responsibility for the assembling of a mob of armed men and their march toward the Guyan coal field, which narrowly escaped precipitating a conflict in which hundreds of men would have been killed.

On Tuesday, Sept. 16, Governor Cornwell announced that the investigation into conditions in the Guyan field and into the armed invasion from the Kanawha field would start Monday, Sept. 22, Mayor Thomas B. Davis, acting adjutant general and former chief of the Huntington Fire Department, being the investigator. Col. George S. Wallace, a Huntington attorney will assist him and examine all witnesses.

The Governor has stated "It is not my desire to make anything spectacular out of the investigation. On the other hand, I hope its progress will quiet rather than disturb the situation. Its purpose is to remove whatever is unlawful, unfair, unjust, whoever may be responsible for it."

To Look Into Slugging, Mine Guards and Wages

In directing Major Davis to conduct the investigation, Governor Cornwell outlined the scope of such investigation in the following letter:

Confirming my personal instructions to you, I desire that, commencing on Monday next, Sept. 22, at 10:30 a.m. you begin an investigation of the following matters:

1. The charges made in the public press and in public addresses by officers and agents of the United Mine Workers Organization that the coal operators in the Guyan field are employing armed guards; that said alleged guards are or have been beating, slugging and maltreating the workers and other persons in said coal field; that men are kept in the mines by threats and intimidation; that their rates of pay are below that at mines in union fields and that their living conditions are infinitely worse; that a large majority of the workmen in the field desire to join the "union" but are forcibly prevented from doing so.

"In addition to investigating the foregoing charges which have been made publicly and to me, personally, I desire to know whether the guards, if any, have in any way violated the laws of the state or infringed upon the rights of any law-abiding person or persons, as well as to ascertain from competent witnesses or otherwise, the facts as to the labor and industrial conditions and practices in said coal field as well as the living conditions and rates of pay, as compared with the rates of pay in other coal fields of the state where the natural conditions are in general similar to those in the Guyan region.

To Find Out Who Started Kanawha "Army"

"2. To investigate and if possible ascertain and fix the responsibility for the assembling of several hundred armed men, miners from District 17, who, on Saturday, Sept. 6, marched from a point on Lens Creek, Kanawha County, to Coal River, Boone County, returning on special trains, Sunday, Sept. 7, and whose purpose, as stated, was to invade the said Guyan coal fields.

"While you are to conduct and control the investigation and determine where sittings are to be held and the competency of all witnesses, I have secured the services of Col. Geo. S. Wallace, whose duty it will be to conduct all inquiries of witnesses. While it is absolutely necessary that the investigation be full and complete, regardless of where it may lead, it is equally important that the record be not encumbered with hearsay testimony or with extraneous or irrelevant statements. Facts and not opinions are what I am seeking. Statements should be as brief as possible and confined to the matters at issue. The record, as made up, will be a public document and it should not be unnecessarily large.

"The United Mine Worker officials, the coal operators or other interested persons, should be invited to present witnesses and to submit to Col. Wallace information as

to what is expected to be proven by each, in order that he may be in a position to propound questions, but inasmuch as this is an investigation by and on behalf of the state all inquiries should be made by him. There being no plaintiff and no defendant it would manifestly be improper and impossible to allow attorneys representing persons other than the state to conduct the examination of witnesses and to cross examine them. Such a method would lead so far afield that the investigation would be worthless.

"I am depending upon the well-known ability, courage and character of Colonel Wallace to obtain all the facts from all witnesses presented to or found by you without fear or favor and at the same time to keep out of the record such things as do not properly concern this investigation. I suggest your first sitting be held in Charleston on the date mentioned.

"You are authorized to secure a competent and reliable stenographer to do the work—a court stenographer if possible. Copies of this letter are being sent to Colonel Wallace as well as to Frank Keeney, and the Guyan Operators Association."

Strikes Where Wages Have Been Lowered

Differences having arisen between operators and miners in the New River field as to the construction of the new contract which became effective on Sept. 1, the executive committee of the New River Coal Operators Association met at Charleston during the third week of September for the purpose of ironing out some of the grievances. The miners at three or four plants in the district have been on strike since the new agreement became effective. It is believed, however, that the differences between the companies and their employees will be adjusted and that the men will be able to return to work, as a result of the meeting of the executive committee of the association.

About 400 miners have been on strike at Jodie in the New River field, the strike growing out of a reduction in the price per ton paid miners under the recently adopted wage contract which supersedes the old contract on Sept. 1. Officials of District 29 claim that the reduction is a violation of the new wage contract, in that the new contract provided that there should be no increases or decreases in wages, pending the adoption of a new contract in the Central Competitive region.

Despite New Restrictive Clauses, Men Strike

As the new contract provides for a penalty in the event of strikes, it is contended by officials of the New River Coal Operators Association that inasmuch as the operators at both Jodie and Wright, where the strikes have occurred, are parties to the contract, the men are violating their pledged word in not returning to work. The officials of District 29 are also found in fault for countenancing the strike of the miners. The price per ton paid under the old contract, according to officials of the mine workers' organization, was $1.20. Under the new contract the wage per ton, it is claimed, is only 59c.

It is to iron out such differences that the Executive Committee of the New River Coal Operators Association has been holding a meeting. Interpretation of the new wage contract, as it applies to the mining of low coal so as to prevent any reduction of wages in the thin-vein section, may be agreed upon, and it is therefore likely that most of the plants in the thin-vein section will soon be in operation again. It is proposed to meet the situation by the payment of a differential to such miners as are engaged in mining low-grade coal.

While the prospect of an early settlement of differences between the operators and miners in the thin-vein territory of the New River field is reasonably bright, there is no prospect that those operators who withdrew from the New River association, rather than operate their mines on a "closed shop" basis, will make a concession on that matter and thus pacify the union miners who immediately went on strike at such operations. Operators who refused to accept the "closed shop" produce about 10 per cent. of the tonnage of the New River field. Since Sept. 2 their mines have been for the most part idle. No attempt has been made by their owners to operate them, at least insofar as the union miners are concerned.

The operators propose to secure full crews of nonunion miners, offering a slight advance in wages as compared with the rest of the field, so as to be able to run the mines at the usual capacity when they resume operations. Even the electric power plant is closed down at the mines of the McKell Coal & Coke Co., and both Glen Jean and Kilsyth are in total darkness. The operators at the McKell plant and elsewhere indicate that they will under no circumstances give in and that while union miners are welcome to work at their plants if they desire, they do not on the other hand propose to have the organization of miners dictate who they shall or shall not employ nor do they propose to permit any discrimination.

Some Refuse to Concede the Closed Shop

No labor troubles exist anywhere in the northern West Virginia fields except at Mabie in the Randolph field where the miners of the J. B. Jenkins Coal & Coke Co. are striking as a result of the refusal of the company to put its mines on a "closed-shop" basis. This the company states it will under no circumstances do, and that the mines will continue to remain closed down until they can be operated as an "open shop." Both sides appear to be equally obdurate.

The general consensus of opinion in West Virginia is that there will have to be a "show-down" when the miners present their demand for a five-day week and a six-hour day. While there has been no general expression of opinion among producers and while operators have not said in so many words that they will close down their plants before they accede to such a demand, their general disposition is nevertheless to meet the issue and to close down rather than give in to such a preposterous demand. It is believed that if the mines are closed down public sentiment will force the miners to recede from their position, for production will entirely cease.

Illinois insurgents are continuing spasmodically their hopeless resistance against the authority of their organization. The "armies" which expected to "pull out" the loyal miners have demobilized, or rather disintegrated, but the leaders of the insurgent faction are doing their best to keep the fires of revolt burning. "Mass meetings" are held on slight provocation and under the influence of heated oratory the miners resolve to keep up the fight and go forth the next day to this mine or that and try to get the workers to quit.

The workers, to avoid clashing with their misguided brothers, usually resort to subterfuge. If they know the strikers are coming they are not at work when the delegation arrives. It has been found expedient to shut down for the day. If the mine is working some of the men respond to the appeals of the strikers and go home, only to return to work in a day or two. No permanent results are accomplished by the insurgents anywhere.

Union Has 13 Riotous Insurgents Arrested

The workers are getting out of patience and when a band of strikers intercepted the workers on their way to Consolidated Mine No. 17 at Collinsville Monday morning, they went back home rather than have a clash, but warrants were sworn out against 13 of the insurgents, charging them with intimidation with intent to incite a riot. The officials of the United Mine Workers are behind the action taken, and Mose Johnson, member of the State Executive Board, announces that the prosecutions will be pushed.

New locals are being organized by loyal miners to take the places of those whose charters were revoked by State President Farrington under authority of the International organization. The unfavorable action taken at Cleveland against the insurgents has put the finishing touch to the débâcle of their ill-advised revolt.

Advices from Birmingham, Ala., on going to press were to the effect that 10,000 coal mine workers employed by steel companies in that region were likely to be idle on Oct. 1 when the steel strike commenced.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Safety in Mine Timbering

Letter No. 5—While traveling through an airway a short time ago, I came suddenly to a full stop where a large fall of roof had occurred that blocked my passage. It was plain to be seen that the timbers were not broken but had simply given way. I said to myself, These timbers have been put up wrong or this would not have happened. Upon examination, I found that the fall had knocked out about six sets of timber. Neither the crossbars nor the legs that had supported them were broken, but were lying more or less covered with the mass of slate that had fallen.

Sitting down a few moments to study over the matter, I concluded that the sole cause of the trouble lay in the fact that the bottom was soft, too soft to resist the pressure of the legs resting on it. I said, if this could occur on an airway the same might take place, at any time, on the haulage road and block the mine. My conclusion was that this was a wrong method of timbering under these conditions.

Again, I thought, how many men have been caught on haulage roads and crushed between the car and the legs of a timber set, and how many drivers have been killed by a fall of roof when a derailed car has knocked out one or more sets of timber, to say nothing of the delay caused by the accident.

In this connection, therefore, allow me to suggest a system of timbering that is particularly adapted for

SUPPORTING COLLAR BEAMS ON HAULAGE ROADS

the support of roof over haulage roads. The system I am about to mention requires no legs to support the crossbars and gives no opportunity for men to be caught between the car and a timber standing at the side of the road, or for a derailed car to knock out timbers and cause a fall of roof and, perhaps, a fatal accident.

The system I have in mind is one that I have used successfully in the old country. It does not require the cutting of hitches in the ribs to support the bars. On the other hand, it is a simple and inexpensive method that can be quickly applied. I have known one man to do the entire work alone and accomplish as much as two men would do by the old system of framing timber sets and setting them in place, or by cutting hitches in the ribs for the support of the bars.

The accompanying sketch shows clearly my method. It will be observed that the crossbar is supported on two I-beams running parallel with the entry. These, in turn, are held up or laid over iron plugs, which are driven into holes bored in the ribs, about 3 ft. apart. The iron plugs are 2½-in. bar iron and, as shown in the sketch, are slightly upset on the ends, to prevent the I-beams from slipping off the plugs. The holes are drilled about 18 in. or 2 ft. into the ribs. The depth of the hole and size of bar required will depend on the nature of the roof to be supported and the hardness of the coal. The plugs are driven into the hole and tightly wedged.

My experience with this system of timbering is that it is much more quickly done and costs less, since no legs are required and there is no framing or jointing of the timbers necessary. The holes are quickly bored with an ordinary coal drill, and the method is well adapted to conditions where the coal is hard and the bottom soft. As shown in the figure, the crossbars are wedged against the roof or lagging is used when that is necessary. I have often found that material for the plugs can be taken from the scrapheap and much of that utilized to a good purpose. J. RILEY.

Universal, Ind.

Problem in Coal Extraction

Letter No. 4—After carefully reading the article describing the process employed for the extraction of coal in a certain mine where but 50 per cent. of the coal was taken out, *Coal Age*, Aug. 7, p. 234, it would appear to me, judging from my own experience in working thick seams of coal, that the aim in this case has been to obtain a large percentage of coal in the first working of the mine or, in other words, when forming the panels and driving the rooms.

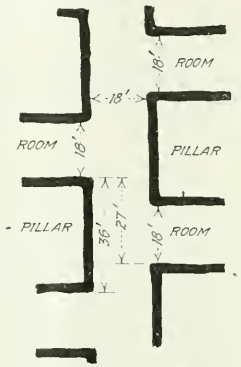
The conditions described in this article are such as to cause little wonder that but a small percentage of the coal was recovered. It is customary, in this district, to speak of mine-pillars as "ribs," and this term would describe more accurately the so-called pillars mentioned in this article as being left for the support of the roof while driving the rooms to the limit. As I have just remarked, it is only what might be naturally expected that only a small portion of these ribs could be recovered in the work of robbing.

Large Pillars Required in Order To Secure a Good Percentage of Recovery

It is a well recognized fact, in the mining of coal, that the best results, in respect to securing a high percentage of coal extraction and the largest amount of round coal, can only be obtained when the panels are not too large nor the rooms too wide in proportion to the width of the pillars. In the present instance, the dimensions given as 1565 ft. between cross-entries and 520 ft. between headings show large panels that will require too long a period of time to open up and drive rooms with the assurance or promise of a good recovery of pillar coal. Especially is this true with the soft fireclay bottom here described.

As a remedy, under these conditions, allow me to suggest that the panels be formed by driving the cross-entries so as to leave a block of coal 1000 ft. in width, while the headings are driven single and 418 ft. center to center. All headings and rooms should be driven 18 ft. wide. By this arrangement, the rooms will be only 200 ft. in depth and the room pillars should be twice the width of the rooms or 36 ft. wide.

I have said that the headings should be driven single and have a width of 18 ft. The rooms on either side of the heading should be driven from 18 to 27 ft. in advance of each other, as shown in the accompanying sketch. Also, the breakthroughs in the rooms should be staggered in the same manner, which arrangement will give a much better support to the roof, under the conditions mentioned, and largely eliminate the risk or danger of squeeze. I believe that the coal in the panels can then be extracted in less than half the time required by the present system.



STAGGERING ROOMS ON SINGLE HEADING

When starting to draw back pillars, the arrangement I suggest will probably be found to afford a practically solid roof. The pillars will not be crushed, and it is my belief that a much larger percentage of total extraction will result and the coal mined in a better condition. Regarding the statement that the fireclay floor is very soft in places, it is impossible to say definitely what is the best method to pursue in that case, but I would suggest leaving the bottom coal in the first working. This would not only permit of the use of shorter props, but give a better floor and keep the fireclay dry. The bottom coal can be wholly recovered when drawing back the pillars.

Referring to the natural cleavage planes claimed to exist in the top coal and roof and extending north and south, I do not think a better plan could be adopted than that mentioned of driving the rooms east and west to avoid the possibility of heavy roof falls.

McKeesport, Penn. ANDREW O. BAIN.

Letter No. 5—Having given some considerable time and thought to the reading of the article on this subject that appeared in *Coal Age*, Aug 7, p. 234, I beg to express an opinion as to the causes that prevented the extraction of more than, as stated, 50 per cent. of the coal by the method employed, and to suggest a plan by which, I believe, 90 per cent., more or less, of the coal can be taken out.

To begin, let me say it is my humble opinion that too much coal was extracted in the first working. In order to obtain a larger percentage of good merchantable coal, the aim should be to take out as little as possible in the first working and leave pillars large enough to prevent any movement in the overlying strata and avoid crushing the coal remaining in the pillars. In other words, let the chief aim be to lay out the work in large pillars, by driving stalls 12 or 18 ft. in width as indicated in the general plan shown in Fig. 1, and depend on the working out of these pillars as the main source of production.

If the seam has any inclination, it is well to remember that the weight on the pillars always starts on the rise side. In working out the pillars, therefore, care must be taken to conduct the work so as to throw this weight off the pillars and have it rest in the goaf or waste. When due consideration is given to this feature, a higher percentage of extraction will result. Though it may cause a slight increase in the cost of haulage, it will always provide a greater degree of safety and less timber will be required to support the roof.

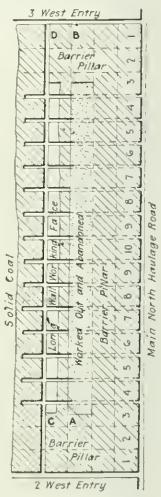


FIG. 1. SHOWING GENERAL PLAN OF PANELS

Because of the nature of the overlying strata, which is described as containing slips and disintegrating readily when exposed to the air, I would leave up the top coal, in the first working, and recover this when working out the pillars. To my mind, the cutting action of the roof is greatly aggravated, in the present method, by attempting too large an extraction in the first working. The surest means of avoiding these results is to secure a good clean fall of roof in the waste so as to relieve the pressure on the pillars; and, by splitting the air, reduce the velocity of the current to a minimum. A well-regulated ventilating system is of the utmost importance in this connection. It appears to me that the so-called "modified-panel system" has been adopted, in this mine, more for the purpose of securing quickly a large extraction of coal than to avoid trouble from gas or spontaneous combustion. It is stated that the present method "develops squeeze," which is always a dangerous condition, besides causing a large loss of coal. It is a wonder to me that, in working a thick seam of coal (8 to 11 ft.), at this depth (450 to 600 ft.), the system employed would allow even 50 per cent. of recovery.

Let me say, here, that the coal left in the pillars is not only lost, but is one of the chief causes of the present trouble, by reason of its throwing the weight onto the pillars and crushing them. This is wholly avoided in the method I suggest and surface damage is reduced to a minimum. Where the weight is thrown back in the waste, not only is the pressure relieved on the pillars, but a tilting action is set up in the overlying strata and the break arches over long before it reaches the surface.

The use of only 100 props in rooms necked 18 ft. wide and driven a depth of 260 ft. would indicate, to my mind, an exceptionally good roof, notwithstanding the statement to the contrary. The appearance of gas in this mine several days after a squeeze had started looks as though this gas came from strata higher up in the formation, which was not released when the squeeze first started. Therefore, I conclude that, by avoiding the occurrence of a squeeze, no trouble may be expected from gas. This field is said to be unionized, so that only 14 men are allowed behind a breast machine and

20 men behind a shortwall machine. Such a condition, however, does not offer any objection to the method I have in mind and will now describe more fully.

Referring again to the figure, it will be observed that I have increased the distance between the west cross-entries, from 1565 ft. to 2280 ft., which will provide space for 19 pillars and 18 stalls driven 12 or 18 ft. in width (I prefer 12 ft.) and about 120 ft., center to center, thus blocking out the coal in square pillars 100 ft. on a side, more or less, and separated by narrow roads or stalls. In this system, the north and south openings will be used as haulage roads, while the east and west openings are rooms.

As shown in the figure, I would leave two lines of these pillars of solid coal to protect the main-north haulage road and 2½ pillars along the west entries, although a pillar only 110 ft. wide is shown on these entries, in the present plan. Time may prove that it will be necessary to leave only one and one half pillars along the west entries. Also, it may be found that the stalls and headings can be driven the full width of 18 ft., as suggested instead of 12 ft. wide.

When the stalls or rooms of the main entry have advanced to a point just beyond the third line of pillars, and the heading marked *AB* in the figure is opened through from the 2-W to the 3-W entry, switches are laid on this heading, running back into each stall and branched to the right and left so as to reach about 50 ft. of longwall face on each side of the stall.

From the sketch, it will be observed there are 14 stalls opened between the 2-W and 3-W entries, and seven of these stalls will furnish the coal hauled on each of the entries. This arrangement will give two working faces, one on the right and the other on the left of each stall, thus providing 14 working places to be cut by one machine, which conforms to the union regulations and yet permits two men to load coal in one place while another place is being cut.

In the figure, the third line of pillars is shown as worked out and abandoned, and the fourth line of pillars is being drawn back and the coal from these pillars hauled out on the road *CD*. In this manner, each line of pillars is worked out successively until the cross-entries reach the boundary, when the work of drawing back the entry stumps and barrier pillars is started and carried on in the usual manner.

Better results will always be obtained by keeping the longwall face in each line of pillars practically

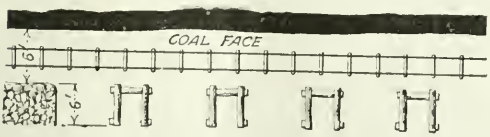


FIG. 2. SHOWING TIMBER COGS ON LONGWALL FACE

straight, as this will reduce the tendency to crush the ends of any pillars that might fall behind, besides providing better ventilation. The top coal is taken down as the longwall face is retreated. A line of cogs should be kept a short distance behind the face, as shown in Fig. 2, allowing only room sufficient to cut and load the coal. These cogs are taken out and reset one by one as the work along the face proceeds. My plan would be to leave up the top coal while working off each slice on a 50-ft. face, and then bring back this top coal as the cogs are drawn and reset to take its place. Only sufficient top coal should be taken down at one time to make a day's loading.

Allow me to say, in closing, that this system has many features common to the working of most coal seams, and is one that I believe is adapted to overcoming the difficulties presented in the problem before us. This is not to say, however, but that there is ample scope for improvement and modification to suit certain conditions. I am fully convinced that practically 90 per cent. of the coal can be recovered by this method.

Linton, Ind. W. H. LUXTON.

Markers on Mine Trips

Letter No. 2—Replying to the inquiry of J. J. S., *Coal Age*, Aug. 28, p. 379, asking for a general discussion in regard to the relative merits of tripmarkers, permit me to endorse this request and to say that there is no more important subject connected with mine haulage than that relating to a good marker on mine trips that will alarm men who are compelled to travel a haulage road.

Before going further, however, allow me to remark that it is difficult to imagine a modern mine using a steam locomotive underground, today, even allowing that ample provision is made for the carrying off of the gases and smoke produced by the engine. Also, all uptodate mines now provide a good clearance on one side of a haulage road that men are compelled to travel when going to and from their work. This is made a provision of most state mining laws and is one of the requirements of the West Virginia law, which also prohibits the use of a steam locomotive, except under certain conditions approved by the mine inspector.

Clearance at Side of Haulage Roads and Refuge Holes Required

It would appear from the reading of this inquiry that the mine in question has no separate travelingway, and the men are compelled to pass in and out on the haulage road in going to and returning from their work. In cases where it is impossible or impracticable to provide a good clearance at the side of the track, to enable men to pass moving cars with safety, the absence of refuge holes cut in the rib would be inexcusable. The holes should be whitewashed both on the rib and overhead so that they can be easily distinguished at a distance of 30 or 40 ft.

Now, in reference to tripmarkers, I prefer a good carbide light that is provided with a reflector, which should always be kept clean. In my opinion, there is no better device for warning men of the approach of a trip than a carbide triplamp. It can always be depended on as such a light can be seen further than a noise can be heard. I believe that a properly constructed triplamp is the most popular means in use for alarming men of the approach of trips on haulage roads.

It is true that no light can be seen around a sharp curve or bend in the road; but, even so, the cars can be heard as quickly as an alarm gong of any description. I would especially recommend that a good clearance be provided for several yards at either end of a sharp bend or where a road takes an abrupt turn. Either this, or manholes should be cut in the rib 60 ft. apart. If it is a very dangerous curve, where the derailment of a car may be expected to occur at any time,

a good light should be provided and kept burning at that point.

Electric Horn or Siren for Mine Locomotives

The suggestion of a horn to alarm men of the approach of a mine trip appeals to me as a good one, although I have never seen a horn in use in a mine. A good electric siren suitable for this purpose was advertised recently in *Coal Age*. In this discussion, it is proper to assume that any alarm in the form of a horn or siren would be placed at the head end of the trip, as it would be of little avail at the rear end where the usual marker is a good strong light such as I have suggested. It may be remarked, however, that every electric, compressed air or gasoline mine locomotive is provided with both a light and an alarm gong to give warning of its approach. Like the correspondent, J. J. S., I hope to see some good suggestions offered along this line. W. H. Noone.

Thomas, W. Va.

Labor and Democracy

Letter No. 2—The subject of Labor and Democracy introduced by "Economist," in his letter, *Coal Age*, July 10, p. 72, is one that should arouse the interest of all who desire the welfare of industry. The tendency prevails to treat with suspicion, and often ridicule, anything requiring the practice of absolute truth in the common affairs of life. But reason compels us to admit that such a course is superficial and obstructive to industrial progress. The necessities of industry, in respect to the relation of its many branches to each other, require candor to insure successful progress.

Present industrial conditions are just what we have willed them to be, which means that we have the power to make them otherwise. It follows naturally that in searching for industrial progress, there must be a change of thought and a just conception of the intimate relation of its essential factors. We must cease tinkering with trivialities that serve no real purpose and adopt clean business methods instead of following the dictates of selfish personal interests. If we were willing to admit responsibility for the present unsatisfactory conditions existing in the industrial world, our excuse would be that they emanate from the fear that truth and candor would have stood in the way of our own personal interests.

The essential point in "Economist's" letter, to which I have referred, consists in his suggestion that "a carefully thought out and well formulated plan for the democratization of industry will be helpful." His letter is suggestive of the need of an early practical consideration of measures that will reconcile conflicting interests and secure the coöperation of capital and labor. This need is made clear by writers of recognized authority on political economy. When the principles of true economics are properly understood there is no industrial problem incapable of solution if those principles are honestly applied.

Economically, the functions of capital and labor are so interwoven that we cannot truly consider their interests apart from each other. The arguing of differences between employer and employed from the standpoint of either must always be confusing. The selfish interests of both parties to a transaction must be exchanged for a common one, which considers the general welfare of the industry. Wealth is produced by labor, and capital is a portion of wealth applied to the production of greater wealth through the agency of labor. Thus, capital and labor are collective agencies in producing wealth.

There are three elements concerned in any industrial undertaking; namely, a fair interest on the capital invested, due compensation for risk and wages of superintendance. The wages of labor are considered as a portion of the circulating capital. Now, such is the relation between these elements that whatever tends to increase or decrease the profits of capital must, in like manner, affect the wages of labor. The price of commodities is regulated by supply and demand; and, at any time, should the selling price approximate the cost of production a demand for increase of wages in such stringency could only be met from the profits of capital.

To democratize labor would be to reconcile conflicting interests, which involves fairness of dealing on the part of both parties, in a common cause. This naturally requires a complete understanding of all matters relating to the industry, including both the cost of production and the selling price. A candid statement of these factors would form the basis for a fair equalization of all interests concerned.

Need of Candid, Straightforward Dealing

It is reasonable to assume that both wages for labor and the profits of capital should fluctuate with prices in the market as determined by supply and demand. If then, we are sincerely desirous of reconciling the conflicting interests of capital and labor and placing industry on a safe and sound basis, we should do away with those barriers of deceit and diplomatic evasion on the one hand, and ignorance and incredulity on the other and, in exchange, adopt straightforward and candid methods in every transaction, which should be clearly understood.

In other words, the practical employment of these moral virtues of candor and truthfulness is the only means of reconciling capital and labor in respect to their conflicting interests. Modern thought has thus far been too tolerant of the vicious schemes and practices permitted in most industrial undertakings and which would eventually carry the nation to the verge of destruction.

Referring to the matter of coöperation between capital and labor, the ideal conditions I have suggested cannot be open to modification without its virtues are weakened or destroyed. To be truly effective, to be genuine, the principles of coöperation must be extended beyond their industrial application and embrace the entire commercial interests of the people. This is necessary because other agencies are constantly at work, under false conceptions of economic law, to take an unjust advantage of a situation and appropriate to themselves the fruits of industry by increasing rents, taxation and the price of public utilities. If industrial success is to be attained, these predatory interests must be controlled by the ruling power.

In casting about for means to make industry more productive, it seems as though the unproductive employment of capital and labor should be regarded as a menace to the welfare of industry and society in general and restrained. It will not be denied that there are innumerable institutions and concerns that serve no purpose whatever in the production of wealth, but are maintained at the expense of capital and labor. Such

useless and wasteful institutions are the parasites that feed on the profits of industry and should not be tolerated. In maintaining these, the functions of both capital and labor are diverted from their true purpose and industry harmed.

It will be well to mention, here, that democratization of industry does not contemplate the adoption of the communists' idea that all property and trade belong to and should be controlled by the community at large. This policy has been shown by authorities in economics to be impracticable. There would be no business competition and ambition and progress would be destroyed. Free and healthy competition must be exercised in the employment of capital and labor, as otherwise there would be no incentive for labor, and exertion and indolence would retard production.

President Wilson's statement as quoted in the letter to which I have referred, namely, "We must find another road leading in another direction and to a very different destination," is a virtual admission on the part of the President, that the present industrial situation is not in line for progress and is not based on the principles of economic law. This being true, it is evident that stern measures are necessary to effect the needed change in industry that will bring about the coöperation of labor and capital and, more than all, prevent the misuse of wealth, which is the product of our country's industries. WILLIAM WESNEDGE.

Ladysmith, B. C., Canada.

Roller Bearings for Mine Cars

Letter No. 1—I am always interested in the references that appear, from time to time, in *Coal Age*, regarding the advantages of improved mine equipment. It seems to me, however, that in no case is the advantage more pronounced than in the use of roller bearings for mine cars. Not long ago some interesting data were given in an inquiry and the discussion that followed regarding the lubrication of mine cars and the facts shown at that time were greatly in favor of roller bearing equipment.

Having had the opportunity of observing results obtained in several mines where heavy mine cars were equipped with roller bearings, let me say that I have yet to find a single failure where this type of bearings has been properly installed and given what little attention they require. Of course, it is assumed that the bearings are well made and of proper material.

Recently, I had occasion to examine some of this class of equipment, in a limestone mine where the service is extremely severe. Inasmuch as the conditions under which the cars were operated in that mine are similar to what is commonly met with in coal mines, the observations I am about to offer will no doubt be of interest to *Coal Age* readers.

The mine car in use was of steel construction throughout, length 10 ft. 6 in. over all; width, 4 ft. 6 in.; length of body, 9 ft. 6 in.; top of car above top of rail, 5 ft.; wheelbase, 36 in., which was the same as the gage of the track on which the cars were operated. The weight of the car was something in excess of 5000 lb. and its capacity, 8 tons of limestone weighing, say 160 lb. per cu. ft., making the total weight of the loaded car about 21,000 lb., 10½ tons. These cars were mounted on trucks equipped with flexible roller bearings contained in a spring-pedestal type of journal box. The journals were 7 in. long and made of 3-in. high-carbon steel.

At the present time the cars are making three trips a day, covering a distance of 3 mi. in 8 hr., which is the record for each car. Two 13-ton Jeffrey locomotives are used on the main haul and two 6-ton Plymouth, gasoline locomotives are employed for gathering the cars. The track arrangements are similar to those in a coal mine, the steepest grade being about 3 per cent. against the loads.

Roller Bearings Stand Up Under Severe Service

In the mine, the rooms are 21 ft. high and 40 ft. wide. The stone is blasted and loaded into the cars by means a No. 20 Marion steam shovel equipped with a 1¼-yd. dipper. The service, in this respect, was more severe than that in a coal mine where the cars are loaded by hand. Dropping 1¼ yd. of limestone into a mine car is considerably more severe than any method used in loading coal in mines. Occasionally, it happens that a rock is blasted that will not fit in the dipper, but must be raised by the teeth on the dipper and dropped into the car. Such a rock may weigh over a thousand pounds and be dropped from a height of 6 or 8 ft., causing a heavy jar and severely testing the car journals and bearings. It is well for these cars that the greater portion of the rock loaded is well broken in that mine.

When loaded, the cars are hauled to the tipple and unloaded in a Woods rotary dump. This installation, at the present time, is not complete; and instead of the cars passing through the dump, as they will later, the empty car is brought back and dropped 150 ft. down a 5 per cent. grade, where it comes to rest with a sudden jar caused by hitting the string of empties standing at the foot of the grade. This arrangement, however, is only temporary, and when the dump is completed the cars will pass through it and return by gravity over a very slight grade.

Hauling Capacity of Locomotive More Than Double

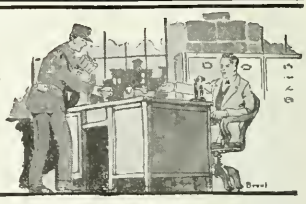
Compare the present work of these motors hauling twenty-five 8-ton cars equipped with flexible roller bearings, with the work previously accomplished when the maximum load hauled was seventeen 5½-ton cars mounted on plain bearings. For example, the load formerly hauled was $17(5\frac{1}{2} + 2) = 127\frac{1}{2}$ tons. At the present time the average load hauled is $25(8 + 2\frac{1}{2}) = 262\frac{1}{2}$ tons, showing that the hauling capacity of the motors has been more than doubled by the use of roller-bearing equipment, employing the same locomotive and hauling over the same track. The figures further show that, at present, each trip brings 200 tons of limestone out of the mine, as compared with 93.5 tons for each trip, formerly.

It should be stated, here, that the spring pedestals of the journals reduce the shock on the bearings and the flexible bearings again absorb more of the shock and prevent its reaching the axles. In other words, there are two cushions between the axle and the load it carries. These and other observed results confirm my opinion that roller bearings are the most effective type of equipment for mine-car use, and I believe this opinion is rapidly growing among practical mining men.

St. Louis, Mo. RICHARD W. HARRIS.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Heights of Flame Caps

For a number of years, I have been firebossing in mines and was wont to pride myself on being able to estimate with some degree of accuracy the percentage of gas in the mine air, as indicated by the observed height of the flame cap formed in a Davy lamp.

It never occurred to me that there could be any material difference in the results obtained by different firebosses, until I came to compare my own observations with those of a fireboss who used a Wolf lamp.

We found, however, that our estimates were quite different. A cap would appear in his lamp when I could find no trace of gas in my Davy; and when I had a ½-in. cap, showing 2 per cent. of gas, there would be a cap almost ⅝ in. in height in the Wolf lamp, which my friend estimated as "3 per cent. of gas." We decided to look the matter up and I am asking *Coal Age* for information that will enable me to correctly estimate percentages of gas from the observed heights of the flame caps appearing in these lamps.

———, Okla. FIREBOSS.

*

A close study of a candle flame, or the flame of an oil lamp, will show that it is composed of three zones, as shown in the accompanying Fig. 1. The inner zone *A* is comparatively small and dark, being composed of the vaporized hydrocarbons of the oil drawn up in the wick and converted into hydrocarbon vapors by the heat of the flame. By the access of air to the flame, the hydrogen and carbon of these vapors are dissociated and the carbon particles become incandescent in the second zone *B*, which is highly luminous, while the carbon burns to carbon monoxide and the hydrogen is set free.

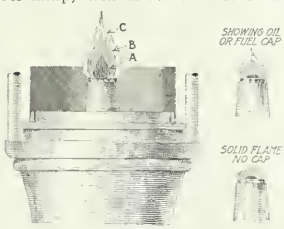


FIG. 1. ILLUSTRATING LAMP FLAMES AND CAPS

As shown in this figure, the zone *B* is enveloped in a third or outer zone *C*, which is nonluminous and barely perceptible against the luminous zone *B*. The outer zone is formed by the burning of the carbon monoxide and hydrogen on coming in contact with the surrounding air, the combustion forming carbon dioxide and water vapor.

When testing for gas, the usual practice is to draw down the flame of the lamp until it is almost extinguished. The height of the flame is then practically ⅛ in. above the top of the burner, as shown in the lower right-hand corner of Fig. 1. Now, when a volatile oil such as the naphtha burned in a Wolf and other similar lamps is used the heat of the lamp vaporizes the oil so rapidly as to form what has come to be known as a "fuel cap." This fuel cap is shown in the upper right-hand corner of Fig. 1.

The fuel cap is often mistaken by firebosses for a gas cap, but that is not all. A lamp burning a volatile oil heats more rapidly in gas than one burning a nonvolatile oil as sperm, cottonseed or lard oil. The longer the former lamp is exposed to gas, the more its oil is vaporized, which increases the height of flame cap observed and renders the calculation of the percentage of gas present less reliable.

Again, a bonneted lamp is never as reliable for making a test for gas as an unbonneted lamp, since the latter permits a free circulation of air in the combustion chamber, and the formation of the cap is not affected by the products of the combustion, which are much confined in the upper portion of the lamp chimney by the bonnet.

In Fig. 2 is shown the appearance of the lamp flame and the heights of flame caps formed when different

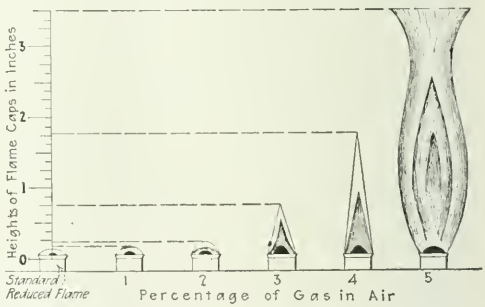


FIG. 2 SHOWING APPEARANCE OF FLAME AND GAS CAPS

percentages of gas are present in the air. These results are what are commonly obtained in the use of an unbonneted Davy burning sperm or cottonseed oil, assuming that other gases than methane are not present, which would slightly modify the heights of the caps formed.

Carbon dioxide present in the air will reduce the height of flame cap for the same percentage of gas; but dust floating in the air will increase both the height of the cap and the volume of the flame. As the percentage of gas is increased beyond the 5 per cent. shown at the right, in Fig. 2, the Davy lamp flames and must be cautiously but promptly withdrawn from the gas to avoid accident.

Approximately, the percentage (J) of gas corresponding to any height (h), in inches, when using an unbonneted Davy lamp burning sperm or cottonseed oil, can be calculated by the formula

$$J = \sqrt[3]{36\,h}$$

This formula gives, for a flame cap, say, ¾ in. high, $J = \sqrt[3]{36 \times 0.75} = \sqrt[3]{27} = 3$ per cent. of gas.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Anthracite Foremen's Examination, Lykens, Penn., May 6, 1919

(Selected Questions)

Ques.—What are the qualifications of a hoisting engineer; how must he handle his engine when men are being hoisted or lowered into the mine and when must he be on duty?

Ans.—Briefly stated, the qualifications of a hoisting engineer are the following: He must be sober, industrious, observant and exercise every precaution to avoid accidents. He must start and stop his engine promptly in response to signals, taking care not to exceed the limit of speed when hoisting men and to keep his engine under control at all times. He must avoid any risk of overwinding and know the exact position of the cage in the shaft, or the trip in the slope, at any moment of the hoist.

An engineer must converse with no one while in charge of an engine nor allow any one to loiter about the engineroom. In no case must an engineer permit any one to handle the engine while in his charge. He must be on duty 15 or 20 min. before the commencement of his shift and examine all parts of his engine, oiling and making any adjustments that may be necessary, so that nothing will be wanting when the time arrives for him to take charge of the engine.

Ques.—Who must be at the head and foot of shafts and slopes when men are being hoisted or lowered into the mine, and what are his duties?

Ans.—A cager or footman (Art. 12, Rule 40) must be constantly at the foot of every shaft or slope to give the proper signals and to see that the rules of hoisting and lowering men and caging cars are enforced and the work properly done. A headman or trip starter must likewise be stationed at the head of every shaft and slope charged with similar duties at that point. Both headman and footman must be on duty when men begin to descend and remain till all have left the mine.

Ques.—What are the requirements of the mine law in regard to doors and what are their purposes?

Ans.—Art. 10 of the anthracite law requires (Sec. 9) all ventilating doors in a mine to be hung and adjusted so that they will close automatically. All main doors (Sec. 10) must have an attendant to open and close the doors for the passage of men and cars, and to see that the doors do not stand open. Main doors (Sec. 11) must be so placed that when one door is open, another door, in the same opening, will be closed to prevent the short-circuiting of the air current at that point. To prevent against a possible accident to a door in use (Sec. 12), an extra door must be so placed and kept standing open that it will always be ready for use if needed. Unless otherwise permitted, in writing, by the inspector (Sec. 13), the framework of all main doors must be substantially constructed and set in stone or brick laid in mortar or cement.

Ques.—What is the mine law in regard to explosives? (a) Care of explosives? (b) How shall they be kept in the mine? (c) How should they be handled? (d) What are the rules governing their storage?

Ans.—Art. 12 gives the following rules relating to explosives in mines: (a) Rule 26 prohibits the storage of gunpowder or other explosives in a mine and requires that no workman shall have on hand, at any one time, in any one place, more than one keg or box containing 25 lb. of powder, unless more is required for that person to accomplish one day's work.

(b) Rule 27 requires such explosives to be kept in a wooden or metallic box securely locked. Each box must be kept at least 10 ft. from the tracks wherever such room is available.

(c) Rule 28 requires a miner, when about to open a box containing explosives, or while handling the same in any manner, to first place his lamp not less than 5 ft. away and in such a position that the air current cannot convey sparks toward him. A workman shall not approach nearer than 5 ft. to an open box containing powder while holding a lamp or having a lighted pipe or anything containing fire.

(d) Rule 29 requires that all high explosives other than gunpowder shall be stored, kept, transported, charged and fired in accordance with special rules furnished by the manufacturers of the powder and endorsed with his or their official signature and approved by the owner, operator or superintendent of the mine.

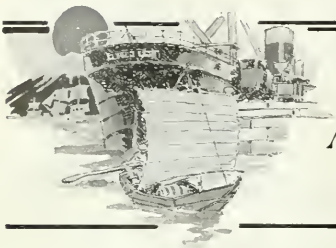
Ques.—(a) What is a safety lamp? (b) What is it used for? (c) What is the principle that makes it safe? (d) When must they be locked and what is the penalty for tampering with the lock of a safety lamp?

Ans.—(a) A safety lamp is a gauze-protected lamp designed to prevent the ignition of any gas that may be present in the air surrounding the lamp.

(b) It is used to enable men to work in mines where the atmosphere is charged with a percentage of gas that would make the use of an open-flame lamp dangerous.

(c) A safety lamp depends on the principle that a flame will not pass through the mesh of a cool wire gauze that is clean and in good condition and the lamp is properly handled. The cool metal of the gauze, by absorbing the heat, extinguishes the flame in contact with it.

(d) Safety lamps must always be locked before being given to workmen. Rule 9 of Art. 12 provides, however, that the mine foreman may give permission to have the lamps used unlocked. The anthracite law appears to provide no special penalty for tampering with locked safety lamps, but states (Rule 58) that failure to comply with the rules will be an "offense against this act."



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Coal Resources of Germany

Head of U. S. Geological Survey Makes Clear the Fact That Germany Can Meet the Fuel Obligations Imposed on Her by the Peace Treaty

The testimony concerning the export-coal situation given at the recent hearings before the Senate Committee investigating the coal industry left many of the spectators with the impression that after ceding the Silesian and Sarre coal fields Germany would have no coal resources left with which to supply her own needs and to meet the obligations for reparation imposed by the treaty. It is felt that this impression should be corrected, stated George S. Rice, director of the U. S. Geological Survey, in a letter addressed to the Committee. The statements made by the witness were accurate, as far as they went, but they failed to bring out two facts: First, that Germany still has large assets in coal remaining, and, second, that at the same time her assets are reduced her internal liabilities are also reduced by the cession of territory which formerly consumed large amounts of German coal.

The Geological Survey fortunately, for a year past, has been making a special study of foreign mineral deposits and to this preparation for the discussion of just such questions as those before the committee there has been added the knowledge gained on this subject by one of the Survey geologists, F. G. Tryon, while attached to General Headquarters in France. The following statement was prepared by Mr. Tryon:

The coal fields of Germany are shown graphically on the accompanying map. Each column represents the production of one district, the height of the column being proportional to the size of the output. The base of the column is centered in the district. Black columns indicate bituminous coal; shaded columns lignite.

Assuming that the League of Nations should decide to leave the Sarre field permanently in French hands, and assuming that the impending plebiscite in Upper Silesia results in transferring that field to Poland, Germany would still have the enormous Westphalian coal field and four smaller bituminous fields with an aggregate production of 130,000,000 tons of bituminous coal per annum. In addition she would retain all of her lignite mines, a resource of great importance in German economy though often ignored by outsiders. Her reserves of bituminous coal alone are still the greatest in western Europe and her lignite reserves are very large. She would remain the third coal producer of the world, and it is by no means improbable that within a few years she would outstrip the declining production of Great Britain.

These are the resources from which Germany must make the reparation required by the treaty. Are the resources sufficient?

Before attempting to answer this question it is essential to distinguish between what Germany can do now and what she can do when industrial order is restored within her boundaries. At present Germany, like all the rest of Europe, faces a coal shortage of the most serious proportions. The miners of Westphalia have not been at work; her transportation system is in disorder. It is clear that Germany is far from able to make the reparation payments required by the treaty this year. But if German industry is once rehabilitated and the German people seriously set themselves to perform the obligations of the treaty, the reparation payments in coal can be made.

Without entering into the justice of the settlement and speaking only of the reserves underground and of the physical development of the mines, it is safe to say that if Germany desires to fulfill the treaty she can fulfill the treaty so far as the clauses concerning coal are concerned.

In the first place the cession of Upper Silesia, if decreed by the plebiscite, will have little effect upon Germany's power to make the coal shipments required. She cedes the field, but she also cedes in German Poland much of the territory which the Silesian field supplied before the war. The coal of Upper Silesia has never been exported by sea. It is consumed in central Europe. It never has been and probably never will be exported to France, Italy and Belgium. The movement of coal is determined by transportation costs, not by political boundaries. Germany has been assured the right to purchase coal from Silesia. Indeed the new Polish and Bohemian owners, to sell their coal at all, must very largely sell it to consumers in Germany. The cession of Upper Silesia would amount, therefore, to a transfer of property rather than a shift in the marketing of coal.

Much the same situation will prevail with respect to the Sarre. A large part of the output of the Sarre mines was consumed locally. Much of it went to France before the war, or to Alsace-Lorraine, now part of France. While a large part of the Sarre coal was shipped to south Germany it is expected that the new French owners will soon find they also must ship to south Germany because that is one of the natural markets for Sarre coal.

The Sarre and Upper Silesian fields thus served a continental market and must, because of the inexorable facts of transportation costs, largely continue to serve the same market. It is from the great Westphalian (Ruhr) field and the small but high-grade Aachen field that Germany must make her reparation payments. The treaty throws upon these two fields the burden of making certain annual payments during the next ten years to Belgium, Luxembourg, Italy and France.

The payments to be made each of these countries will be considered briefly:

Belgium.—The amount required (8,000,000 tons) is practically what Germany furnished Belgium before the war.

Luxembourg.—Germany undertakes to furnish only the amounts supplied before the war.

MAP OF COAL FIELDS OF GERMANY, SHOWING PRODUCTION OF DIFFERENT GRADES OF COAL BY DISTRICTS

Italy.—The amount required by the treaty (4,500,000 tons the first year, increasing to 8,500,000 tons) though far greater than German pre-war shipments to Italy, is still much less than Italy consumes. The principal effect of the provision will be to give to the Westphalian exporters the lion's share of the former British export trade to Italy.

France.—The treaty specifies a maximum of 27,000,000 tons per year for the first five years and a maximum of 15,000,000 tons for the second five years. The payments consist of a fixed base of 7,000,000 tons plus a decreasing amount which represents the deficit in the production of the devastated mines of the north of France. It must be borne in mind that France's coal requirements have been greatly increased by the return of Alsace-Lorraine and by the occupation of the Sarre. The base of 7,000,000 tons fixed by the treaty is actually much less than the shipments of Westphalian and Aachen coal to France and to Alsace-Lorraine before the war.

The shipments prescribed by the treaty to these four powers exceed the pre-war shipments to the same powers by approximately 21,000,000 tons the first year, decreasing to 10,000,000 tons the tenth year. But at the same time the war relieved Germany of some millions of tons of exports to the bunkering stations of the world, a business which has since been largely taken over by England and the United States. This export tonnage can be diverted to meeting the obligations imposed by the treaty. Moreover, the production of the Westphalian field is susceptible of great increase. The reserves are enormous. Before the war the production of this field was increasing at the rate of 7,400,000 tons per year. Without going into details it is the judgment of Mr. Tryon that if German labor returns to work, normal conditions are restored on the German transportation system, and the German people set themselves to the task of fulfilling the treaty, the reparation payments of coal can be made. The payments may involve a temporary curtailment of the home consumption, but the curtailment need not be nearly as serious as that endured by the German people during, for example, 1915.

Paraguay as a Market for American Coal

There are no manufacturing plants, railways, or other large industries using coal in Paraguay, reports Consul Henry H. Balch, Asuncion, Paraguay, under date of July 10, 1919. Before the war, however, and up to about 1916, some steam coal was used by the Paraguayan Central Railroad Co. Wood obtained from the extensive forests of Paraguay is found to be a cheaper fuel for steam-generating purposes than coal that has to be brought from the United States or from Europe. For cooking purposes locally burned charcoal is used almost exclusively.

It is estimated that about 600 tons of forge coal and 400 tons of coke are consumed here annually. At the present time, on account of the high prices, the sale is limited. In this market coke is selling at 2500 pesos and forge coal at 2000 pesos per ton. (The Paraguayan peso is now worth about $0.055 American currency.) The prices f.o.b. Buenos Aires are 46.90 pesos per ton for forge coal and 56.05 pesos per ton for coke (both figures are given in Argentine gold). The freight rate from Buenos Aires to Asuncion is 11.06 pesos Argentine gold per ton.

Imports for Past Eight Years

The imports of coal (including coke and forge coal) for the years 1911 to 1918 and the countries of origin are given in the following table:

Imported from—	1911 Tons	1912 Tons	1913 Tons	1914 Tons	1915 Tons	1916 Tons	1917 Tons	1918 Tons
United States	140	328	....	....	1	....	4	54
United Kingdom	1,603	1,704	3,800	3,330	1,218	655	136	44
Argentina	2	34	42	327	5	50	73	53
Uruguay	....	2	....	....	....	40	....	....
Germany	....	66	28	54	....	10	....	1
Spain	....	....	....	15	....	....	....	....
Total	1,754	2,134	3,870	3,726	1,224	755	213	152

The imports from Argentina and from Uruguay are mostly of American or English origin.

The ever-increasing prices, due to the war, had so affected the imports into Paraguay that scarcely any coke or forge coal was imported during the past two years. The lack of facilities for unloading coal in the harbor of Asuncion and for handling it after unloading further tends to make the price of coal too high for local use. Probably the cost of handling will some day be reduced when the projected port improvements are carried out, and a slight demand may consequently result. Forge coal and coke come in bags.

As shown by the figures given above, the amount consumed here even in normal times will not warrant an extensive campaign for the introduction of American coal and coke unless a considerable change takes place in the fuel market. The best method would be to correspond with the importers, quoting prices and terms. [A list of Asuncion coal and coke importers may be obtained from the Bureau of Foreign and Domestic Commerce or its district and cooperative offices by referring to file No. 123214.] All prices should be f.o.b. port of shipment, stated in Argentine gold, if possible. The Argentine gold peso is equivalent to $0.965 United States currency. Correspondence should be in Spanish. There is no duty on coke or forge coal.

Coal Exports from Port of New York in July, 1919

Reports showing the amount of coal and coke shipped through the port of New York during July of this year have just been made public. There was a decided decrease as compared with the corresponding month of 1918 and 1917, except in the shipments of bituminous in 1917 and coke in 1918. In July of 1917 only 448 tons of bituminous went out of this port to foreign countries, while in July of last year but 117 tons of coke was shipped to foreign countries by New York shippers.

A tabulation showing shipments of anthracite and bituminous coals and coke in July of 1917, 1918 and 1919 follows:

	Anthracite						Bituminous						Coke					
	1917		1918		1919		1917		1918		1919		1917		1918		1919	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value	Tons	Value
Argentina	....	....	....	....	....	....	....	....	....	....	175	$1,575	....	....	56	$1,500	....	....
Barbados	....	....	....	....	35	$402	....	....	....	....	....	....	....	....	....	....	....	....
Brazil	134	$1,160	....	....	294	2,431	261	$1,756	6,250	$44,072	....	....	84	$1,641	40	1,255	....	....
Brit. W. Africa	18	240	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Canada	14,335	97,427	8,574	$57,948	4,454	36,957	....	....	....	....	....	....	....	....	....	....	....	....
Colombia	....	....	....	....	200	1,200	....	....	....	....	....	....	....	....	....	....	....	....
Cuba	406	3,110	....	....	....	....	18	100	....	....	341	2,046	240	3,576	....	....	20	$420
Denmark	....	....	....	....	....	....	....	....	....	....	405	2,200	....	....	....	....	25	550
Ecuador	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
France	50	585	....	....	....	....	54	297	....	....	....	....	2,996	24,095	....	....	....	....
French W. I.	....	....	....	....	....	....	....	....	....	....	....	....	....	....	6	60	....	....
French Guiana	....	....	....	....	....	....	....	....	10	80	....	....	....	....	....	....	....	....
Italy	....	....	....	....	....	....	....	....	....	....	750	5,000	88	3,395	....	....	....	....
Jamaica	2	25	....	....	....	....	50	272	....	....	....	....	....	....	....	....	....	....
Mexico	....	....	....	....	....	....	20	102	....	....	....	....	....	....	....	....	....	....
Newfoundland	391	2,073	766	4,876	....	....	....	....	152	875	....	....	....	....	....	....	138	3,500
Norway	....	....	....	....	....	....	....	....	....	....	1,176	6,900	....	....	....	....	....	....
O. B. W. I.	....	....	....	....	....	....	....	....	1	14	....	....	....	....	....	....	....	....
Panama	....	....	....	....	....	....	....	....	....	....	....	....	7	137	5	160	....	....
Peru	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	100	2,400
Portugal	257	1,860	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Salvador	....	....	....	....	....	....	....	....	....	....	....	....	....	....	10	245	....	....
San Domingo	364	2,366	....	....	....	....	25	240	500	3,260	....	....	....	....	....	....	....	....
Trinidad	....	....	....	....	....	....	....	....	27	301	....	....	11	268	....	....	....	....
Uruguay	....	....	....	....	....	....	....	....	500	3,800	....	....	8	126	....	....	....	....
Venezuela	10	140	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	15,967	$108,986	9,340	$62,824	4,983	$40,990	448	$2,767	7,440	$52,402	2,847	$17,721	3,434	$33,238	117	$3,220	283	$6,870
Aver per ton		$6 82+		$6 80+		$8 22+		$6 17+		$7 04+		$6 22+		$9 67+		$27 52+		$24 27+

Italy's Coal Problem

The problem of supplying Italy with coal has become more serious since the armistice, despite the fact that it was thought that once hostilities had ceased the solution would have become easier.

In 1913 Italy imported on the average 900,000 tons of coal per month, equal to 10,800,000 tons annually—2,200,000 tons for the State Railways, 200,000 for the other railways and steam trams, 700,000 for the navy and merchant marine, 1,200,000 for the gasworks, and the remainder for private industry.

During the war the consumption of coal by private industry increased in some branches, such as metallurgy, and decreased in others. The total shows a progressive decrease in coal, due to the shortage of tonnage and diminished production. During the war the Italian Government informed the Allies that the requirements of Italy would be placed at 740,000 tons, which was later reduced to 690,000 tons. There was allotted a monthly supply of only 600,000 tons, but it was only an allotment, for which was always furnished a smaller quantity—5,280,000 equal to a monthly average of 440,000 tons in 1917; 6,400,000 equal to a monthly average of about 530,000 tons in 1918. The most critical month was February, 1918, during which Italy received only 328,000 tons of coal.

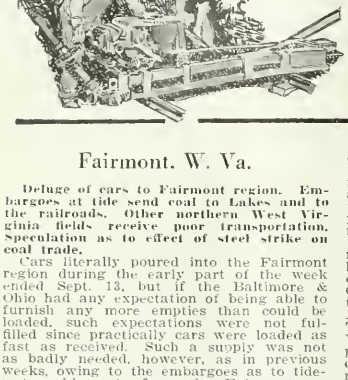
The armistice having come, the Italian Government had the assurance of a monthly average of 800,000 tons for two months, but instead of improving the situation has become steadily worse. In November Italy received 647,000 tons of coal; in December 472,000; in January 339,000; in February 502,000. In March not more than 375,000 tons were received.

In March permission was obtained from the Allied Economic Commission for importing 100,000 tons of coal from the Saar basin, from St. Etienne and Salon. This 100,000 tons arrived, naturally, by land. It was a long flame coal, not suitable for locomotives, and served for other uses.

With reference to the furnishing of coal by France, it may be said that this was carried on actively from January, 1918, to January, 1919. It was agreed to by the Allies, always with a view of conserving tonnage, that France should ship its coal by land and replenish its supply from England.

In 1918 Italy received 2,000,000 tons of French coal out of total imports of 6,400,000. The balance was all English. This year she received only 42,000 tons from France, in January and February. All the rest was English coal.

A favorite prospect for the solution of the difficult problem is contained in the possibility of sending American coal to Italy, England leaves her entirely free to obtain supplies from this country.



COAL AND COKE NEWS

Fairmont, W. Va.

Deluge of cars to Fairmont region. Embargoes at tide send coal to Lakes and to the railroads. Other northern West Virginia fields receive poor transportation. Speculation as to effect of steel strike on coal trade.

Cars literally poured into the Fairmont region during the early part of the week ended Sept. 13, but if the Baltimore & Ohio had any expectation of being able to furnish any more empties than could be loaded, such expectations were not fulfilled since practically cars were loaded as fast as received. Such a supply was not as badly needed, however, as in previous weeks, owing to the embargoes as to tidewater shipments from the Fairmont region, except as to special permits in cases where shippers had vessels waiting. Although cars were plentiful, shipping points were more limited, and it was rather embarrassing to many operators; however, they made the best of it by shipping to the Lakes and by increasing the shipment of railroad fuel. Taking the week as a whole, there was an unusually large production, but the Fairmont-Clarksburg district alone was blessed with a sufficient supply of cars, and even in that district the week wound up with many late placements, at least thirty different mines being affected. In contrast to the Fairmont region, the car supply fell behind on roads supplying other northern West Virginia fields; the supply being exceedingly short on both the Western Maryland and the Monongahela railroads, although on the last named road, by the end of the week, mines were receiving about a 90 per cent. supply.

With cars so much more plentiful and with tidewater points embargoed, the natural tendency was for prices to break somewhat since operators were more circumscribed in their markets. However there was an excellent demand for most Fairmont coals and price declines, such as they were, were regarded as being only temporary.

Speculation is rife as to the effect a steel strike might have on coal shipments to the Lakes. However, Lake shipments have been way below normal during the present season; northern West Virginia fields would not be affected to as great an extent as in former years; but the suspension of ore shipments, it is believed, would mean also the suspension of coal shipments.

Charleston, W. Va.

Labor troubles lessening. Car shortage again coming forward to limit production. Tonnage far below normal. Special meeting called to work out better car distribution. Smokeless exports increasing as more ships are available at tide. Kanawha coals may be shut off from tide by embargoes.

Labor troubles were less of a factor in holding back production in central southern West Virginia during the second week of September than during the preceding week, which was in many respects a turbulent one in this section, with 10,000 miners on strike in the Kanawha field and with several strikes marking the course of events in the New River field. While the week opened with 30 or 40 per cent. of the miners absent from their posts after an attempt to invade the Logan field, most of the miners were back at work before the week was over and there was no further outbreak, although it was by no means certain that there would not be a recurrence of the trouble.

It was not so much a shortage of miners, therefore, as it was a shortage of cars which limited production during the week ended Sept. 14. At the outset of the week cars were plentiful, comparatively few having been loaded during the last half of the previous week, but the supply was soon exhausted and the same old trouble was apparent—a scarcity of cars. At no time during the week was there more than a 70 per cent. supply. Most of the time mines were not able to secure more than a 65 per cent. supply and by the end of the week the supply was even shorter, total production, therefore, running far behind normal.

It was this shortage of cars and its serious effect on production, during the first half of September, which led to the special meeting of the Railroad Relations Committee of the National Coal Association and representatives of the Railroad Administration at White Sulphur Springs. This meeting, just on the edge of the West Virginia coal fields, was called for the purpose of working out some plan for a better distribution of cars. The shortage is a serious one and is seriously crippling production and consequently making it impossible to overcome the shortage for the year.

While only pools Nos. 7 and 46 at tidewater were embargoed, operators along the Chesapeake & Ohio were given to understand that other pools would also be embargoed, thus shutting off shipments altogether to tidewater from C. & O. points. There was still much congestion at tide. However, smokeless producers expected to be able to have enough vessels on hand for the exporting, during the week, of a large tonnage of that kind of coal. The demand at least in eastern markets for steam coal was unabated and rather difficult to procure, especially in view of limited transportation facilities.

While differences between operators and miners in the New River field were hindering production to some extent during the second week of September, the extremely poor car supply played the most important part in pulling down production. In some instances mines were unable to operate at all. Production therefore in the New River field was at the most over 125,000 tons. Despite a serious congestion of coal loads at and near tidewater points, it was possible for some smokeless producers to export quite a large tonnage during the week, more ships being available at tidewater. It is believed that labor troubles entail a loss in tonnage of about ten per cent., some mines being closed down entirely at plants whose operators refused to run on a closed shop basis. In the thin-seam section, production was somewhat increased. The tonnage of smokeless finding its way to western markets was rather light in comparison with eastern shipments.

By the middle of the second week of September miners were all back at work in the Kanawha field. In the meantime, however, some mines were unable to operate at all owing to the fact that so few men reported. With cars on hand, left over from the previous week, the supply was entirely adequate for a day or so but by Wednesday had dropped to only 70 per cent of normal and before the end of the week it was still less. Such a shortage of empties made it impossible to mine more than about 125,000 tons and although a part of such tonnage is flowing to tidewater it was by no means certain when it would be unloaded owing to congestion in that part of the country. Should pools Nos. 5 and 6 be embargoed, as some Kanawha operators rather anticipated, it would mean cutting off entirely the shipment of gas and splint coals of the Kanawha field to tide. Kanawha producers reported an excellent demand for steam coal in eastern markets, the demand not being so pronounced in western markets. For the most part, such coal as Kanawha mines were able to produce, under limited transportation facilities, was going to contract customers. The car supply on the Kanawha & Michigan was somewhat better than that on the C. & O. However, cars were short the latter part of the week on the Coal and Coke Division of the Baltimore & Ohio.

Consequently mines were able to work at intervals during the latter part of the week or were limited to part time operation each day.

Ashland, Ky.

Northeast Kentucky coal fields secure new through rate. Considerable new trade expected to develop. Bunkerage, transshipment and inland business. Southern railroads should now relieve congestion on C. & O.

Northeast Kentucky Coal Association commends Governor Cornwell on his stand on Plumb bill.

The petition made by the Northeast Kentucky Coal Association for through rates on coal to southeastern points and the Carolinas, and a through tidewater rate to Charleston, S. C., for bunkering and transshipment from all mines along the Big Sandy division of the Chesapeake & Ohio and its branch lines, including the Sandy Valley & Elkhorn and Long Fork railroads, has been aswered. Under date of Sept. 9 the Southern Freight Traffic Committee issued telegraphic instructions authorizing the publication of rates on five days' notice under Freight Rate Authority No. 12,817, as follows:

To Charleston, S. C., for bunkerage and transshipment, 20c. per ton of 2000 lb. higher than rates from Elkhorn City.

To Charleston proper and to points in southeastern and Carolina territory, 30c. per ton of 2000 lb. higher than rates from Elkhorn City.

This would make the tidewater rate from the northeast Kentucky field to Charleston, S. C., $2.34 per gross ton.

In view of the serious shortage of coals for European and South American countries, it is believed that considerable new business will be developed in that portion of the Kentucky field affected by the rates, as previous to the granting of the operators' petition the region had never enjoyed a tidewater rate. It will also affect the inland business, as it is felt that there will be an augmented demand from both industrial and domestic consumers for the high-grade coals mined in this region.

Another interesting phase of the matter is presented by the thought that the southern railroad lines involved will be able to handle any traffic resulting from these new rates to the relief of the Chesapeake & Ohio, which of recent years has been seriously congested in its northern and western shipments.

Commendation of the position taken by Governor John J. Cornwell, of West Virginia with reference to the Plumb plan has been expressed by the Executive Committee of the Northeast Kentucky Coal Association in a letter to the West Virginia executive, in which it is said: "The secretary was instructed to communicate with you and to congratulate you for the very forceful and able manner in which you have acquainted your constituents with the imminent danger which confronts them if the Plumb bill should carry. They feel that the best interests of all rests in the private ownership and operation of all industries. They feel that the interests of the state of West Virginia have been and will in the future be well taken care of by you, and are confident that the great majority of the citizens of your state support you in your views."

Birmingham, Ala.

State administration puts through revenue bill as amended Will raise over half a million dollars from tonnage tax on coal and iron ore. Statistics quoted from report on Alabama coal mines. State deficient in mechanical mining equipment. Coke industry makes good showing in up-to-date plants.

The general revenue bill has finally passed both houses and thus ends one of the hottest, longest-drawn-out and most bitterly contested fights ever staged in the Alabama Legislature. All the influence and all the power the state administration could command was put behind the bill,

says the *Birmingham Age-Herald*. As finally passed, the bill will raise about $550,000 a year from the coal and iron ore tonnage tax, based upon the average production of the present year. This is 50 per cent. of the amount originally intended to be raised from this source. As at first drafted, the bill called for a tax of 5c. a ton on coal and 3c. a ton on iron ore, but amendments reduced the coal tax by three-fifths, making it 2c. per ton. The vote on this bill was as follows: Ayes, 51; nays, 42; paired, 2; not voting, 10.

The coal and iron interests were charged as being responsible for the deadlock which held up this bill and to have threatened the calling of an extra session of the Alabama Legislature. It was even imputed that a small minority of "coal barons" would try to defeat the revenue bill unless the tonnage tax was eliminated. The various phases of this whole matter, during the last two months, have been noted in the news department of *Coal Age* and the comments given of those most interested in the mineral industry of the state.

In connection with the tonnage tax on Alabama's coal production, some statistics published in the annual report of this state for the year 1918 are of interest. Last year 19,731,301 tons of coal were mined in Alabama and 4,344,726 tons of coke were manufactured here. On this coal production, a tonnage tax of 2c. would net a revenue to the state of $390,436.80 or a little less than four-fifths of the tax return from Alabama's mines.

The coal men of the state plead a narrow margin on profits, claiming that even a small tax will work hardship on many operators, especially the owner of the small mine. In connection with the cost of producing coal here, it is significant that in 1918, 12,969,975 tons were mined by pick and 6,551,865 tons were produced by means of machines—or 66.4 and 33.6 per cent., respectively. Alabama's principal competitors are much more fortunate apparently in being able to use mining machines to a considerably greater extent. However, in the coke business, byproduct ovens in this state manufacture 2,611,215 tons of coke, or 60.4 per cent., compared with 1,733,511 tons, or 39.9 per cent., from beehive ovens. Some 110 men were killed in the coal mines of Alabama last year, which means that only 177,473 tons of coal were mined per life lost. Also 137 per cent. were killed per 1000 employed in the mines. Furthermore, a scant tonnage —741—of coal was produced for each employee.

Indianapolis, Ind.

Idleness of Indiana mines in July due to lack of orders. Car shortage in August. Conflicting expressions of opinion as to state of affairs. Poor coal preparation shifts orders to other states.

It is said that lack of cars was the chief cause of the many shut downs which occured in Indiana coal mines during August. July reports showed that lack of orders was the principal cause of idleness at the mines. Some of the mines report that they were closed as much as 15 days in August on account of the lack of cars, while others say that they had practically no difficulty at all in getting their quota of cars. In this connection, it was pointed out that the Federal Railroad Administration operates an equalizing office whereby cars are supposed to be distributed in proportion to the necessity and call. This equalization is said to be working as well as can be expected, according to some of the operators. Car distribution always was a bone of contention and it may be that the millennium only will effectually relieve the situation.

Cary Littlejohn, state mine inspector, is authority for the statement that coal operators would not report their mines closed because of a car shortage when in reality the mines might have closed on account of no orders. Walker D. Hines, director general of the Federal Railroad Administration, has declared that the coal car shortage is principally a myth. There was much talk among some operators in July about poor transportation, but according to reports in the office of the state Industrial Board, in which is also the office of the state mine inspector, lack of operation in Indiana mines was due principally to lack of orders for the month in question.

An Indianapolis coal dealer says that the householder has in his cellar now only about 40 per cent. of the coal which he had at the corresponding time last year. It is reported that the Indiana householder has bought less Indiana coal and more coal from other states than he did last year. The same coal dealer further commented that owing to general conditions during the last two years, Hoosier mines have sent to Indiana consumers, coal which was not as good and as free from waste as it might have been, and that the householder has an opinion about Indiana coal not altogether justified by its real quality.

St. Louis, Mo.

Attorney general resumes investigations of coal matters in Fifth and Ninth districts. Secretary Greenlaw of Coal Trade Bureau testifies. Valuable data presented. Actual costs of producing coal given and expenses analyzed. Average prices charged at the mine noted. Scope of inquiry to determine whether coal producers have violated anti-trust laws.

Attorney General McAllister recently resumed his investigation of the Fifth and Ninth Districts' Coal Trade Bureau, Illinois, which was begun in 1917 but was interrupted at the time of the creation of the Federal Fuel Administration.

The secretary of the Coal Trade Bureau, P. H. Greenlaw, was on the stand parts of three days when he testified as to the manner in which the 46 companies holding membership in the bureau made daily reports of output and prices. He stated that the bureau was supported by an assessment of three mills per ton of output of each member, respectively. On the basis of the production of 16,249,257 tons by member firms in 1918, it is estimated that the revenue of the bureau for the year was $48,747.

Secretary Greenlaw offered exhibits showing that the average cost of producing coal by member firms was $1.76 a ton last year. The main items entering into this cost are as follows: Labor, $1.35; supplies and maintenance, $0.17; fixed charges, $0.24. Included in the average mining costs for labor ($1.35) are, 2.6c. for legal services and 1.1c. for taxes. Among the mines in the group in question are 15 small plants, the report shows, and as production costs in these are slightly higher, they raise the average cost on the whole. Four of the largest mines in the group reported their costs as follows: Mine No. 11—labor, $1.31, and total cost $1.59; total tons mined 1,939,437. Mine No. 7—labor, $1.28, and total cost, $1.60; tons mined 1,104,405. Mine No. 9—labor, $1.29, and total cost, $1.61; total tons mined, 979,904. Mine No. 17—labor, $1.47, and total cost $1.78; tons mined 1,386,143. Attorney General McAllister said that the scope of the inquiry, which seeks to determine whether the coal producers have violated the anti-trust laws, would be governed by the testimony of Mr. Greenlaw.

Oftentimes bare statistics are dry reading but not so to coal men in these days when data relative to costs of production and selling prices of coal are involved. During the last two years cost sheets of coal companies have assumed a new significance. The Fuel Administration carefully prepared blanks which operators were required to fill out monthly giving the whole story of the cost of operating coal mines. Severe penalties were attached to making incorrect entries in these reports. In connection with the expense of mining coal, a statement presented by the Victor American Fuel Co., of Colorado, is of interest; it appeared in the May 22, 1919, issue of *Coal Age* under the title, "Some Items That Enter Into the Cost of Producing Coal."

During the investigation conducted by the attorney general, of Illinois mining conditions, it further developed that the average price charged at the mine for standard grade coal was, $2.11 on contract and $2.27 on non-contract; for Staunton grade, $2.13 on contract and $2.30 non-contract. Secretary Greenlaw refused to produce the reports sent to his bureau by member firms, showing the grades, amounts and prices of coal shipped out of the Fifth and Ninth districts, with the names of consignees. He took the position that the reports contained confidential trade information which he thought would be found irrelevant to the purposes of the inquiry. In answer to questions, Mr. Greenlaw admitted that reports were received from some non-member firms, and the attorney general intimated that on account of the interstate character of the business, he might seek the aid of the Federal authorities in the investigation. In view of the fact that the "independent" anthracite operators of Pennsylvania expect to sue the U. S. Government for severe losses sustained during the régime of the Fuel Administration, it is altogether probable that the Federal authorities will take an active part in matters pertaining to the cost of producing and marketing coal both in the anthracite and bituminous fields. Information about this test case was given in the immediately preceding issue of *Coal Age* in the "News" department under the title "New York, N. Y."

Victoria, B. C.

Coal advanced $4 during the war to the consumer. Now $11.50 a ton. Miners receive advance in wages in proportion to cost of living. No shortage of coal expected in Northwest. Miners not working full time.

Coal continues to advance in price in British Columbia, the quotation per ton to the consumer now being $11.50 a ton, as compared with $6.50 asked before the war. The explanation, of course, is the high cost of production, although there is a disposition in some quarters to doubt whether the value placed on the fuel is justified. The jump from $6.50 to $11.50 did not come without notice. The process has been more or less gradual. During the war there was an investigation into production costs authorized by the Dominion Fuel Controller and, as a result, the price of coal at the bunkers of the various companies was fixed.

Since the first of the present year, coal miners have received increases to their wages. Those employed by the Canadian Collieries, Ltd., the Pacific Coast coal mines, the Nanoose Collieries and other companies (with the exception of the Canadian Western Fuel Co.) have had their pay raised at intervals in proportion to the increase in the cost of the necessities of life. The extent of the additions to their pay envelopes is as follows: February 1, 1919, 2½c.; May 1, 2½c.; Aug. 1, 5c., or a total of 20½ cents. The men of the Canadian Western Fuel Co. did not come within the general arrangement which brought to the employees of the other companies these increases. The situation as regards this company was commented upon in the News department of the Sept. 11, 1919, issue of *Coal Age*, under the title, "Nanaimo, B. C."

With the increase in the miner's pay, some changes were made in the price of domestic coal at the bunkers; to make the cycle complete advances were recorded, almost simultaneously, by the retailers. On April 1 last the retailers announced an increase of 50c. a ton; on June 29 there was added another 50c.; and on Sept. 1 there was a further addition of 75 cents. Thus, since the beginning of the year, the retail price of domestic coal in this province has climbed $1.75 a ton.

While it is not expected that there will be any shortage of coal in the Pacific Northwest this winter, it is a noteworthy fact that the miners have not been working full time during the summer. Owing to slack trade the Reserve mine was closed down on May 30, previous to which time the mines of the Canadian Western Fuel Co. had been operating only four days a week. With the Reserve inactive it was thought that the other mines could be kept producing to capacity, but this did not prove so as the other mines thereafter worked an average of only 18 days a month.

All the Island mines have been working short time since the month of April, and a careful computation of the loss in output, from that month to Aug. 31, 1919, because of slack trade, shows that it reached the substantial total of 192,807 tons.

PENNSYLVANIA
Anthracite

Hazleton—Mine Workers throughout the Lehigh anthracite coal field express themselves in favor of the movement started to erect a monument to the memory of John Mitchell who was buried on Sept. 12 at Scranton, Penn. It is suggested that each one of the approximately 170,000 miners in the anthracite region give one dollar toward this memorial.

Carbondale—Ground settled over a considerable area in this city recently damaging five properties on lower Powderly Road. The settling occurred over workings of the Hudson Coal Co. The houses in question are said to have been wrecked to such an extent that all household effects have been removed and the families occupying them have sought other quarters. It is predicted that further settlement and some caving of surface will take place in this section.

Pottsville—More than $15,000,000 are to be spent within the next eighteen months in the southern end of the anthracite region, developing old collieries and opening up new territory. The principal developments will be in the western end of Schuylkill County, where vast mountains of coal await the prospector. Notwithstanding the many millions of tons of coal taken out in that region, the surface of the vast coal product has scarcely been scratched.

Minersville—The Buck Run Coal Co., managed and owned by James B. Neale, former chief of production for the United States Fuel Administration, is completing an up to date athletic field for his employees. Work was first devoted to the baseball diamond, said to be one of the best in the southern fields, but the ground will be made suitable for other forms of athletic amusement and for general recreation.

Scranton—It is reported that a mine fire has been raging since about the first week in September in the big seam of the Continental mine of the Coal Department of the Delaware, Lackawanna & Western R.R. It threatens to spread and destroy considerable coal. All the men employed at the mine are on strike, and unless they will agree to go into the workings and fight the flames untold damage may result, as the fire is now said to be several acres in extent. The mine has ten electric locomotives and four electric machines.

Lansford—Plans are now being made by the Lehigh Coal and Navigation Co. for a resumption of free night schools for employees on the same basis as prevailed before the war. Sessions will probably begin about Oct. 1, in Lansford, and will be held three nights a week. Classes in mining, mechanical and electrical engineering will probably be included, and it is noteworthy that there will probably be instruction in English and naturalization. Instructors will be chosen from the company's own organization and they will be paid by the company.

Shamokin—Recently the Greenough Red Ash Coal Co. sold its colliery near this place to the Madeira-Hill Coal Co. for $1,000,000. The Greenough plant was controlled by local parties. The retiring officers of the company are, M. W. O'Boyle, president, of Pittston; John H. Foy, vice president, of Pittston; Frank A. Gable, secretary, Shamokin; George C. Graeber, treasurer, Shamokin; Edward Boerman, general manager. The Greenough Colliery was opened up in 1898 and the breaker built in 1900; in 1902 the breaker burned down and was replaced by a modern one. The Madeira-Hill company owns the Natalie colliery immediately adjoining the newly purchased Greenough operation. Some 600 men are employed at the plant, which has just changed hands; in the year 1917 the plant shipped about a quarter of a million tons of coal.

Bituminous

Kittanning—The Allegheny River Mining Co., with general offices here, is opening up 5-ft. seams of coal of good quality at its Brookville and Cadogan mines in Armstrong County. The existence of these seams has been known for some time, but labor sufficient to do the work was not available until now.

Greensburg—The largest car of coal ever loaded along the tracks of the Pennsylvania R.R. was made ready for shipment on the siding of the Keystone Coal and Coke Co.'s mine at Greensburg, No. 2. The capacity of the car is 200,000 lb. and with the ten per cent. increase over the marked capacity it will carry 220,000 lb. On the first trip only 200,000 lb. will be carried. The car was recently turned out as an experiment from the Altoona shops. It has two trucks with three wheels each. The only cars anything near this capacity were recently started on the Norfolk & Western R.R.

Brownsville—The Youngstown Sheet and Tinplate Co. is opening a large coal mine and building a town at Buckeye, in Greene County, Penn., on the line of the Pennsylvania R. R. and the Monongahela River. Three million dollars was the initial appropriation for the construction and development work; the output is expected eventually to reach 6,000 tons per day. One of the features of the mine, which will be a shaft operation, is that the coal will be dumped (two cars at a time) by a revolving dump into a large storage bin at the shaft bottom. From this bin the coal will be loaded into a self-dumping 50-ton skip which will be hoisted and dumped by an electric hoist. Only one skip will be used and this will be balanced by a counterweight running in one end of the shaft. Instead of the customary single rope used in hoisting, the skip will be handled with several smaller ropes.

Johnstown—The recent merger of the Imperial Coal Co.—a selling corporation—and the Shade Creek, Diamond Smokeless and the Cambria Smokeless coal companies with the Imperial Coal Corporation, with a capital of $440,000, means the formation of a concern which will later largely increase its capital and also the present production of about 600,000 tons a year. It is said to be probable that other operations will be taken into the concern. The Shade Creek mines are at Miller Run Somerset County, in the Windber field; the Cambria Smokeless plant is at Coalport, Clearfield County; and the Diamond Smokeless mines are at Charles, Indiana County, about seven miles west of Johnstown. The main offices will be in Johnstown but the president—Charles A. Owen—will maintain an office in New York City. The other officers of the company are: James P. Thomas, Johnstown, vice president; Frank D. Baker, Johnstown, secretary; Philip E. Thomas, Philadelphia, treasurer; E. H. Zimmerman, New York, assistant treasurer and James M. Cook, Johnstown, general superintendent. These, with H. A. Linz, of Philadelphia, are the directors of the corporation.

WEST VIRGINIA

Fairmont—Speed marked the construction of the new bin and coaling station erected by the Consolidation Coal Co. at its shaft mine No. 38 at Barnstown. The bin was destroyed by fire on June 22, less than two months being required to rebuild the coaling station. The bin has a height of 75 ft. above the railroad. The capacity of the new bin is 1200 tons, there being room for 800 tons in the storage bin proper and for 400 tons in the coaling station. A 25-hp. Westinghouse motor is a part of the loading equipment.

Wheeling.—Four thousand acres of coal land, property of the Richland Coal Co., known as the Beech Bottom mine, north of this city, was sold recently to the American Gas and Electric Co., of Beech Bottom. The purchase price was not announced. The property was purchased to supply coal for the mammoth electric power plant at Beech Bottom.

The present annual production is said to be 400,000 tons which the purchaser expects to increase by 50 per cent. The tipple is close to the power plant and the company will thus secure a great advantage by direct delivery.

Charleston—The Railroad Committee of the National Coal Association was in session at White Sulphur Springs, W. Va., on Sept. 12, a special meeting having been called in order to deal with the car situation, which has been daily growing worse and which looms large as the principal factor in a possible and in fact probable fuel famine during the coming months. The meeting at White Sulphur was evidently called for the purpose of holding a conference with secretaries and other officials of the various district coal associations in West Virginia, since all association officers received notice of the meeting and were invited to be present; both D. C. Kennedy, secretary of the Kanawha Coal Operators' Association and M. H. Tomb, secretary of the Kanawha Coal Shippers' Association attending the meeting. Other districts, insofar as could be learned, also had representatives at the meeting. J. G. Bradley, president of the West Virginia Coal Association, is Chairman of the Railroad Committee of the National Coal Association.

Changes will be made in the system of rating mines for cars and in the distribution of cars to mines as the result of a conference held on Sept. 12 and 13, at White Sulphur Springs between the committee on Railroad Relations of the National Coal Association and representatives of the United States Railroad Administration. For instance, it is believed, that the practice of counting cars half loaded with screened coal at the end of a day as a whole day's supply will be discontinued. It is also proposed to adopt a uniform system of rating mines and of distributing cars to them; car-rating rules and car-distribution rules now undergoing revision. New rules will be available for distribution in a few days, it is said. J. G. Bradley, president of the West Virginia Coal Association and also chairman of the Railroad Relations Committee, of the Association, presided at the White Sulphur meeting. A special meeting of the Executive Committee of the West Virginia Coal Association was also held at White Sulphur during the conference.

OHIO

Murray—The Murphy-Hocking Coal Co., recently organized, has taken a lease on 250 acres of coal lands from the Sunday Creek Coal Co., the property is located near this place, on the Hocking Valley Ry. A tipple is being constructed and electrical equipment installed. Loading will start soon. The concern will work both No. 6 and No. 7 seams of coal.

Nelsonville—Recently three large slack piles in the Hocking Valley field have changed hands and preparations are being made for shipping the slack. It was found during the war that slack could be used to good advantage by steam users by the installation of a special sort of stoker, and that because of cheapness it is an advantage to use it. Shipping slack from these piles will be started soon.

Columbus—A large and representative audience of coal men heard an address by George H. Cushing, managing director of the American Wholesale Coal Association here recently. Following a dinner at the Chittenden Hotel Mr. Cushing spoke at length on present conditions, emphasizing the fact that there will be no marked coal shortage this winter if coal men keep their heads and do not urge people to buy to any excess at present. He pointed out that the deficiency of approximately 25,000,000 tons of several months ago, is being reduced by increasing production, by about 9,000,000 to 11,000,000 tons per week, and that the current needs are about 9,000,000 tons. The various reasons for the falling off of demand since the war were explained. He urged coal men to not permit a runaway market in order to prevent Government control or drastic regulations. G. H. Merriwether, secretary-treasurer of the association also spoke.

The entire sales force of the Sunday Creek Coal Co., visited many of the company's operations in the Hocking Valley field recently for the purpose of familiarizing the salesmen with mining conditions and equipment. Those in the party were J. R. Pitzer, general sales manager; B. Kinsey, Toledo; R. D. Teele, Grand Rapids; J. S. Fitzer, Bucyrus; E. F. Kelly, Findlay; M. J. Gallagher and G. H. Case, Columbus; H. C. Davis, Ft. Wayne.

INDIANA

Shelbyville—Laboring men of this city members of local unions, have arranged to take over a local coal yard and to provide coal for themselves during the winter at cost. A company is being formed and shares are being sold at $5 each. Only two shares will be sold to each member who may pay for them at the rate of 50c a week. Coal will be sold at cost only to the share holders.

Evansville—The Southern Indiana Coal Bureau has appointed a committee to investigate a bomb explosion, at the mine of the Bosse Coal Co., at Buckskin, a few miles north of this city, from the results of which George Lutz, mine foreman, may lose his life. The Coal Bureau made an appeal to the sheriff and the prosecuting attorney of Gibson County to see that the men who committed the crime are brought to justice. Mr. Lutz was injured by an explosion of dynamite which had been placed on top of the mine cage. Walter B. Korff, manager of the Bosse company, says that threats had been made against him by the same men who had threatened the life of Foreman Lutz.

ILLINOIS

Centralia—The Bell & Zoller Mining Co., operating mine No. 5, south of here, recently broke its record in hoisting coal. One day's run totalled 2,250 tons in eight hours, or over 400 tons per hour. This is considered quite a record at the present time.

Marion—The newly reorganized Sunrise Coal Co., which operates the "Cambria" mine in Williamson County near here, is rapidly completing the remodeling and reconstructing of the plant. A new switch is being built to the mine from the main line by the Illinois Central R.R. The output is expected to be increased 50 per cent. by the improvements which are being made.

Belleville—The Southern Coal, Coke and Mining Co. has closed the Muren mine indefinitely. The mules are to be taken from the mine and operations entirely suspended, probably until next spring. The company reports that the number of men in the New Baden, at New Baden, and Shiloh and Little Oak mines, at this place, is increasing daily. The general offices of the company are at St. Louis, Mo.

Duquoin.—The Old Ben Coal Corporation is now completing what promises to be one of its largest collieries in the state, near Pershing, Williamson County. Work has been in progress for over a year and coal has been hoisted out of the air shaft for several months. It is expected that shortly coal will be reached in the main shaft and then operations will take on new life. When working at full capacity this mine will employ between 800 to 1000 men, with a tonnage of 6000 daily. All machinery and equipment will be electrically operated and the most modern methods of mining will be used.

The Old Ben Company is one of the big shippers of the state and one of the most progressive as well.

Staunton—The coal hoisted at 87 mines in the Fifth and Ninth districts of Illinois decreased from 826,704 tons in July to 446,335 tons in August, according to an exhibit filed by P. H. Greenlaw, secretary of the Fifth and Ninth districts' Bureau at an inquiry conducted by Attorney General McAlister, of Missouri, in St. Louis recently. The decrease was mostly due, it was stated, to labor troubles, although mine disability, lack of market and car shortage had their influence. During July the mines were idle 192 hours because of labor trouble and in August the idle hours from that cause ran to 7,392. The Illinois strikes started July 31 and by Aug. 5 had spread over a considerable part of the state. In July the mines were idle 1,253 hours on account of disability. This disability was cut to 757 idle hours in August. The idleness in July from lack of market was 7,946 hours. The idleness from this cause was reduced in August to 3,011 hours. Loss of time from lack of cars was practically the same in the two months, 6,005 hours in July and 3,605 hours in August.

OKLAHOMA

McAlester—The Oklahoma Coal Operators' Association at the annual meting held here recently, elected Dorset Carter of Oklahoma City, as president to succeed E. T. Price, of Muskogee. Other officers were elected as follows: Dan McAlpine, Haileyville, Okla., vice president; F. F. Lagrave, McAlester, secretary and treasurer; J. B. Wilson, of McAlester was re-elected as commissioner for the coal operators. The board of directors for the coming year will be as follows: James Duncan, Alton, Ill.; James McConnell, Wilburton, Okla.; John Reid, McAlester, Okla.; P. W. Malley, Lehigh, Okla.; R. T. Price, Muskogee, Okla.; William A. Evans, McAlester, Okla. and William Jones, Hartshorne, Okla. Three delegates to the Buffalo wage conference will be appointed later by Mr. Carter.

MISSOURI

St. Louis—Morton F. Leopold, safety engineer of the United States Bureau of Mines, was in this City recently making arrangements for the exhibit which is to be made by the Government at the American Mining Congress, to be held at the Planters Hotel here Nov. 17 to 21. The exhibit will include a moving picture of "The Story of Coal," showing its development from primeval beginnings to the last step in coal mining. Demonstrations will show the development of war gases and gas masks undertaken by the Bureau of Mines before Chemical Service was instituted. A model coal mine will be shown at work. Not only mine operators and owners but labor leaders, governors and members of Congress are expected to attend. The meeting will be the first one held in three years. Industrial problems that affect the mining industry will be considered.

COLORADO

Grand Junction.—Coal operators in the vicinity of Palisades, east of here, expect to double their output as a result of revised tariffs reducing the freight rates on coal, thus permitting them to compete with the Utah mines and extend their trade territory to various parts of Colorado and Utah.

Equipment to handle increased output is in process of installation.

Foreign News

Sydney, N. S.—The New Victoria mine of the Dominion Coal Co., which in 1902 had a producing capacity of about 1800 tons per day and employed some 400 men, has been re-opened. It had been closed down during the war.

Edmonton, Alberta—Production of coal in Alberta is rapidly becoming normal again and there is every prospect that a large quantity will be got out before the winter sets in. At the Drumheller mines the output is nearing the 3000-ton mark, which is considered very satisfactory. At Crows Nest Pass production is going ahead rapidly with over 1000 miners at work and 300 more at the mines in the immediate vicinity. At Lethbridge all the mines in the district are working to full capacity, and the Canadian Pacific Ry. mines are shipping between 50 and 75 cars per day, which is a large production.

Calgary, Alberta—At the Industrial Congress recently held here an address was delivered by Dr. Dowling on the coal resources of the Province of Alberta. He said that in the country from the Grand Trunk Pacific to the Smoky River there is as much coal as in the whole of the Province of Nova Scotia. There was estimated to be 1,000,000,000 tons of anthracite which compares favorably with the Welsh product although not as hard as that of Pennsylvania. The area of Alberta's coal lands Dr. Dowling placed at 25,000 sq. mi. which is in a belt 50 miles wide that runs along the foot-hills, sweeps out to the plains and back to the hills.

Victoria, B. C.—In conformity with an amendment to the Coal Mines Regulation Act, passed at the last session of the British Columbia Legislature, all plans filed with the Department of Mines hereafter must be prepared by a competent and properly qualified man holding a certificate under the provisions of the Act. From Oct. 1 no plans will be accepted unless prepared by a person who has had two years practical experience in surveying mines or is the holder of a diploma in scientific and mining training; this after a course of study of at least two years at an approved educational institution, and who is competent to make an accurate survey of the workings of a coal mine and to connect such survey with a surface survey, etc. Sobriety and general good conduct also are stipulated.

Melbourne, New South Wales.—Acting under regulations authorizing the prime minister to acquire and dispose of all coal mined in Australia, the commonwealth Government has virtually taken control of the coal industry in New South Wales. Strikes have been averted and the wages of the coal miners increased by the action of the Government.

The coal regulations were passed by the Federal council, under the war precautions act, and empower the Government to control the sale and distribution of coal and to fix rates of wages to be paid the miners.

The Government is authorized to acquire all the coal mined in New South Wales and to set the price at which coal purchased from stocks belonging to the commonwealth may be sold. It is made an offense to sell coal at any higher price than that fixed by the Government.

The object of the coal regulations was to insure the continuous operation of the coal mines and avert a disasterous strike. The agreement under which the miners get higher wages was approved by the great majority of the workers.

Personals

W. W. Cox, engineer for the Peabody Coal Co., at its mine near Marion, Ill., has been transferred by that company to Hellier, Ky.

W. T. Delihant, Jr., who has been with the Taylor Coal Co., for several years, has taken a position as manager of the coal department with the H. M. Byllesby & Co., of Chicago.

W. S. Walker, formerly with the Northern Coal Co., has been appointed special representative of the Peabody Coal Co. Mr. Walker will have charge of two mines in Gallitin County, Ill., which are operated by the latter company.

W. D. Howard, who has been superintendent for the Laurel Hill Mining Co., at Arcola, Webster County, W. Va., for over three years, has resigned to accept a similar position with the Miller Coal Co., at Adrian, in Upsuhr County, W. Va.

J. A. Graft, Connellsville, Penn., and **C. K. Brown**, Kingwood, W. Va., have been appointed instructors in the mining extension bureau of West Virginia University, to have headquarters at Beckley, Raliegh County, and Wellsburg, Brooke County, W. Va., respectively.

John A. Malady has been appointed master mechanic for the Hillman Coal and Coke Co., with headquarters in the First National Bank Bldg., Pittsburgh, Penn. He held a similar position with the United Coal Corporation, of Pittsburgh, Penn., before its absorption by the Hillman company.

Clarence W. Watson, Jere H. Wheelwright and **Sprigg D. Camden**, all prominently identified with the Consolidation Coal Co., have been elected directors of the West Virginia Metal Products Corporation. This concern was recently organized with a capital of $2,500,000. It is stated that the plant will cost $1,500,000.

Thomas J. Smith, of Pana, Christian County, Ill., was recently reelected to succeed himself for the sixth successive term as county mine examiner. Mr. Smith had a petition bearing the names of a large majority of the prominent mining men of the county. He is now serving his thirteenth year in his present position, having finished the terms of other examiners.

Obituary

Samuel Seger, a coal and coke operator of Ligonier, Westmoreland County, Penn., died at the age of 49. The brothers, Samuel and John Seger, were engaged in opening the coal field of the Ligonier Valley and establishing plants at Ligonier and Millwood.

J. P. Brennen, aged 62, died at his home in Scottdale, Penn. For many years he has been prominently identified with the Connellsville and Lower Connellsville coke regions, being best known as a coke plant builder. Most of his plants were absorbed by the McClure interests and later taken over by the Frick Company. At one time he was the leading spirit in the Producers Coke Co. and in the Connellsville Coal Tariff Association. At the time of his death he was president of the Producers company, vice president of the Central Connellsville Coke Co. and a director in the Thompson Connellsville Coke Co. Mr. Brennen built the plant of the last named company and was its active head from 1907 until the company was taken over by the Hillman interests.

Industrial News

Fairmont, W. Va.—Robert Talbott, Fairmont, and associates, are arranging plans for the development of about 1000 acres of coal properties in the Lowesville, W. Va., section.

Fairmont, W. Va.—A large number of new houses are being built by the Harry B Coal Co., at its Pitcairn plant. The company is also installing new machinery at the same plant, including 50 new mine cars and two Jeffrey mining machines.

Bellefonte, Penn.—The Manufacturers' Coal Co., with headquarters at this place, in Cambria County, has recently started two new mines; one known as Aldine No. 1, at Spangler, Penn., and Aldine No. 2, at Indiana, Penn.

Warfield, Ky.—The Himler Coal Co. will build a railroad bridge at a cost of $130,000 across Tug River, a mile and a half of siding, forty miners' houses, etc., in developing 1,400 acres of coal land for a daily production of 2,500 tons.

Macdonald, W. Va.—The New River Co., with headquarters here, in Fayette County, is equipping four of its mines with automatic cagers made by the Mining Safety Device Co., of Bowerston, Ohio. Many of the big mines of the country are provided with this device, and it is worthy of note that those holding records for production are thus equipped.

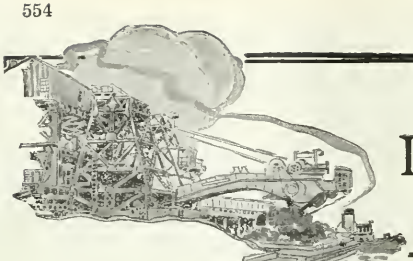
New Cumberland, W. Va.—The West Virginia-Pittsburgh Coal Co. is considering plans for the construction of a new power plant at its properties, to be used for general works operation. It is proposed to make extensive improvements in the present transportation at the plant, to facilitate operations, the entire work being estimated to cost $100,000.

Charleston, W. Va.—The Camp Creek Coal Co., recently organized with a capital of $500,000, is arranging plans for the development of extensive coal properties located on Camp Creek in the southern part of West Virginia, comprising a total of approximately 2039 acres. The property has just been purchased by the new organization for a consideration of about $300,000; it is proposed to commence work at an early date on the construction of a new plant and the installation of complete equipment for development, estimated to cost in excess of $150,000. L. A. Tinder is president, and L. W. Hamilton, secretary.

Chicago, Ill.—The Roberts & Schaefer Co., engineers and contractors of this place announces new construction as follows:

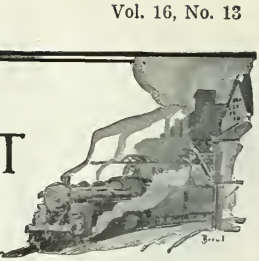
The Wolf Den Coal Co., at Kitzmiller, Md., has recently put into operation their new Marcus patent picking table screen. The Storm King Coal Co., of Jeff, Ky., has contracted for a complete Marcus tipple, which will also have incorporated in it shaking loading booms. The Clinchfield Coal Corporation has contracted for a Marcus screen to be installed in its No. 3 tipple, near Dante, Va. The installation also includes a retarding conveyor and cross-over dump.

The above concerns are installing Roberts & Schaefer equipment.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Soft Coal Market Quiet—Steel Industry Taking All the Coal It Can Get—Division of Opinion Regarding Car Supply—Prices Maintain Levels—Export Business Unprecedented —Anthracite Steam Demand Listless

TAKEN in its entirety, for the country as a whole, it can be stated that the market for bituminous coal is quiet. Beyond doubt the saturnalia of strikes is having its effect. Strange to relate, however, iron and steel works continue to take all the steam coal they can get, despite the tieup of that industry which is threatened at this writing.

The questions of adequate car supply and the attitude of mine labor still loom up all-important to the soft-coal operators. Regarding the former, opinion seems to be divided. Reports of betterment from one section are counterbalanced by complaints from another. However, weighing one against the other, a slight improvement in car supply is noticeable. As to labor, no one can state with any degree of certainty what the situation in the soft-coal industry will be in the not-distant future.

Already there is talk of nationalization or, to use the newer expression, "socialization" of the coal industry; and rumor has it that such a scheme is sponsored by no less a person than our worthy President himself. Surely, this is a time for sanity or clear thinking!

Until the miners' delegates, who are now assembled in convention in Cleveland, present their demands, it is futile to conjecture as to the probable attitude of the operators. In the meantime, the efficiency of the mine worker seems sadly impaired, and this will doubtless be the case until the crux of the situation is reached.

Bituminous coal prices cannot be said to have changed much within the past week. The steam coals show practically no new levels, while the trend in price of the better grades of domestic coal, if anything, is slightly on the up grade.

The strike of the coal dock workers at the head of the Great Lakes has finally been settled, the men having been granted wage increases of about 11 per cent. A total of five weeks' time was lost on account of the strike, and some 200,000 tons of bituminous coal have been held in storage by lake carriers, awaiting a settlement. Lake shipments of soft coal in August of this year amounted to 2,700,000 tons, compared to 4,800,000 tons in August, 1918.

Exports of coal continue on an unprecedented rate, and a considerably larger tonnage could be shipped abroad if there were more vessels. An increased call is noticed for gas coals for export, and several large English buyers are here in an effort to obtain coal for delivery to Italy and France, to take the place of Welsh coals that are held in check by the British Government's restrictions on exports.

Anthracite production is on a par with that of 1916, which was a normal year. The opening up of many coal washeries late in the fall will furnish sufficient extra tonnage to offset the growth in consumption since 1916. The producers are having trouble in disposing of their steam sizes of anthracite, while the domestic sizes, such as egg, stove and chestnut, are scarce.

Atlantic Seaboard

BOSTON

Steam coal extremely quiet. All grades quoted at lower prices all-rail. Receipts still heavy by that route. Medium to poor grades druggy at New York and Philadelphia piers. Hampton Roads market continues strong. Prices on Pocahontas and New River for inland delivery equally strong. Towboat engineers threaten strike. Prospect for anthracite therefore uncertain.

Bituminous—We have seldom had a September with so poor an outlook for fall business. In the spring many operators were so confident of a strong market at this time that they reserved a large proportion of their output for "free coal." Not being able to make contracts for season delivery, buyers in this territory took the alternative of purchasing spot coal wherever available. One result was the bidding up of prices in June and July, and another is the rapid recession in prices since Aug. 15. Steam-users now have ample stocks, there is little inquiry for spot shipment, and so eager are sales agents to induce buying that it will be extremely difficult to create any interest in the market for weeks, if not months, to come. These remarks apply to all the grades shipped all-rail, the lowest cost avenue of supply to this whole territory. The state of trade is hopelessly dull and there are few who have any confidence in improved conditions later this season.

Present quotations show a further falling off as compared with a week ago. The choice grades have now begun to show the effect of current conditions and it is quite likely that those operators who have no very strong outlet for export will be in the open market before long looking for business. The whole situation on Pennsylvania grades is so easy, so far as buyers are concerned, that offers of 10c.@15c. less than quotations are sure to be accepted. Phillipsburg coals are now an easy purchase at $2.40@2.60 per net ton, and even high-grade Moshannons are selling down to $2.85 for prompt shipment. First-class Cambrias can be had at $3.10@3.25 not necessary at first hands, and the next move will be down rather than up.

Meanwhile, shipments continue heavy on old purchases. All-rail receipts are still keeping up to the volume maintained through the latter part of August, and it is clear that all chance of a steam coal shortage are effectually removed, unless strike difficulties intervene. Statements are still handed out complaining of "light" shipments to New England, but the comparisons are made with 1918 when a widespread scare prevailed and buyers determined to err on the side of over stocks, rather than risk being without coal at the beginning of the next season. It was psychological, as so many such situations are, but since steam-users bought with such large eyes it takes time for the trade to get back on anything like a normal basis. The chances are favorable now for starting in next April with most of the large consumers reasonably well-stocked with fuel. It must not be forgotten, too, that fuel oil is making inroads on coal tonnage. An oil-tanker arrived here within a few days that alone would displace nearly 15,000 tons of coal.

At the tidewater piers, at New York particularly, prices have softened materially. There is ample tonnage available of high-grade low volatiles for bunker and oversea use, and in consequence there is much less opening for the medium qualities. Poor coals that are less than "good" have struck hard going and only with difficulty are they absorbed. At Philadelphia the receipts are less and the market is not quite so depressed, but shippers are fast reaching the point where they will not consign to the piers without firm orders in hand. The outcome will doubtless have a favorable affect on the prices now ruling.

Gas coals are also off in price. Shippers of fancy grades have also relied on a strong market this fall and now find themselves casting about for orders. The premiums that prevailed six weeks ago have now almost entirely disappeared.

On Hampton Roads so large a volume of the smokeless coals are being taken for export and for Government purposes that prices there have been unaffected by the current lack of demand in New England. Quotations, where made, continue on the same firm basis that has prevailed now for 60 days and there is even a want of prepared coal for shipment west. Output is reasonably large and yet there is apparently no surplus to be worked off in this territory. It only emphasizes the extent to which the trade here has shifted from West Virginia sources of supply to those districts in Pennsylvania that are open to the all-rail route.

There are still enough buyers inland, who will pay the price for the smokeless grades, to keep quotations on a high level. At Providence sales are being made on the basis of $8.75@$9.00 per gross ton f.o.b. cars and the coal is being taken at places where the rate is 90c.@$1, even though all-rail deliveries of fair grade Pennsylvania can

be had at nearly $3 less. This is only one of the anomalies of the present situation.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F. o. b. mines, net ton	$2.40@2.90	$2.85@3.25
F. o. b. Philadelphia, gross ton	4.50@5.10	5.05@5.50
F. o. b. New York, gross ton	4.85@5.45	5.40@5.80
Alongside Boston (water coal), gross ton	6.75@7.60	7.50@7.75

Georges Creek is quoted at $3.70 per net ton, f. o. b. mines.

Pocahontas and New River quotations continue on the basis of $6.00@6.50 per gross ton f. o. b. Norfolk and Newport News, but no sales are reported at these figures other than for export or bunker trade.

Anthracite—The ultimatum of marine engineers that they will walk out on Sept. 25 unless their demands are met is causing renewed alarm among the retail dealers who are dependent upon ocean tugs for their continuing supply of domestic sizes. Another interruption to water transportation would certainly prove serious, especially to those points up the rivers where navigation closes in December. The all-rail route has never been dependable for shipments so far east and there is much anxiety on the subject. Just now a real effort is being made to concentrate on shipments to those points that are still very much in arrears on receipts of anthracite.

On hard coal in Reading barges an advance in rates is scheduled to go into effect on Sept. 22. To Boston from Philadelphia the rate will be $1.55 instead of $1.30, as heretofore this season.

NEW YORK

Domestic sizes of anthracite continue to be short, while the steam sizes are plentiful. Local dealers not pushed for coal and have cleaned up most of their early orders. Egg size shorter than stove. Dealers take chestnut in order to get the larger coals. Inland dealers buying heavily. Bituminous quiet. Plenty of coal here and many embargoes placed.

Anthracite—Market conditions are far from normal. The demand for the domestic coals has not subsided, and the strike in the Northern coal fields not only resultd in a heavy loss in production but increased the pressure on the shippers of those coals.

Frequently it has been said that the call for stove had eased somewhat and that egg was the shortest of the larger coals, but there are shippers who complain of the continued lack of both egg and stove. So far as chestnut size goes, it is easier, and most shippers are able to keep it moving by urging buyers to take a small percentage of it in their cargoes of other coals.

The labor situation tended to cause more anxiety among the New England dealers, many of whom feared they would run short of supplies if it continued much longer. As a result there was increased urgency on local wholesale houses for both water and all-rail shipments.

Locally the situation is satisfactory when considered in connection with outside conditions. The trade here is not suffering from the lack of coal, although it cannot be said to be entirely satisfied with the tonnage on hand. Retailers have had a strenuous summer filling the orders placed in the early spring and summer months. These orders have been pretty well cleaned off the books and comparatively few new orders are now being received.

Similar conditions exist in the surrounding territory, although there is more coal in the yards than there is in the city yards. With these conditions the trade feels that the situation here next winter will be far better than anticipated.

The reports that excessive premiums were being offered and paid for independent coals are not being heard now. Independent coal is now said to be bringing not more than 75c. differential allowed by the Fuel Administration, and in some instances it is claimed not that much is being asked. Local dealers are in a position where only in isolated cases are they paying more than company schedule.

There is hardly any demand for the steam coals. Buckwheat, while plentiful, is not menacing the market because the companies have facilities for storing the surplus, and quotations for it and for rice of the better grades are close to full circular. Considerable easier figures are being quoted for the off grades. Barley coal is hard to dispose of and independent product is said to be quoted around 75c. at the mines.

Dumpings of anthracite at the local railroad docks for the week ended Sept. 18 were 4260 cars, as compared with 5540 cars the week previous.

Quotations for company, white ash coals, per gross tons, at the mines and f.o.b. New York tidewater lower ports, follows:

	Mine	Tidewater
Broken	$5.95	$7.80
Egg	6.35	8.20
Stove	6.60	8.45
Chestnut	6.70	8.55
Pea	5.30	7.05
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The feeling that there would be a strike among the steel workers with the resultant effect upon the coal situation caused many buyers to stay out of the market in anticipation of a runaway market with much lower prices. This caused a decided let-up in buying, and as a result the local ports became blocked with coal and many embargoes were ordered. This had little effect upon quotations, however, as shippers were not to be thrown into a frenzy to dispose of their holdings at reduced figures.

Car supply is reported as better along the Pennsylvania and Central lines, but there has not been much change along the Baltimore & Ohio. Quicker shipments are being reported in all directions.

The order for the issuance of a permit to allow shipments to South Amboy inaugurated several days ago is still in force.

The demand along the lines has tended to keep the accumulation in the market down. The better grades are scarce for the spot buyer.

New England buyers continue to be out for heavy purchases, although the demand has not been up to expectation. It is predicted that the next few weeks will see home heavy buying in that section.

Salesmen report a brisk market along the rails with prices firm.

The export demand is far in excess of the vessels available. New inquiries are being received continuously, but contracts must be limited because of the lack of bottoms. Demand for bunker coals is heavy because of the large number of vessels entering this port.

There were 4826 cars of bituminous dumped at the local railroad piers during the six days ended Sept. 18, as compared with 5570 cars the week previous.

There is considerable coal in the various pools and quotations for coal, f.o.b. at the pier range about as follows: Pools No. 1, 9 and 71, $5.55@$5.90; No. 10, $5.15@$5.35; No. 11, $4.30@$5.10; and Nos. 18 and 41, $4.80@$4.90.

Quotations for spot coals, net tons, at the mine range about as follows:

	Spot
South Fork (best)	$3.25@$3.50
Cambria (best)	3.00@3.25
Cambria (ordinary)	2.70@2.90
Clearfield (best)	3.00@3.25
Clearfield (ordinary)	2.70@2.90
Reynoldsville	2.85@2.90
Quemahoning	3.25@3.50
Somerset (medium)	3.00@3.25
Somerset (poor)	2.65@2.75
Western Maryland	2.65@2.75
Fairmont	2.50@2.65
Fairmont ½ in.	3.10@3.25
Latrobe	2.75@2.90
Greensburg	2.75@3.00
Westmoreland, ½ in	3.50@3.75
Westmoreland run-of-mine	3.20@3.35

PHILADELPHIA

Anthracite demand is all on egg, stove and nut. Light shipments to local trade. Dealers object to being slighted on price. Retail ordering increases. Strike conditions cleared for moment. Consumers anxious to avoid increase after Nov. 1. Production well maintained. Pea a problem to dealers. Steam coals troublesome to producers. Bituminous easier. Slight price reductions on some grades. Heavy storing. Fairmont coals maintain strong position. Embargoes everywhere.

Anthracite—The local market is featured by almost the entire absence of the large prepared sizes—egg, stove and nut. Usually the large companies have been accustomed to make heavy shipments of all sizes at this time of the year, but up to this time none of them has seen fit to take care of the local dealers. This is particularly true of one of the companies which practically deserted the city during the war, shipping its entire tonnage to New England, by which method it believed it would get the additional financial advantage of routing shipments via a small railroad closely allied to the coal company. Even this company, which has always considered this market peculiarly his own, has made light shipments of the most desirable sizes. The only explanation continues to be that the lake region and New England must be taken care of first.

The dealers are inclined to grow somewhat critical of their present treatment. They readily admit that the city on account of its proximity to the mines is easiest taken care of in the winter, when transportation is often hampered. Their chief complaint lies in the fact that all summer long they have seen coal at its cheapest go into other markets, and then later in the season when the price is at its maximum the coal is shipped here. They feel that the consumers in this territory are entitled to a greater proportion of the cheap fuel than they have been getting.

The coal men have been somewhat surprised at the persistence with which people continue to place orders for future delivery. The new business comes in a gentle stream, and while most dealers had hoped to have the bulk of their storing business cleared off the books by the first of September, they have now reached the point where orders are beginning to get ahead of the deliveries. Unfortunately, the greater portion of the orders continues to be for stove and chestnut sizes, and of late it has slightly turned in favor of the latter size recently. There is more than one dealer who is now urging chestnut in advance of stove. There is practically no tonnage whatever of these two sizes in the local yards this week, and those concerns which had hoped to go into the winter with storage stocks of nut have been greatly disappointed. In addition to these sizes there has been considerable increased business on egg, but this size has in no wise improved over its condition during the past eight or ten weeks. As it looks now the time is not far distant when the consumer will be willing to take any one of the three large prepared sizes.

As stated last week pea coal is hanging very heavy on the hands of the dealers. It has got so that more than one has been compelled to ask his shipper to hold off until he could make more room to store the coal. The number of dealers advertising this size in the papers has increased, and while it has been productive of some business it has not been sufficient to affect the situation. There are dealers who are growing anxious as to the quantity of pea coal in stock, especially since it is tying up a considerable portion of their capital. Nevertheless the opinion is that when cold weather comes there will not be a single dealer in the city who will not be glad to have this size on hand. There has been no time during the past eight or nine years when any retailers carried anything but the most meager stocks of pea coal into the spring, and the usual case has been that they have had none at all.

The production reports of the operating companies continue to indicate a tonnage equal to three years ago, with every likelihood that this production will keep up. With the opening of the big washeries of the larger companies later in the season it is believed that the additional tonnage from them will be sufficient to produce the additional tonnage needed to offset the growth in consumption since 1916.

The companies at this time are having much trouble with the steam sizes. The market is far from able to absorb the production and the storage yards are fast approaching their maximum tonnage. The expected improvement in buckwheat has failed to arrive and it is believed that the price of this size as compared with both the contract and spot prices of bituminous has hurt buckwheat. This latter fact also applies to rice and barley and the belief is growing now that much of these two sizes now in storage will remain there.

Bituminous—There continued to be an easing off in the Pennsylvania soft-coal grades. All tide ports have been congested and this has released a heavy tonnage for line sale. Quite a little of good coal has come on the spot market as a consequence. There has been a fair volume of Pool 9 coal to be had in this way, although the greater portion of this fuel continues to be placed on contracts. Pool 10 fuel was in much freer supply and while fair sales have been made of it many buyers

have assumed the attitude that coal can be bought later at a recession from the present prices and are slow to buy in quantity at this time. The fact is that once the embargoes are raised at tide prices will quickly recover from the slight recession that has been made during the past two weeks.

The lower grade coals, such as Pool 18, have had much difficult/ lately in making a market and many mines producing these coals are running short of orders. The car supply has been fairly good and it is believed that the average in this respect can be figured close between 65 per cent. and 70 per cent. It is quite noticeable that the plants throughout this district are accumulating heavy supplies of fuel, and some in the trade are inclined to believe that half the battle against a fuel shortage has already been won. The southern coals, especially those from the Fairmont region, display a great show of strength despite the embargo at Baltimore which has hampered that region for three weeks. The shippers there have been enabled to get enough special permits, it would seem, to let sufficient coal through to tide, so that they have been fairly well able to maintain their prices, and the expected break on this coal has so far failed to show up.

The prices per net ton prevailing in this market are approximately as follows:

Georges Creek Big Vein	$3.15@3.25
South Fork Miller Vein	3.15@3.25
Clearfield (ordinary)	2.80@2.90
Somerset (ordinary)	2.75@2.85
Fairmont lump	3.20@3.30
Fairmont mine-run	3.00@3.10
Fairmont slack	2.50@2.60
Fairmont lump (ordinary)	2.95@3.00
Fairmont mine-run (ordinary)	2.70@2.80
Fairmont slack (ordinary)	2.50@2.65

BALTIMORE

Big export movement continues to jam tidewater terminals and rigid embargo is enforced. September looks like record-breaker. Prices held up despite oversupply at tide. Anthracite trade dull.

Bituminous—At the present time there is a race on between an exceptional export movement and the facilities at tide. The tremendous number of orders, backed by a liberal movement from mines to piers during three of four weeks, seem for the moment to have over-topped the situation. This is the more patent because, while a vast amount of coal is being dumped into waiting ships from the two piers at Curtis Bay and the one at Canton, the chase of slow-trimming ships allocated to the port is making rapid loading impossible in some cases. The result on some days last week was that every track at Curtis Bay was filled with waiting loads, every track at Canton was in use and overflows were noted at the yards of the Western Maryland near the recently burned Port Covington pier. In addition many loaded cars were reported waiting on sidings on the Baltimore & Ohio and Pennsylvania between this point and the mines. The piers managed to load on foreign-bound coal carriers a total of 85,652 tons for the week, and for the first two weeks of September the dumping on foreign account here has reached the total of 151,637 tons. If kept up this will mean that the month will be the banner one in the entire history of the coal trade here.

Rigid embargoes against all movement except to ships actually here for loading are enforced at present in an effort to lighten the congestion. Prices remain steady, a shortage of cars at the mines for loading because of the many loads now standing awheel stiffening the producers to take anything but top offerings. For steam coals the best grades are pretty well cleared out, as they kept running while other classes of fuel piled up and caused the general jam. On this business offering for anything like prompt delivery the quotation is generally around $3.50, although some in the trade report purchasing in the mines at a little less. Intermediate steam grades run all the way from $2.95 to $3.10 and some less desirable at $2.75. The lowest mixed pools are around $2.40. Gas coals are in heavy call on export, and it is noted that several big English buyers are here in efforts to get coal for delivery to Italy and France to take the place of Welsh coals that are held in check by the British Government's restrictions on exports. Low sulphur three-quarter is holding to the trade at the mines around $3.50; medium sulphur at $2.75 to $3.00 and run-of-mine at $2.40, or possibly $2.35.

Anthracite—The market for hard coal is more or less listless, only a part of the trade urging customers to buy before Oct. 1, when many are figuring there is to be an advance. September ordering is light, as is the usual case here, and there has been a cut down in the proportion of coal bought at 75 cents or more premium because of necessity to round out orders on the book at once. The company run of coal is also reported stronger, although considerably more of stove size could be handled with satisfaction here

Lake Markets

PITTSBURGH

Car shortage continues. Strike threat did not decrease coal demand in steel industry. No opinion on miners' demands.

The Pittsburgh coal district is hampered in its production by car shortage as much as formerly, and the situation is made the more distressing by the possibility looming large of there being labor troubles in the not distant future. Shipments are at about 60 per cent. of capacity, while there is labor supply for a 75 per cent. production, possibly more.

Operators of the district continue in their attitude of refusing to express any opinions as to the demands being formulated by the annual convention of the United Mine Workers at Cleveland. It is obvious, however, that the demands as a whole promise to be far beyond the limits of possible acceptance, and it may be inferred that whether they say so or not the miners are definitely committed to a policy of pushing the subject of nationalization, an issue which it is beginning to appear would be supported by a few members of Congress.

Lake shipments continue to decrease, but the line trade is no better supplied than formerly and a great many coal consumers would be glad to secure much more coal than they are receiving. While the steel manufacturers have been threatened more and more pointedly with a strike, they have evinced no disposition to curtail their coal supplies but rather have been taking all the coal they could get.

While occasional spot purchases of small lots of spot coal are made at above the general market, the following quotations remain fairly representative of the market as a whole: Steam coal: Slack, $2.10@2.30; mine-run, $2.50@2.60. Gas: Slack, $2.20@2.40; mine-run, $2.50@2.70; prepared sizes, $2.60@2.80, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous not so active. Consumers hold off, as if they were getting heavy stocks. Car shortage not quite so bad. Prices quite unbalanced. Anthracite very scarce.

Bituminous—The market is quiet. Jobbers find it hard to keep up their tonnage, for some reason which they hardly understand. If the consumers were getting more stock than they care to hold it might be explained in that way, but there is no report to that effect. The chances are that the many strikes are having a bad effect on the business outlook, so that manufacturers are afraid to go ahead freely. Such would naturally be the result.

One of the worst features of the trade is that the prices are so out of line. Some of the local shippers report one price and others another. Even the best-posted of them say that quotations seldom meant so little as they do now. All that can be depended on is the order from the consumer, then if the coal can be bought at a profit to the jobber it is ordered. For the most part there is an operator somewhere who will sell at living prices. This makes a very unsettled market, but it is the best to be had now.

The car shortage is expected to regulate the prices almost any time, but just now it is hardly so bad as it was a week ago. The same is true in the grain and flour trade, but it is felt that the lull is a matter of a few days, after which the scarcity will return, perhaps worse than ever before. As it is, the filling of orders at the mines is a slow matter.

Bituminous prices cannot be said to have changed much of late in this market, but the range of them is at least 50 cents, with slack now rather firmer than sizes. Quotations: $4.45 for Alleghany Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for same three-quarter, $4.20 for mine run, $4.10 for all slack, $4.60 for smokeless, $5.70 for Pennsylvania smithing, all per net ton f.o.b. Buffalo.

Anthracite—The situation is anything but pleasant or promising. The miners' strikes cut this market pretty nearly out of the local supply. It is felt that the lake movement must be kept up anyhow, and this is being done as well as possible. The latest report from city distributors is that they have a little chestnut on hand, but are not sure they will get any more right away. Consumers are uneasy, but there is nothing they can do. Canadian retailers are over here in unusual numbers, all clamoring for coal.

The local prices of anthracite remain as follows:

	F.o.b. Cars, Gross Ton	At Curb, Net Ton
Grate	$8.55	$10.20
Egg	8.80	10.65
Stove	9.00	10.85
Chestnut	9.10	10.95
Pea	7.45	9.30
Buckwheat	5.70	7.75

Shipments by lake are a little less liberal this week, but the falling off may be merely accidental. The ending of the strike at Duluth and Superior means that the movement will be more free soon. The loading for the week was 92,200 net tons, of which 35,000 tons cleared for Chicago, 16,600 tons for Milwaukee, 3000 tons for Racine, 3400 tons for Manitowoc, 3000 tons for Green Bay, 15,700 tons for Waukegan, 9000 tons for Superior, 6500 tons for Port Arthur.

Freight rates are fairly strong at 60 cents to Chicago, 57½ cents to Racine, 47½ cents to Milwaukee, Manitowoc, Waukegan, 42½ cents to Superior, Port Arthur and Green Bay.

CLEVELAND

Spot requirements of bituminous coal consumers are just about being met. Attempts to stock are proving fruitless. Pocahontas and anthracite grades are even scarcer than they have been. The lake bituminous trade now is only about 40 per cent. of normal.

Bituminous—Car supply continues to be the dominating factor in the local coal market. Some operators say the situation has been somewhat improved in the last few days, and that their mines have been able to ship possibly 10 per cent. more coal. Other operators cannot see any betterment at all. Nevertheless, it is apparent that receipts of bituminous coal in northern Ohio has increased between 5 and 10 per cent. in the past week. Even so, steam-coal users are getting no more than they are consuming, and stockpiles are few and small.

Despite the widely circulated talk of a strike in the iron and steel industry, the belief is generally held in the industry that the tieup, if any, will not last more than a few days. Since the industry takes probably 65 per cent. of the steam-coal coming into northern Ohio, a protracted strike would cut heavily into the market. Iron and steel works continue to take all of the steam coal they can get for their stockpiles are unusually small for this time of the year.

Prices of steam coal continue unchanged, but domestic bituminous is constantly on the upgrade. Due to the strike in the anthracite fields, this grade has become practically unobtainable in the past few days. An already unsatisfied demand for Pocahontas has thereby been augmented, and even domestic bituminous is feeling the effects. This is a great surprise to dealers, who anticipated an exceptionally light domestic demand for bituminous coal this winter on account of the unfortunate experience of householders with bituminous during the war.

The labor situation at the mines continues to "boil," and mine workers' efficiency is sadly impaired. Operators here do not hope for any improvement in this direction until wage-scale negotiations are concluded. They continue in their declaration that there will be no strike, and believe the President's industrial conference at Washington early in October will point the way both for the operators and the mine workers.

Lake Trade—The strike of coal dock workers at the head of the Great Lakes has finally been settled, the men getting wage advances of about 11 per cent. and work has been resumed. A total of five weeks' time was lost by the strike, and some 200,000 tons of bituminous coal have been held in storage by lake carriers, awaiting a settlement. Shipments last week totalled about 550,000 tons. August shipments of bituminous coal amounted to 2,700,000 tons, compared with 4,800,000 in

August, 1918. To Sept. 1, including vessel fuel, Lake Erie coal docks have loaded 16,774,276 tons of bituminous, against 16,866,606 for last season to Sept. 1.

Prices of coal per net ton delivered in Cleveland are

Aathracite:	
Egg	$11.75@11.90
Chestnut	12.00@12.20
Grate	11.75@11.90
Stove	11.90@12.10
Pocahontas:	
Forked	9.50@10.00
Lump	8.75@ 9.00
Mine-run	7.50
Domestic bituminous:	
West Virginia splint	8.00@8.25
No. 8 Pittsburgh	6.60@6.90
Massillon lump	7.70@7.95
Canoel lump	7.85
Coshocton lump	6.85
Steam coal:	
No. 6 slack	4.60@4.80
No. 8 slack	5.10@5.50
Youghiogheny slack	5.25@5.50
No. 8 1-in.	5.70@6.00
No. 6 mine-run	4.75@5.00
No. 8 mine-run	5.20@5.45

DETROIT

With inquiries suggesting a somewhat larger interest among consumers, sales of steam coal show little improvement in volume.

Bituminous—Despite the warnings of coal men and various developments of a nature to encourage prompt action, quite a number of the Detroit buyers of steam coal are still holding back, while others appear to be purchasing on a hand-to-mouth basis, taking only enough stock to satisfy current needs.

The convention of bituminous coal miners in Cleveland, a few days ago, and the program they unfolded, appear to have suggested to some of the local buyers that a little closer interest in the market might be desirable. Jobbers and wholesalers find a small increase in the number of inquiries, which is not yet accompanied, however, by any substantial growth in business.

Meanwhile the car-supply situation seems to he developing increasing importance as a factor in the market, and reports of scarcity of cars are coming to the jobbers with considerable regularity from the mining fields of West Virginia and Ohio. These reports are accepted as indicating the probability of a more troublesome deficiency in transportation facilities as soon as weather conditions become wintry.

There is little or no smokeless coal to he had at present owing to the heavy demands from eastern markets and from the export trade. Small quantities of mine-run are offered occasionally at $2.75 to $3. Hocking domestic lump is selling at $3.25 to $3.50 a net ton at the mines, and egg size coal brings about $3. Mine-run holds around $2.25 to $2.40 and slack brings from $1.90 to $2. Four-inch West Virginia lump of good quality is held at $4 and two-inch lump brings $3.75. Mine-run is offered at $3 and slack is selling at $2.25 to $2.50.

Anthracite—With only scanty supplies in stock, retailers are complaining they experience considerable difficulty and delay in getting anthracite. Orders are not being filled promptly, they say, and movement of the coal from the mines to Detroit is slow. Bituminous or some other fuel probably will have to be substituted in many homes during the coming winter.

Lake Trade—Unloading docks at the head of Lake Superior, after having been handicapped by a five weeks' strike, are again working full crews and shippers are again loading cargoes for delivery there. It is expected the last of the carriers waiting—some of which have held cargoes five weeks or longer—will be unloaded this week

COLUMBUS

The keen edge of a few weeks ago is lacking in the Columbus market, but still there is no apparent dullness. Prices are firm all along the line, and no grade is a drag on the market. Production is increasing under the influence of a better car supply.

A slight easing of the market as far as steam and domestic demand is concerned is apparent during the past week. Buying is not as active as formerly, due in a large part to some accumulated stocks in the hands of dealers and steam consumers. This condition is expected to be temporary only, as there is still a strong potential demand in the country. Retailers have stocks up to a certain extent and the same is true of large steam users. But with a steady consumption, it is believed that buying will soon again reach an active stage.

Retail trade is going along steadily, with householders buying rather actively. A large majority of the orders placed before Sept. 1 for domestic grades are firm at the levels which prevailed for several weeks. Pocahontas lump sells at $8, West Virginia splints at $7 and $7.25, and Hocking lump from $5.75 to $6.75.

Lake trade is still active, despite the dock strike in the upper lake region. There is some congestion on the upper lake docks due to slow interior movement. The car supply, being improved, a larger tonnage has been moved during the past week. Indications point to a continuation of the good lake movement up to Nov. 1 at least.

The steam trade is rather quiet, although some slack and mine-run is moving. Steam plants have accumulated some supplies and are not worrying about the future. Rubber plants are now fairly well supplied. General manufacturing concerns are in the market and the smaller consumers are the best purchasers at this time. Railroads are taking a larger tonnage and that is providing a market for mine-run. The slight flurry caused in the market by the threats of a railroad strike has now passed away. Steam prices are holding firm all along the line.

Production is better in all Ohio fields. In the eastern Ohio district the output is now about 55 per cent. The Hocking Valley reports about 65 per cent, and the same figures are reported from Pomeroy Bend. Crooksville and Massillon have an output approaching 60 per cent. of the average.

Prices at the mines for grades sold in the Columbus market are as follows per ton:

Hocking lump	$3.50
Hocking mine-run	2.50
Hocking screenings	2.10
Pomeroy lump	3.75
Pomeroy mine-run	2.75
Pomeroy screenings	2.25
West Virginia splints, lump	4.75
West Virginia splints, mine run	4.25
West Virginia splints screenings	3.25

CINCINNATI

Car shortage interferes with delivery of necessary coal. Plans under way to relieve transportation situation.

Operators of coal mines located along the Louisville & Nashville R. R. met in Cincinnati last week to discuss possible ways and means of relieving the present car shortage, which is rapidly becoming serious. If conditions are not corrected, it was said, there is likelihood of a few if not many of Cincinnati's industries and factories being closed down during the coming winter through lack of fuel. Railroad officials also met in conference and discussed plans for correcting, or at least ameliorating, present conditions, which were admitted to be bad. Both of the meetings were executive.

Heads of industries and plants throughout the Ohio and Miami Valleys are complaining that their contracts for fuel are not being filled. Operators say that the railroads are furnishing only 55 to 60 per cent. car supply, and that the delivery of coal on their contracts absolutely depends upon the transportation facilities furnished For this reason they are compelled to prorate deliveries on their contracts, and they are doing all that possibly can on the present basis of cars supplied by the railroads under government operation.

Railroad officials decline to submit to interviews and H. A. Worcester, Federal Director of the Ohio-Indiana district, is absent from Cincinnati It was learned, however, from official sources, that operating officials assert that much of the blame for the present large number of cars requiring repairs is due to the changes in the shops dictated by the present Railroad Administration under Government operation. Under the old plan, when the railroads were operated under Private ownership, shop workers received 68 and 70 cents an hour on piecework and worked 10 and 11 hours a day.

Operators contend that much of the labor trouble at the mines is due to the car shortage and the consequent reduction of working hours at the mines. Railroad officials insist, on the other hand, that much of the present coal shortage is due to labor troubles among the miners and that the coal men are placing the blame on an insufficient supply of cars.

Consumers are also vitally interested, for the reason that any real fuel shortage resulting from either labor troubles or scarcity of cars will inevitably mean higher prices for coal this winter, and both directly or indirectly increase the present high cost of living when reductions are being promised.

In addition to these conditions, which are more or less general throughout the country, operators say that railroads feeding the Kentucky and West Virginia Fields, particularly the Chesapeake & Ohio and the Louisville & Nashville, are being discriminated against in the matter of cars. In support of this contention we point to the weekly reports of the Geological Survey in Washington, which show car shortages as high as 40 per cent. in fields supplying Cincinnati and this section, when car shortages in other sections are only 15 per cent., 10 per cent. and even less.

Several plans submitted for the purpose of relieving these conditions were considered at the meeting of the operators, which were presided over by E. L. Douglas, president of the Hazard Operators' Exchange. It is probable that further action will be decided on at a conference to be held soon.

LOUISVILLE

Slightly better car supply with operations climbing up to three days a week. Good demand from large industrial consumers. Block coal in good demand. Retail demand a little dull.

Some improvement in routing cars to the Kentucky coal fields has been noticed, and mines that for weeks have been working two days a week are now operating three, with indications that they will all be operating on that basis shortly. Reduction of cars moving into the South and being routed back to pool territory has helped somewhat.

There is an excellent demand from industrial consumers of the larger type for coal, big men realizing that coal will be scarce and high, and trying to get under cover. Utility companies, gas, byproduct and similar concerns are the largest buyers, while railroads, too, are buying coal. Some steam coal is still going to the Northwest.

Retailers are taking all the block coal they can secure, but production is still low and old orders and contracts are taking up all supplies, with little coal available on new business. Efforts of Harlan operators to hold down prices have not helped much, although a number of companies are selling no coal at more than $4 a ton. Retailers report a full demand due to hot weather, but are stocking somewhat more freely.

Quotations on Kentucky coals are as follows:

	Eastern Kentucky	Western Kentucky
Block	$4.50@$5.25	$2.60@$3.25
Run-of-mine	3.00@ 3.50	2.35@ 2.60
Nut and slack	2.50@ 2.75	1.90@ 2.05
Fine screenings		1.15@ 1.75

BIRMINGHAM

Scarcity of high-grade steam coal has increased the demand for lower grades. Domestic inquiry unusually strong, with no supply available. Car supply around 55 per cent. of requirements.

A slightly better market has developed for medium and lower grades of steam fuel the past week, due to the tonnage from mines producing the best grades of steam coal being so restricted by car shortage as to be unable to supply the requirements of the trade. As a whole, there has been little, if any, improvement in market conditions. Considerable inquiry for bunker and export business is being received by local brokers and agents, but nothing out of the ordinary has developed as yet along this line. Quotations are unchanged and are as follows on steam coal per net ton mines: Big Seam, $2.30@2.60; Corona, $2.85@3.00; Pratt, $2.85@3.00; Black Creek and Cahaba, $3.15@3.86.

Domestic mines have declined to book further orders for the present, having all the business in hand that they can expect to handle under the adverse operating conditions now prevailing, therefore deliveries on contracts constitutes about all the coal that is moving for domestic use.

The Southern started off the week with about a 35 or 40 per cent. car supply and

the Louisville & Nashville about 50 per cent. of the equipment needed. The average for the past week was probably 55 or 60 per cent. The output for the week ending Sept. 6, as reported to the Alabama Coal Operators Association, was 249,071 net tons, the mines making the returns claiming a loss of 550 hours due to lack of equipment.

Coke

CONNELLSVILLE

Furnace coke fluctuates. Foundry very strong. Threatened strike in iron and steel industry has not visibly affected market.

The furnace-coke market has had its ups and downs from day to day, being affected by the appearance and disappearance alternately of small accumulations of coke loaded on track and awaiting shipping instructions. Such accumulations have been quickly absorbed by consumers whose contract deliveries were short, and as high as $5 has had to be paid, though there are reports of $4.75 and possible a shade less having been done within the past ten days.

The coke situation has been complicated by the threatened strike in the iron and steel industry. While the organizing committee of the 24 unions that has been seeking for several months to organize the entire iron and steel industry desired to organize the coke workers and ore miners just as much as the workers at the furnaces and in the mills, it does not appear that they had any considerable success in the Connellsville coke region. Thus on theory there was a possibility of coke becoming quite plentiful through blast-furnace operations being affected by a strike and coke production not being affected. This did not influence furnaces, however, and there has been the same demand as formerly. At this writing it cannot be told whether there will be a strike, or if there is, how extensive it will be.

The demand for foundry coke has continued relatively heavy, with offerings light, and the market is even firmer, at the advanced levels quoted a week ago. Very ordinary foundry coke brings $6.25 if loaded in box cars, and there is nothing being done at less than $6, while favorite brands readily bring $6.50, even when loaded in hopper cars. We quote the spot and prompt market at $4.75@5 for furnace and $6@6.50 for foundry, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Sept. 13 at 259,900 tons, a decrease of 3842 tons.

Buffalo—The demand is not heavy and it is not likely to improve till it is known what is to be the result of agitation in the steel industry. The movement of iron ore by lake continues good and is not quite up to normal, so that the time lost in the short strike is likely to be fully made up. Quotations are firm at $7.60 for 72-hour foundry, $7.25 for 48-hour furnace and $7 for off grades, with domestic sizes $6.75, and breeze, $5.75, all per net ton, f.o.b. Buffalo.

Middle West

MILWAUKEE

Coal trade conditions quiet. Stove and nut anthracite scarce. Total receipts of all kinds of coal a little behind last year.

The coal market is pursuing an even tenor, with no apparent concern on the part of consumers as to price or adequacy of supplies on the docks. Dealers report a steady demand both from city and country. A shortage in stove and nut anthracite makes it hard to meet orders from small consumers with magazine heaters. Prices of coal and coke hold steady. Shippers complain of a lack of cars. This condition is apt to be accentuated as the grain movement increases. Cargoes by lake continue to arrive daily. Thus far two cargoes which had been consigned to Duluth found their way to the docks here because of the dock strike at the head of the lakes. Receipts for the season by lake, including the first half of September, aggregate 600,940 tons of anthracite and 2,194,671 tons of soft coal, a gain of 164,064 tons of the former and a loss of 222,342 tons of the latter in comparison with last year's receipts during the same period.

ST. LOUIS

Continued quiet and somewhat inactive market locally. Country demand good, except on screenings. Tonnage unusually small and strike still in progress in the Standard and Mt. Olive fields. Car supply poor, with promise of betterment.

Conditions in the St. Louis market are different from those of other years at this time. There is little demand for coal other than Carterville. The principal call for both steam and domestic coal comes from the country districts. The local industrial situation is rather light and many plants are running only part of the time.

With about two-thirds of the mines in the Standard districts working, there is an oversupply of screenings and within the next few days some mines are going to be idle on account of their failure to move this size. On account of Standard selling at a price equal to, or higher than, Mt. Olive, there is a call for Mt. Olive locally and little demand for Standard. The Mt. Olive operators are still holding their coal in the local market at from $2.40@2.55 for domestic sizes, with the exception of washed, which is going at $2.80@3.

The Standard market locally for 2-in. lump is $2.50@2.60. Out of town this coal is selling at as high as $2.75. Standard 6-in. lump is from $2.75@3, and the same applies to 3x6 egg and No. 1 nut, with little to offer and an outside market that will absorb all that is produced.

There are several mines in the Standard field still idle on account of the strike. The miners at No. 17, of the Consolidated Coal Co., at Collinsville, tried to work the early part of the week. Insurgents aided by several of the women prevented them from going out by throwing stones, and a general fight almost resulted. The day following about ten detectives were on the mine train, and as soon as the miners found that they were guarded they quit the train, so that the mine was idle again. In other places only a few of the mine workers are back.

In the Mt. Olive district the trouble is dying out, and conditions ought to be normal within the next week or ten days unless something unexpected turns up.

The supply of cars in the Standard field shows some improvement, even on the Illinois Central. In the Mt. Olive field conditions are almost normal with a fairly good car supply. In the Carterville field of Williamson and Franklin Counties the principal trouble is car supply. There has been a let-up in the railroad demand on the Iron Mountain in the past week, since its source of supply on contracts, which is in the Standard field, is resuming operations. There continues, however, to be a demand about three times as great as the supply for coal from this field. At a few mines there has been an easing up on screenings, but on everything else the mines are sold up anywhere from one month to three months.

Labor conditions are good right now and the movement of cars shows some improvement. The only great trouble is car shortage. The same situation applies to the Du Quoin field. The prices are generally maintained throughout the field, although there is a difference of from 10c. to 15c. in the so-called circular.

The prevailing prices per net ton, care mines, are as follows:

	Williamson and Franklin County	Mt. Olive and Staunton	Standard
6-in. lump	$3.15@3 30	$2.40@2 55	$2 75@3.00
3x6 egg	3.15@3 30	2 40@2 55	2 75@3.00
2x3 nut	3.15@3.30	2.40@2 55	2 75@3 00
1¼x2 nut	3.15@3 30		
Mine-run	2.40@2 50	2 25@2 35	2 00@2.20
Screenings	2.10@2 25	2 05	2 00
2x6 egg			
2-in. lump			2.50@2 60

Williamson-Franklin County rate to St. Louis is $1.07½; other rates $0.92½.

The domestic prices range, f.o.b. the mine, from $3.15@3.30 on lump, egg and on the screened nut sizes. Screenings are going out from $2.10@2.25, with mine run at from $2.40@2.50.

In St. Louis proper a little anthracite moved in the past week and a few cars of smokeless, with no Arkansas. The local demand for coke shows improvement, but the outside demand can hardly be taken care of.

Recent Coal Patents

Gathering mechanism for coal loading machines. J. F. Joy, Belle Vernon, Penn., 1,300,620. April 15, 1919. Filed Aug. 23 1917. Serial No. 187,805.

Fuel economizer. E. B. Overshiner, Chicago, Ill., 1,301,000. April 15, 1919. Filed Oct. 11, 1918. Serial No. 257,679.

Mine cage hoist. T. Price, Nanaimo, British Columbia, Can., 1,300,647. April 15, 1919. Filed Jan. 15, 1918. Serial No. 271,266

Tool for miners' and blasters' use. E. Godfrey, assignor to Canadian Explosives, Ltd., Montreal, Can. 1,300,834. April 15, 1919. Filed June 26, 1918. Serial No. 241,942

Car hoisting and dumping apparatus. A. H. Wood, assignor to Wood Equipment Co., a corporation of Illinois, 1,301,208. April 22, 1919. Filed Sept. 23, 1916. Serial No 121,809.

Ash Conveying System. A. P. Strong, assignor to Green Engineering Co., E. Chicago, Ind., 1,301,194. April 22, 1919. Filed Sept. 23, 1916. Serial No. 121,809.

Coal receiving and storing plant. C. S. Wilkinson, Chicago, Ill., 1,301,630. April 22, 1919. Filed Oct. 6, 1916. Serial No. 124,046.

Safety device for mines. J. A. Nolan assignor to Mining Safety Device Co., Bowerston, O., 1,301,732. April 22, 1919. Filed June 28, 1916. Serial No. 106,451.

Smoke consuming furnace. Oscar Lox, Chicago, Ill., 1,302,061. April 29, 1919. Filed Oct. 28, 1914. Serial No. $69,003.

Hand stoker. G. H. Thacher assignor to Files Engineering Co., a corporation of Rhode Island, 1,302,453. April 29, 1919. Filed Sept. 15, 1917. Serial No. 191,578

Furnace grate. P. Scherman, Fort Atkinson, Wis., 1,303,119. May 6, 1919. Filed Dec. 17, 1915. Serial No. 67,375.

Boiler cleaning apparatus. H. J. Lund, Skien, Norway, 1,302,940. May 6, 1919. Filed Nov. 21, 1916. Serial No. 132,601.

Mining apparatus. W. E. Hamilton assignor to Jeffrey Mfg. Co., Columbus, Ohio. 1,303,303. May 13, 1919. Filed Aug. 30, 1909. Serial No. 515,341.

Coal charging lorry. L. Wilhutte, New Rochelle, N. Y., 1,303,526. May 13, 1919. Filed Sept. 1, 1916. Serial No. 117,980.

General Statistics

ANTHRACITE SHIPMENTS FOR AUGUST, 1919

The production of anthracite continues to increase, according to reports of shipments made to the Anthracite Bureau of Information at Philadelphia. The shipments for August amounted to 6,144,144 gross tons, as compared with 6,052,334 tons in July, which in turn had the record for largest shipments since October, 1918. Compared with August, 1916, the latest normal year in the anthracite trade, the shipments last month showed an increase of a little over 600,000 tons, or about 11 per cent. For the first five months of this coal year the shipments have amounted to 28,752,699 tons, as compared with 26,678,333 tons for the corresponding period of 1916, an increase of 2,074,366 tons.

The shipments by railroad were as follows:

	August, 1919	August, 1916	Coal Year, 1919-1920	Coal Year 1916-1917
P & R. Ry.	1,142,713	1 000,667	5,559,110	4,904,976
L. V R R	1,171,026	1,026,074	5,220,226	4,865,344
C. R. R. of N J	560,331	541,156	2,593,506	2,633,831
D., L. & W. R R	936 212	875,131	4,619,134	4,063,406
D. & H Co	716,333	572,822	3,380,415	3,007,146
Penna. R.R.	438,214	482,416	2,029,557	2,265,283
Erie R R	678,437	658 044	3,161,576	3,182,216
N. Y. O & W Ry.	182,450	184 708	838,560	814,272
L. & N. E. R R	318,428	190,779	1,350,615	941,859
Total	6,144,144	5,531,797	28,752,699	26,678,333

COAL AGE

Volume 16 — New York, October 2, 1919 — Number 14

The Vicious Circle

BY RUFUS T. STROHM

A playful pup pursued his tail in the midst of a busy street,
Till his tongue hung limp from his gaping mouth and he wobbled on his feet.
The passers-by were stirred to mirth as they watched his exercise,
And they held their sides and they laughed so hard that the tears rolled from their eyes;
And someone yelled: "I like the way that you keep on chasin', pup,
But you're plain damfool, for you're all one piece, so you never can catch up!"

The trainmen wanted a boost in pay,
So they argued loud and long,
And the railroads let them have their way,
For the Brotherhood was strong.
The miners started a husky kick
For the raise they felt was due,
And just as smooth as a juggler's trick
Was the way the thing went through.

The dub that toted the humble hod
Held an upturned palm for more,
The truckman, too, and the white-wing squad
And the rough-necked stevedore.
And after them came the roustabout
And the stokers and the crew—
A crowd with their eager hands held out
The cook from the galley, too.

The linemen threatened to call a strike,
And the guys that tapped the keys;
They swore: "We'll do it, so help me Mike!"
And they won their case with ease.
The simple spinners of wool and silk
And the cotton proletaire,
The wagon-drivers for ice and milk
Held off till they got a share.

But since their wages have sought the sky
With a strong and steady trend,
The cost of living's gone up so high
That they're poorer in the end.
Yet still each struggles with might and main
In getting the most he can,
Nor cares a damn for the stress and strain
He puts on his fellowman.

The gods that from elysian fields gaze down on the spinning earth
And see the frantic, scrambling race must be moved to tragic mirth;
And Jupiter doubtless turns to Mars with a dismal smile, to say:
"My word, old top, observe these fools run rings in their silly way!
They're just plain nuts, for the whole blamed bunch forms a body that is one,
And its head won't ever catch its tail, for it simply can't be done!"

Up-to-date Plant of the Buckeye Coal Company at Nemacolin

The plant is not yet completed and probably will not be entirely finished in less than about a year and a half. Indications are that it will eventually be one of the most efficient and up-to-date plants in the world. No expense is being spared on equipment and the construction is of the highest quality

By Donald J. Baker
Pittsburgh, Penn.

SEVENTY-FIVE miles up the Monongahela River from Pittsburgh, Penn., at Nemacolin, is situated the plant of the Buckeye Coal Co. It lies on the west bank of the river, in Greene County, the river dividing Greene from Fayette County at this point. The operation is accessible from the station of Huron on the Pennsylvania R.R. out of Pittsburgh, and thence by ferry to the opposite side of the river.

Eight thousand acres of byproduct coking coal will be available through a 250-ft. shaft. The coal is that of the Pittsburgh seam and runs from 8 to 10 ft. in thickness. The mine is being developed on the rather unusual 15-entry system. The Buckeye Coal Co. is a subsidiary of the Youngstown Sheet and Tube Co., whose main executive offices are located at Youngstown, Ohio.

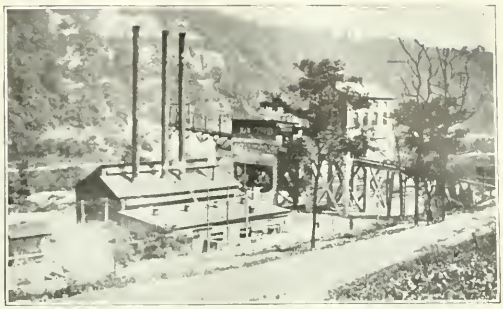
FIG. 1. CONCRETE WALLED ENTRANCE TO THE SLOPE

Construction work on the surface plant, as well as the development of the mine itself, has been going on for some little time. It is doubtful if the plant will have been completed and working to its ultimate capacity of 6000 tons daily much before the spring or summer of 1921. No expense has been spared to make the plant one of the most up-to-date operations in western Pennsylvania. Engineering genius has left the tried and usually practiced methods of the past to the rear. The highest degree of efficiency is being sought through construction and installation that is novel as well as carefully thought out. While considerable of the present equipment is temporary, and the plant is in an unfinished stage, yet a short review of the work that has been completed with some of the plans for the future should prove instructive until such a time as this mine shall have become in actual fact one of the most up-to-date bituminous operations in the world.

The coal will eventually be brought to the surface through a 250-ft. concrete-lined shaft. The dimensions of this elliptical opening are 12 ft. 8 in. by 32 ft. Rotary dumps will be installed at the bottom and the coal fed into two skips, the capacity of which has not yet been decided upon but which will nevertheless permit of 6000 tons being brought to the surface in 8 hours. The tipple and hoisthouse have not been constructed but will be similar in design to the type now in use at the slope, of which something will be said later. This shaft will be used exclusively for hoisting the coal to the surface by the skips.

At present some coal is being mined, but only that which is necessary to carry on the underground development and permit of construction work being brought to a like stage on the surface. This coal is being removed through an 850-ft. slope on a 19-deg. pitch, the entrance to which is illustrated in Fig. 1. The slope is concrete walled to the coal and several hundred feet beyond, and is divided into two compartments. The lower of these is 11 ft. wide by 11 ft. high and will eventually be used for the transportation of materials and the removal of slate and refuse exclusively. The upper half is 11 ft. wide by 7 ft. high and is used as a manway. Over 400 concrete steps with 6-in. risers lead to the bottom. The two compartments with their concrete walls are waterproof and electrically lighted. They give the impression of the interior of a large building. At the bottom, concrete arches span the haulageways and are so built that it is not possible for a miner to cross over a haulageway directly. This is a decided innovation and is in strict accord with safety principles.

The tipple and hoisthouse for the slope are illustrated



FIGS. 2 AND 3. GENERAL VIEWS OF POWER-HOUSE, HOISTHOUSE AND TIPPLE

in Figs. 2, 3 and 4, and are of steel, concrete and brick construction. The upper half of the hoisthouse is built of brick and contains a single-drum, Nordberg hoisting engine, built by the Nordberg Manufacturing Co., of Milwaukee, Wis. It is equipped with a C. R. Welch automatic controller which forestalls any accident that might result from carelessness on the part of the operator at the end of the run. The hoist engine is operated by a 2200-volt, General Electric motor.

The lower half of the hoisthouse is of open construction so as to permit of the passage of cars to the tipple.

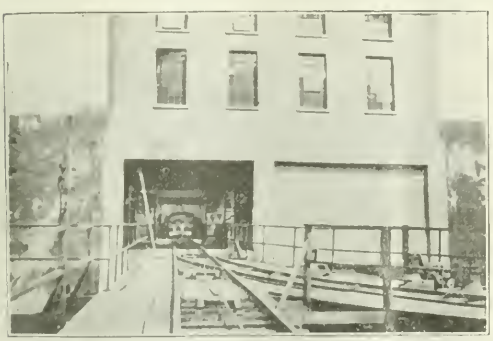
The cable from the hoist engine runs through an opening in the rear of the hoisthouse, to a carrier pulley on the end of the tipple and thence down through the tipple and under the hoisthouse. The tipple contains an electrically operated, two-car rotary dump, manufactured by the Wood Equipment Co. The small amount of coal that is at present being handled at this tipple is later loaded into river barges. A railroad siding off the Pennsylvania R.R. is now under construction and when completed will be 2 miles long. It will be used in conjunction with the main tipple.

FIG. 4. BIRD'S-EYE VIEW OF HOISTHOUSE AND TIPPLE

The fanhouse, as shown in the illustrations, is of brick construction and divided into three compartments, the middle of which contains a 6 x 10-ft. double inlet Jeffrey fan with a blowing capacity of 400,000 cu.ft. per minute. The air shaft is concrete walled and 20 ft. in diameter. The compartments on either side of the fan are used as motor rooms. One contains a 220-volt, direct-current Westinghouse motor and the other a 2200-volt, alternating-current Westinghouse motor. The fan is primarily intended to be operated from the alternating-current side. Connections from the fan shaft are made to both motors by means of a friction clutch which automatically puts the direct-current machine into operation in case the alternating-current motor is forced to shut down.

Power is purchased from the West Penn Power Co. for operating certain units of the surface plant. When completed, all of the different pieces of equipment will be electrically operated. At present this is not possible within the mine because of some gas having been encountered. It is believed, however, that by the time the plant is completed and working to capacity the gas will have been sufficiently drained off to permit of a complete electrical installation throughout. Present plans are being made toward that end.

The high-tension line of the West Penn Power Co., carrying 22,000 volts, is taken to an outside transformer station of 500-kw. capacity, where the current is reduced to 2200 volts. Provision has been made at the transformer station to permit of increasing it later to 1500-kw. capacity. Transformers built by the Pitts-



FIGS. 5 AND 6. LOOKING TOWARD HOISTHOUSE AND TIPPLE FROM SLOPE OPENING (ROTARY DUMP IN BACKGROUND) AND REAR VIEW OF FANHOUSE

FIG. 7. CONCRETE SEWAGE DISPOSAL PLANT (IN FOREGROUND), TRANSFORMER STATION AND FANHOUSE

burgh Transformer Co. are in use within a picketed inclosure.

A power plant is located adjacent to the slope and contains three batteries of Stirling boilers. It might be mentioned that this power plant is temporary and will be dispensed with as soon as it is considered safe to use electrical equipment underground. A brick partition separates the boiler room from the engine and motor room. A direct-current generator is at present being operated by steam. An alternating-current generator driven by a direct-current motor comprises the lighting apparatus for the mine and town. One Sullivan steam-driven air compressor and one Ingersoll-Rand electrically driven air compressor, both of 2500-cu.ft. capacity, are situated in the room adjoining the boilers and furnish the energy by which much of the present underground equipment is operated.

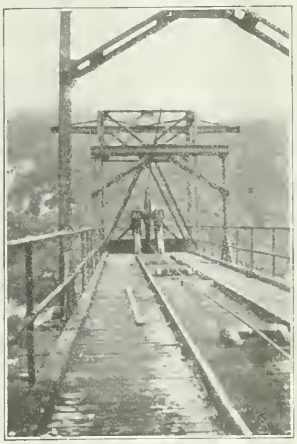


FIG. 8. END VIEW OF TIPPLE, SHOWING CARRIER PULLEY ARRANGEMENT

A pump room is adjacent to the power plant and contains a De Laval electrically driven turbine pump with a capacity of 480 gal. per minute. This machine is operated by a 2200-volt motor. Two emergency steam-driven pumps are at present used as spares. Water for the town and plant is available through five wells drilled to a depth of 150 to 175 ft. These are located at different points around the power plant. Each well is equipped with air lifts, the water flowing from each lift by gravity through a system of piping to the central pool near the pump room. From here it is pumped to water tanks on top of one of the nearby hills and thence flows to either town or plant supply by gravity. The water is excellent in quality and requires no treatment for boiler use. Cast-iron pipe is used throughout in the system of piping.

A spacious machine shop is located to the right of the tipple and is of brick construction. It is at present 80 x 105 ft. in dimensions but can be enlarged later to 200 x 105 ft. An elaborate system of skylights and windows gives a remarkably well illuminated appearance inside. Arrangements are being completed to install a 10-ton crane at an early date. The building contains space for a carpenter shop, tool room, supply room and an electrical equipment supply room. The railroad siding runs through the shop and makes possible the removal of supplies under cover. Numerous drilling and cutting machines as well as lathes are now in different stages of installation. Some have been completed and are in operation.

The only electrical equipment that has been installed underground is that for the lighting and telephone systems. The coal is at present being cut by Sullivan compressed-air turbine machines. Drilling is also being done by machines operated by compressed air. Forty-four-inch gage track equipment is used throughout the mine. The mine cars are of solid steel, rotary-dump type, with a capacity of 120 cu.ft. Two Goodman articulated storage-battery locomotives are in use on the main haulageways. The later installation of trolley wire will allow for a heavier type of locomotive to be employed, and the present ones will then serve as gatherers. In like manner will electric cutting and drilling machines be installed.

The drainage system in the mine is in an infant stage but will eventually be handled by a wood-lined electrically driven duplex Epping-Carpenter pump with a capacity of 800 gal. per minute. This type of pump is employed at present, but steam-driven. Another machine of the same type will be used as a spare.

The town is located about a quarter of a mile from the plant and reflects the same careful forethought that has been exercised in constructing the plant. It is situated on a hilltop above the mine and commands a fine view of the river and surrounding hills. One hundred and twenty-four houses of the bungalow type have been built, the majority of which are occupied. The designs of the houses are numerous and each is equipped with running water and electric lights, inside toilet, either shower or tub bath, and a laundry room in the basement. As can be seen in Fig. 11, there is not an outhouse in the town.

The houses are of frame construction with a deep brown stain on the weather-boarding caused by a creosote treatment. The walls are plastered and tinted. One of the features of the living room is an attractive open fireplace. The streets are

FIG. 9. VIEW OF OUTSIDE TRANSFORMER STATION

laid out to conform to the contours of the hill, which leaves no two houses on the same elevation and produces a staggered effect that is quite different from the ordinary straight-line run of houses found in most mining communities.

The streets are graded and have a firm crushed sandstone surface. A closed sewerage system is in effect that carries the waste from each house by gravity to a concrete disposal plant located near the fanhouse at the mine. This conforms to state regulations.

At a spacing of 500 ft. apart throughout the town are located small brick and frame buildings that cover a double-outlet fire plug. About 250 ft. of hose is placed in each of these buildings and furnishes adequate protection against fire. A schoolhouse of brick, concrete and stucco construction is nearing completion and is modern in every respect. It is constructed in an E-shape

FIGS. 10 AND 11. GENERAL VIEW OF A SECTION OF THE TOWN AND A CLOSE-UP OF ONE OF THE BUNGALOWS

and conforms to the ground upon which it is built. The rear wings are so designed that an addition can be made when the town has grown to an extent that will demand greater accommodations. Domestic science and manual training are a part of the educational plan.

Protestant and Catholic churches are in different stages of construction. An up-to-date frame hospital is located near the plant and away from the town. This arrangement gives quicker service to any men that may be injured at the mine. A company store is also maintained. The present building used for this purpose is temporary. The completed building will be a combination store and community theater and recreation room. The theater will be used for moving pictures primarily and has a seating capacity of 600. The seats are removable and the room can be thus converted into a place suitable for dancing.

The cars in a certain coal field were reported to hold a ton. In reality, however, they held two or three times that tonnage, though payment was made as for a ton of coal. A newly arrived British miner looked the car over and asked what it held. "A ton," was the answer. "Well," said the miner, "in which corner of the tub shall I 'put' it?"

Ammonia from Coal

By M. Meredith
Liverpool, England

The process of high-temperature carbonization with an efficiency of recovery approaching 80 per cent. can scarcely be said to provide much room for economic improvement. There is, however, one direction from which it is frequently assailed, and that is as regards the yield of ammonia.

The ordinary bituminous coal employed in gasworks contains on an average about 1.5 per cent. of nitrogenous organic matter, which represents a yield of nearly 160 lb. of sulphate of ammonia from each ton of coal, on the assumption that the whole of the nitrogen is recoverable in this form. As is well known, the yield in practice falls far short of the theoretical maximum, the returns of even the largest undertakings showing a recovery of only 26 to 27 lb., or about one-sixth of the quantity represented by the total nitrogen in the coal.

For some years attention has been directed toward recovering a greater proportion of the original nitrogen, but although plants for the generation of low-grade gas are operating successfully in this respect, the conditions under which the increased yield is obtained are scarcely consistent with ordinary gaswork methods. As an instance, mention may be made of the Mond gas system, by means of which an average yield of 96 lb. of sulphate of ammonia is obtained per ton of coal, a quantity which represents 25 lb. of ammonia, equivalent to 65 per cent. of the total nitrogen.

In view of the fact that there appears (in spite of the knowledge gained from war-time research) to be little enthusiasm for synthetic ammonia production on a large scale in Great Britain, and apart from low-temperature carbonization, there remains but one expedient by means of which the ammonia output can be augmented, and that is the possibility of turning to more efficient account the nitrogen of bituminous coals. Fortunately, the modern principles of carbonization appear to be moving in the right direction, for some considerable increase in the recovered ammonia has followed the new general practice of steaming the coal charge in continuously operated vertical retorts.

Details of the working of vertical retorts collected over a considerable period show that, with steaming carried out continuously, the normal yield of 35 gal. of ammoniacal liquor per ton of coal may be enhanced to something between 50 and 60 gal. The reason why this appreciable increase occurs has not as yet been definitely explained, but as ammonia begins to decompose at a temperature of 500 deg. C., and is almost completely broken down if it comes into contact with surfaces at 800 deg., it would seem that the steam, involving as it does an absorption of heat, exercises a cooling action in the retort and also acts as a shield to the ammonia vapors.

In this respect, it may be noted that the continuous vertical retort, unlike the horizontal pattern, is not subject to a stage in the distillation period when the temperature of the charge approaches that of the retort and thus the chief disintegrating influence is eliminated. Again, the work of Tervet and Beilby throws much light on the question. Tervet, in fact, succeeded in obtaining a yield of ammonia equivalent to 57 lb. of sulphate of ammonia per ton of coal, and he showed that if a stream of hydrogen is passed through the incandescent

coke remaining after carbonization, ammonia is formed by combination of the hydrogen with the residual nitrogen of the coke. This work was corroborated by Beilby, who employed a mixture of air and steam in lieu of hydrogen, so that the vertical retort process of today may be looked upon as a partial application to the gas retort of the principles made use of in the manufacture of Mond gas.

A later development which should also assist considerably in augmenting the yield of ammonia is the process of Perkin and West, whereby a stream of moderately low quality gas is passed in at the base of the vertical retort at such a rate as to carry the volatile matter away before degradation has time to occur. Although the method has for its primary object the preservation of the hydrocarbons, there can be little question that it must also reflect on the ammonia, for conditions of a thoroughly shielding nature are introduced, while synthesis is encouraged.

Some extremely interesting results have recently been published by Salmang, who endeavored to increase nitrogen recovery during the gasification of coke by adding chalk or oxide of iron to the bed of fuel in the generator. Varying mixtures of steam and air were passed through the fuel bed, and under the most favorable conditions 59 per cent. of the free nitrogen was recovered as ammonia, a figure which agrees closely with the yield obtained with the Mond gas plant. When, however, 5 per cent. of chalk was intermixed with the coke the proportion of nitrogen recovered increased as high as 96.3 per cent., while with 5 per cent. of oxide and iron added the figure was 70 per cent.

Salmang says that under given conditions of ammonia concentration and duration of heating the rate of decomposition of ammonia in the presence of steam is only about one-eighth to one-twentieth of what it is in a nitrogen atmosphere and without steam. In fact, the yield of ammonia is increased by the presence of steam in conjunction with a considerable excess of air. The effect of lime, too, was to increase the nitrogen obtained as ammonia up to 12 per cent. in the case of coke derived from coal, and up to as much as 100 per cent. when coke derived from peat was experimented with.

Experience at Cheltenham Gasworks

These results are certainly interesting in that they confirm to some extent the experience gained at the Cheltenham gasworks where, by adding a small quantity of lime (about 2 per cent.) to the raw coal before carbonization, it was found that the sulphate of ammonia recovered was augmented by some 2 lb. per ton of coal distilled, or an increase of from 8 to 10 per cent. Unfortunately, so long as gas of the present description is made, it is not possible to arrange for the atmosphere which is most amenable to maximum ammonia output—namely, a mixture of steam and air—while with the air excluded the maximum recovery obtained by Salmang was 20 per cent. less than with a steam-air mixture.

Further interesting work on the ammonia problem has recently been published in Germany by F. Sommer, who says that the maximum yield of ammonia with typical German coals invariably occurs when distillation temperatures between 800 and 900 deg. C. are employed. In contradiction to previous workers, who have shown that with high temperature carbonization about 50 per cent. of the total nitrogen of the coal remains in the coke, this investigator says that the greater proportion is there retained—namely, up to 79 per cent.

Sommer also corroborates the fact that the presence of steam has a tendency to conserve ammonia, and he accounts for this by suggesting that the ammonia under such conditions is present as the hydroxide (NH_4OH) which is comparatively stable. Moreover, he is of the opinion that the inclined chamber oven is productive of better results than can be obtained with the vertical retort, for the necessary conditions (shortened time of contact with the hot charge through rapid removal of the gas) are more readily obtained therein. A similar advantage is obtained by increasing the size of coke ovens and by lowering the level of the upper collecting flue so as to avoid undue heating of the gas as it passes out. Benzol, in addition to the ammonia, is thereby conserved particularly toward the closing period of carbonization when all the moisture has been driven from the coal. Speaking of moisture in the original coal it may be mentioned that although dry coal is looked upon as essential in the ordinary gasworks process there can be no doubt that, whatsoever the effect of moisture in other directions, it is certainly helpful in the way of ammonia recovery, as is shown by the large increase in this byproduct which is obtained when improperly dried washed coal is used.

Free Oxygen in Carbonized Coal

When coal is carbonized a small proportion of free oxygen is always evolved from the coal substance as distinct from that which may be drawn into the retort through ill-fitting floors. The oxygen has a decidedly lowering influence on both ammonia and benzene, which have comparatively low ignition temperatures. Sommer points out that the oxidation of ammonia by air begins at 150 deg. C. and increases in effect with rise in temperature. At 250 deg. 5.86 per cent. of the ammonia is oxidized, although moisture acts as a decided preserving agent. At 450 deg. 12.89 per cent. of ammonia was shown to be lost under dry conditions and 2 per cent. in the presence of moisture. It is interesting to note, however, that sulphuretted hydrogen, which is a primary product of carbonization and which is, therefore, invariably present in the gas mixture simultaneously with ammonia, is oxidized much more readily. It has accordingly a distinct protective action, particularly since—unlike ammonia—its tendency to oxidize is accentuated by the presence of moisture. Sommer found, in fact, that at 100 deg. C. 25 per cent. of the sulphuretted hydrogen was oxidized, and at 425 deg. 95.3 per cent. disappeared; whereas at the same temperatures under dry conditions only 0.26 and 1.48 per cent. was effected. Thus the sulphuretted hydrogen by its more ready action with oxygen tends to conserve the ammonia and prevent its destruction.

Professor Thomas Gray, who is at present in charge of the Fuel Research Station at East Greenwich, has stated that the ammonia formed during the earlier stages of carbonization is evidently a primary product; but as the heat penetrates the charge water still present in the interior is vaporized, and, along with the water vapor which results from the decomposition of the coal, passes through the highly heated and almost completely carbonized outer skin. It is then partly decomposed by the incandescent carbon, with the formation of carbon monoxide and carbon dioxide, while the hydrogen liberated unites with the nitrogen of the coke to form ammonia synthetically.

The production of the secondary ammonia was explained by Tervet, who expressed the opinion that the nitrogen in the coke can be liberated in the form of ammonia so long as the latter is brought into a state of strain which will prevent it from undergoing subsequent degradation. This state is effected by subjecting the ammonia to the superior affinity which exists between the combined nitrogen in the coke and free nitrogen at a particular temperature and in a diluting atmosphere. Thus, during the later stages of carbonization, when hydrogen is being freely evolved, the Tervet reaction comes into play and continues throughout the remainder of the period, though the ammonia which is formed toward the end of the process is, no doubt, decomposed to some extent.

The increased yield of ammonia at high carbonization temperatures is attributable to secondary reactions of this nature, and more especially to the action of hydrogen. It would appear, then, that there are considerable possibilities of augmenting the yield of this byproduct beyond the normal 26 lb. of sulphate of ammonia as at present obtained; and, though the admission of steam to the retort is playing a helpful part, there can be no question that further research in the direction of admitting hydrogen in the form of "stripped" coal gas or blue water gas would lead to the discovery of some interesting information. Some process of this kind would, moreover, be particularly easy of application in gasworks generally.

A Safe Powder Car

By H. H. Honaker
Crumpler, W. Va.

Keeping in mind the disastrous explosion of powder that occurred some time ago at Wilkes-Barre, Penn., and wishing to avoid any possible recurrences of such an accident in the operations over which I have charge, I designed and had built at the company shops the safety powder car shown in the accompanying illustrations. This car is employed exclusively for the transportation of explosives in the mines.

The car is built on a standard-gage truck. The sides are of 1-in. oak and the bottom of 3-in. oak. Both sides and bottom are lined with 1-in. tongued and grooved flooring, this lining being raised or separated from the true car bottom by 1-in. strips upon which the lining is laid. The top consists of a "ridgepole" to which is hinged a door upon either side. These doors are built up of an outer layer of planking and an inner layer of tongued and grooved flooring, between which is placed Paroid roofing. The entire top of the car is also covered with this material.

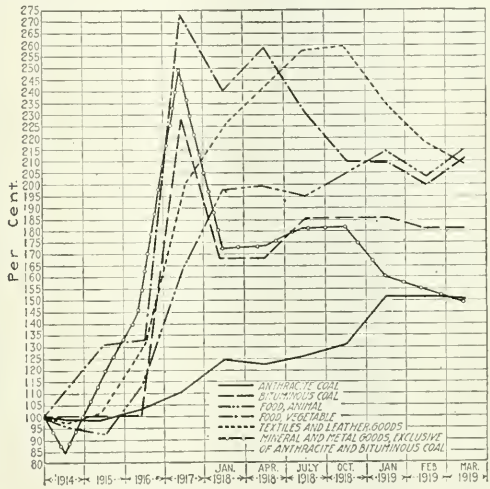
The interior of the car is divided into 36 compartments, each 11 in. square, for the reception of the miners' powder jacks. At no point can one of these containers come in contact with any metal whatever.

The car is 10 ft. 9 in. long over all and stands 3 ft. 2 in. high above the rail. The inside dimensions are: width, 3 ft. 10½ in.; length, 9 ft. 1 in.; height at eaves, 11 in.; at gable, 19½ in.

Miners are transported to a point convenient to their working places by man trip while this powder car is taken in by a separate locomotive.

Price Movements in War Times

Present-day concern over the cost of living gives point to the official price comparisons, issued from time to time by the United States Bureau of Labor Statistics in its Monthly Labor Review. The bureau gives comparisons of current wholesale prices of 51 commodities in ordinary everyday use with those that obtained dur-

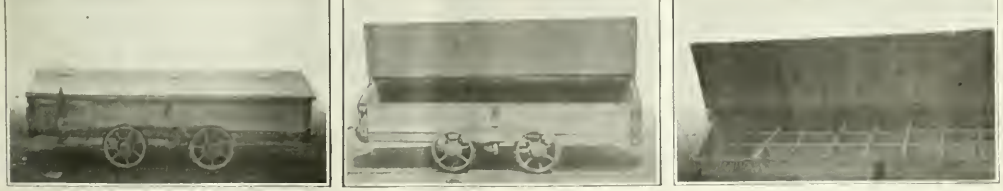


FLUCTUATIONS IN AVERAGE PRICES FROM PREWAR PERIOD TO MARCH, 1919

ing the world war and immediately before it. The latest comparisons issued by the bureau bring the statistics down to Mar. 31.

On the basis of these official Government figures two interesting charts have been prepared. One shows in a graphic way the percentages of increase as of Mar. 31, and the maximum of increases which occurred during the war period, the 1913 prices being the basis of comparison.

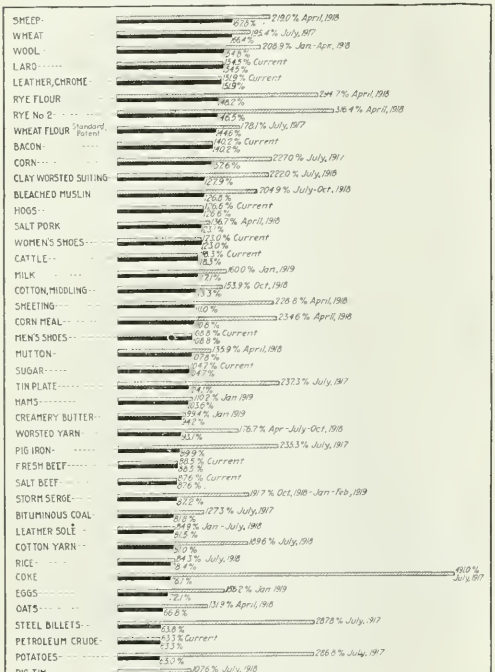
Sheep, for example, showed the largest percentage of



OPEN AND CLOSED VIEWS OF A CAR DESIGNED SOLELY FOR THE TRANSPORTATION OF EXPLOSIVES

increase as of Mar. 31, being 167.8 per cent. Sheep reached the maximum of advance in April, 1918, when 219 per cent. is recorded. Wheat was 166.4 per cent. above the 1913 price on Mar. 31, but was as high as 195.4 per cent. in July, 1917.

Food products showing the largest advance were rye and rye flour, 316.4 per cent. and 294.7 per cent. respectively in April, 1918, and both about 150 per cent. over the 1913 price in March of this year. White potatoes, which touched an advance of 286.8 per cent. in July, 1917, have gone back to 63 per cent. Coke was the champion skyrocket, having advanced 491 per



PERCENTAGE INCREASE IN PRICE OF 50 COMMODITIES

cent. in July, 1917, then dropping back until its net advance in March was about the same as the advance in soft coal. Metals had a meteoric career. Spelter registered a maximum advance of 279.3 per cent. by July, 1915, and dropped back to 12.1 per cent. by March of this year. Steel billets tried to keep pace with coke, and did get as high as 287.8 per cent. over the 1913 level in July, 1917, then coming down to 63.8 per cent. advance in March, 1919. Pig lead fell from its high of 159.1 per cent. to 18.2 per cent., while electrolytic copper, which advanced 102.5 per cent., was 3.8 per cent. under the 1913 price in March.

Anthracite, nut size, showed a maximum advance of 51.5 per cent., reached in January of this year, following the wage increase granted to the miners as of Nov. 1, 1918. The only commodities in the list of 51 which have consistently shown, during the whole period, less percentages of advance than anthracite are refined petroleum and gasoline. Their maximums were 47.2 per cent. and 45.8 per cent. respectively in March.

Another chart shows commodities grouped according to vegetable and animal foods; textiles and leather goods; minerals and metals, exclusive of coal; bituminous coal and anthracite. The fluctuations are shown by the averages (not weighted) of the groups, starting with 1913 prices as 100. They are shown by years from 1914 to 1917, by quarters in 1918 and by months in this year.

Vegetable foods showed a declining tendency through 1918 and until February, 1919, but were advancing in March. Market reports and current news accounts would indicate that this advancing tendency has continued during the spring and summer. Animal foods showed an advancing tendency, with two slight recessions, and are continuing to advance. The chart shows clearly the effect of the armistice on mineral products and textiles, and the relatively slight advance in the price of anthracite is seen to follow the advancing trend of wages—increases having been given in May, 1917, December, 1917, and November, 1918. The slight recession, followed by an upward movement in 1918, shows the effect of the 30-cent summer reduction in effect from May to September, and the decline in March, 1919, was due to the temporary disappearance of differential prices during the slump of February and March.

The whole story of the charts is that, with the exception of gasoline and refined petroleum, anthracite has added less proportionately to the increased cost of living than any other commodity commonly used, in spite of the fact that advances in wages and in the cost of supplies has more than doubled the cost of producing hard coal.

The Real Test of First-Aid Training

By J. Kenvin
Jeddo, Penn.

First-aid contests are valuable in many ways, yet it seems that the final and best test of a team's training lies in the number of days these men save for their fellow workers through proper care. If through unwise attention a worker becomes infected and loses time from an injury that should have been an easy case, although that colliery team may have won by a perfect score in its field meet, it has failed seriously, after all.

First, last and always, any group of trained fellows should be "first-aid men"; and to be this requires close attention and skill. The tendency among doctors and men who follow first aid as a hobby is toward making physicians of the teams. Some of the questions asked in "meets" are such as would tax a surgeon to answer promptly and properly.

In actual practice in some dark and narrow mine working, all the daylight plans of help go by the board and it becomes a question of getting the injured man to the "bottom" as soon as possible. Thus it would be a fair and just procedure to make the record of actual accidents, days lost, recoveries and deaths form the real basis for judging any team's fitness and the return the employer was getting for training these men.

Experimental-Retort Tests of Orient Coal*

By R. S. McBride† and I. V. Brumbaugh‡
Washington, D. C.

SYNOPSIS—*The experiments here described were conducted in order to determine the effect of coking temperature upon the quantity and quality of the coke and gas produced. The results secured are compared with those obtained when using other coals. However, definite conclusions should not be drawn from the data here presented.*

THE Bureau of Standards, in connection with two special coke-oven tests, found it desirable to investigate the influence of temperature of coking upon the quality of the coke produced and upon the quantity and quality of gas made from the coal. Although several quite similar coals were used in the oven tests, the experimental-retort work was limited to coal obtained from the Orient mine of the Chicago, Wilmington & Franklin Coal Co., located at Orient, Illinois. The data obtained from the coking tests with this coal at various temperatures are of such general interest that they are presented here.

A series of five experimental-retort tests was made at various temperatures. The coking was done in a cylindrical retort of cast iron, set up as shown in Fig. 1. This apparatus was made available to the Bureau through the courtesy of the Bethlehem Steel Co., Sparrows Point, Md., which has used this equipment regularly for trying out coals or mixtures of coals intended for its byproduct coke ovens. Data of a few similar retort tests on a variety of other coals which have been tested at this plant are presented for comparison.

Apparatus and Method Used

The cylindrical retort, shown in Fig. 1, was inclosed in a refractory-brick setting approximately 3 ft. in each dimension. It was heated by a large bunsen-type burner, using coke-oven gas. The sample of coal to be tested was pulverized and dried thoroughly, generally by allowing it to remain over night in an oven at approximately 100 deg. before introduction into the small cast-iron box used to hold the charge. The retort was heated up to a temperature from 60 to 100 deg. C. above the temperature desired for the test in order to allow for the unavoidable rapid cooling that takes place when the lid of the retort is opened for introduction of the charge. Immediately after each charge was placed in the retort an oil soaked rag was thrown in. This rag quickly took fire and exhausted the oxygen in the retort space, thus eliminating the possibility of an explosion as the gases from the coal were generated.

The temperature of the retort was maintained at the desired point according to the indications of thermocouple T_1, the location of which is clearly shown in Fig. 1. Thermocouple T_2 furnished auxiliary temperature readings, but these were not used as the basis for temperature control. After introduction of the charge the lid was quickly closed and mudded up to prevent gas leakage. The gas driven off from the coal was discharged from the retort through the outlet pipe shown in the figure. As soon as the gas from the coal began to appear at a purge cock in this line, this purge cock was closed and the gas allowed to flow into a small storage holder in which the entire volume generated from the charge was collected. During the test period record was taken at intervals of 5 min., showing temperatures of T_1, T_2, the volume of the gas collected in the holder, and the temperature of this gas. When the charge ceased gassing the coke was removed and quenched, and a record made of the barometric pressure and of the temperature and volume of the gas in the holder.

After quenching, the coke was examined thoroughly, a description recorded, and an average sample prepared for analysis. The gas collected in the storage holder was analyzed, the candlepower and specific gravity determined, and the heating value calculated from the analysis. From these data were calculated the B.t.u. in the gas per pound of coal carbonized, the cubic feet of gas per pound of coal, and the candle-feet per pound.

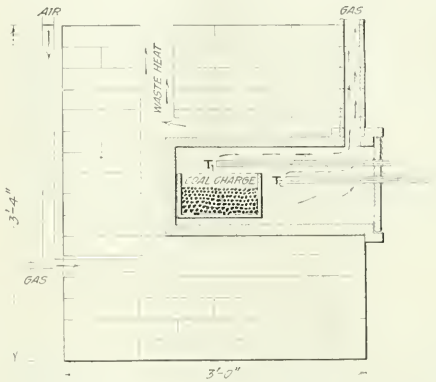


FIG. 1. EXPERIMENTAL RETORT

The coal used for four of these tests was that remaining from the sample taken at St. Paul, Minn., when the Bureau tested the coke plant of the Minnesota By-Product Coke Co., using Orient, Ill., coal. For the fifth test there was another smaller sample remaining from another shipment of Oregon coal used by the Bureau in a separate coke-oven test at Dover, Ohio. Table I gives the analysis of these coal samples as used in the retort tests. These analyses agree closely with those of the carefully prepared samples analyzed by the Bureau of Mines in connection with the plant tests mentioned above. The results of these tests, therefore, can be regarded as typical of the results for the larger shipment. Table II shows the size of the coal as crushed for the retort test.

The results of the five retort tests are given in Table III. In considering these data it must be borne in mind that only a limited number of tests could be made because of the small samples and the short time available for the work. One should be careful, therefore,

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TABLE I—ANALYSIS OF ORIENT COAL AS USED IN EXPERIMENTAL-RETORT TESTS (DRY BASIS)

	Sample from— St. Paul, Minn.	Dover, Ohio
Volatile matter	37.8%	38.0%
Fixed carbon	52.3%	53.4%
Ash	9.9%	8.6%
Sulphur	0.87%	1.47%
Phosphorus	0.007%	0.002%
Total carbon	73.0%	76.3%
Hydrogen	5.1%	5.3%
Oxygen	9.9%	8.5%
Ratio: Hydrogen-oxygen	51.6%	62.6%
B.t.u. per lb. (dry)	12,800	13,000
B.t.u. per lb. (dry and ash-free)	14,200	14,200

not to try to draw too many conclusions from these results.

Test No. 1 was made as nearly as possible to duplicate the usual temperature conditions of testing followed by the Bethlehem Steel Co., so that a basis for comparison of this coal with others would be available. In this particular test the gas for heating the retort was cut off completely 40 min. after the introduction of the charge. The data from this test are the only ones which can be compared with the results given in Table IV for other coals. The coke from this sample was fairly good, and the charge was thoroughly coked, showing considerable contraction in the sample box. The pieces were the medium size with no evidence of sponge and only a small amount of fine pebbly material on top of the coke. The coke had small and regular cell structure,

TABLE II—SIZES OF CRUSHED COAL AS USED IN EXPERIMENTAL-RETORT TEST

Mesh	Percentage Through Sieve
8	99.7
10	89.5
20	50.8
30	36.7
40	30.3
60	19.3
80	13.3
100	11.0

but was soft, shattering rather easily, with a tendency for longitudinal fracture, but no distinct cross-fracture. It was light in weight and of a dark silver color.

Test No. 2 was made at as nearly as possible constant vapor temperature (T_1) of 775 deg. C. This was approximately the average temperature of the vapor above the coal as recorded in the test of the coke plant of the Minnesota By-Product Coke Co., St. Paul, Minn., when the coking time was approximately 19 hr., but it is probable that for the same temperature of retort as of oven the vapor temperature in the retort would be higher than the corresponding vapor temperature in the oven. The coke results obtained in this case should probably, therefore, be more nearly comparable with the results of special oven tests made at St. Paul when coking time was approximately 25 hr. The coke from this test was fair, contracted in the box and broke up into large pieces with no sponge and only a small amount of fine material about $\frac{1}{8}$ in. thick on the upper surface of the mass. It had small and slightly irregular cell structure; but as a whole the coke was clean, soft, and somewhat tougher than in test No. 1, with longitudinal fracture but no cross-fracture. It was slightly heavier than the material from test No. 1 and of dark color.

Test No. 3 was made with the idea of obtaining results at a somewhat lower vapor temperature above the coal than the average prevailing in the St. Paul test, but higher than noted in the other tests made by the Bureau at Dover, Ohio, where the vapor temperature above the coal averaged about 550 deg. C. It was attempted to maintain an average throughout for T_1 of 600 deg. C., and the results correspond closely to this temperature. Judged by the results of this test, the coal would normally be characterized as only semi-coking at this temperature, for the coke was quite poor. There was some contraction in the box and no sponge formed, but there was a large amount of loose material, which appeared almost uncoked, on top of the larger pieces of coke. The cell structure was small and highly irregular. Because there was a poor cementing action,

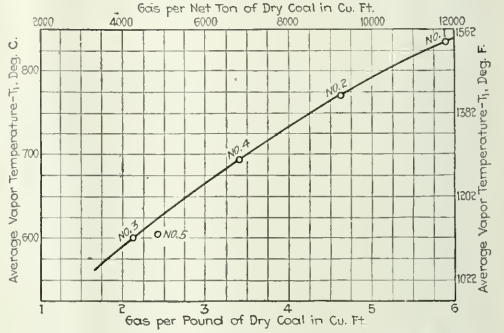


FIG. 2. RELATION OF GAS YIELD TO VAPOR TEMPERATURE T_1 FROM EXPERIMENTAL RETORT TESTS

even the large pieces were soft and easily broken in the hand. The material was fairly heavy, with decided longitudinal fracture and no marked cross-fracture. The color was extremely dark.

For *Test No. 4*, in view of the poor results judged by the character of the coke obtained in test No. 3, it was decided to conduct this test at a somewhat higher temperature. The effort was to maintain T_1 constant at 700 deg. C. throughout this test. Even at this temperature the coal would be characterized as semi-coking, although the coke was superior to that in test No. 3. It showed contraction in the sample box, large pieces, and

TABLE III—EXPERIMENTAL-RETORT TESTS OF ORIENT COAL

Test number	1	2	4	3	5
Date	Jan. 14, 1919	Jan. 15, 1919	Jan. 17, 1919	Jan. 16, 1919	Jan. 18, 1919
Temperature average T_1, (deg. C.)	840	775	700	600	605
Weight of dry coal (lb.)	4.48	4.00	4.00	4.00	3.20
Gas generated (cu.ft. at 30 in. 60 deg. F.)	26.3	18.5	13.6	8.5	7.8
Gas per lb. of dry coal (cu.ft.)	5.87	4.62	3.40	2.12	2.44
Gas per net ton of dry coal (cu.ft.)	11,750	9,250	6,800	4,250	4,850
Candlepower of gas	5.4	10.0	12.2	15.7	15.9
Candle-feet of gas per lb. of dry coal	31.7	46.2	41.5	33.3	38.8
Specific gravity of gas	0.465	0.510	0.625	0.660	0.655
Analysis of gas: CO_2	4.7	5.1	8.2	7.2	8.2
O_2	1.0	1.3	1.0	0.8	1.6
Hl	2.2	3.1	3.8	5.0	5.2
CO	17.3	13.6	11.3	8.1	8.3
CH_4	25.1	30.6	36.6	37.1	39.5
H_2	46.3	44.7	33.6	30.3	26.0
N_2	3.4	1.6	5.5	11.5	11.2
Heating value, calc. from analysis B.t.u.)	510	570	600	610	625
B.t.u. in gas per lb. of dry coal	3,000	2,630	2,040	1,300	1,520
Coke formed: Large (lb.) dry	2.99	2.66	2.79	2.72	2.19
Loose material (lb.) dry	0.04	0.06	0.17	0.21	0.19
Total (lb.) dry	3.03	2.72	2.96	2.93	2.38
Coke yield: Large (per cent of dry coal)	67.0	66.5	70.0	68.0	68.5
Loose material (per cent. of dry coal)	1.0	1.5	4.0	5.0	6.0
Total (per cent. of dry coal)	68.0	68.0	74.0	73.0	74.5
Coke analysis (dry basis): Volatile	5.3	7.1	7.1	11.5	14.0
Fixed carbon	80.2	79.1	.....	.....	74.2
Ash	14.5	13.8	.....	.....	11.8
Sulphur	0.78	0.78	.....	.....	1.23
Phosphorus	0.014	0.014	.....	.....	0.004

TABLE IV—EXPERIMENTAL RETORT TESTS OF OTHER COALS

Data Furnished to Bureau of Standards by the Bethlehem Steel Co. All Tests 4 48 lb. at Approximate T_1, Average of 850 deg. C.

Date	May 11, 1918	Sept. 18, 1918	May 16, 1918	May 10, 1918	May 10, 1917	Dec. 6, 1917	May 8, 1917	Feb. 11, 1917
Coal	40% Washington 60% Quemahoning	50% Gauley 50% Pocahontas	Washington	Quemahoning	Morrell, Fayette County, Penn.	Logan County, W. Va.	Mt. Pleasant, Fayette County, Penn.	Tip Top, Fayette County, Penn
Coal Analysis: Volatile	25 42	28 85	33 02	17 23	31 20	26 08	31 55	30 63
Fixed carbon	66 58	63 98	58 51	75 45	57 80	45 95	59 86	59 07
Ash	8 00	7 17	8 47	7 32	11 00	27 97	8 59	10 30
Total carbon	79 63	79 69	77 78	83 15	72 26	59 77	72 45	70.71
Hydrogen	4 72	4 85	5 05	4 48	4 30	3 82	4 41	4.16
Oxygen	6 35	7 05	7 40	3 75	11 01	7 14	13 25	13.63
Ratio: H/O	74 33	68 79	68 24	119 46	39.05	53 50	33 27	30.52
Gas per lb. of coal (cu.ft.)	4 50	4 55	5 10	4 50	5 17	3 49	5 02	4 08
Gas per net ton of coal (cu.ft.)	9,000	9,100	10,200	9,000	10,340	6,980	10,040	8,160
Candlepower of gas	8 0	6 2	8.5	3 7	1 2	10 6	2 6	2 3
Candle-feet of gas per lb.	36 0	28 2	43 3	16 7	6 2	37 0	13 1	9 4
Specific gravity of gas	0 400	0 476	0 440	0 424	0 450	0 466	0 495	0 551
Analysis of gas: CO_2	3 1	4 5	4 1	2 3	5 6	4 4	8 0	10 8
O_2	0 9	0 5	0 7	0 8	0 6	0 6	0 4 *	0 7
Ill	2 5	2 0	2 6	1 6	1 4	3 1	1 9	1 6
CO	10 4	12 6	11 7	9 9	15 6	8 6	15 5	14 6
CH_4	29 3	31 5	30 8	27 0	21 5	35 0	24 0	26 5
H_2	52 8	46 8	47 5	57.0	51 1	46 1	48 4	42.7
N_2	1 0	2 1	2 6	1 4	4 2	2 2	1 8	3.1
Heating value calc. from analysis (B t.u.)	557	556	561	526	465	600	492	490
B.t.u. in gas per lb. of coal	2,510	2,530	2,860	2,370	2,410	2,090	2,470	2,000
Coke obtained	Extra good* Shatter Test 80%	Good* Shatter Test 66%	Fair* Fingery Sponge Shatter Test 52%	Good	Semi-Coking Coal	Semi-Coking Coal	Non-Coking Coal	Non-Coking Coal

* These results refer to coke from full-size oven tests.

no sponge; but there was a large amount of loose and apparently uncoked material on top of the coke. The small and somewhat irregular cell structure, with soft friable material resulting from a poor bond, corresponds to what would be expected from the results of previous tests. The material was fairly heavy, with typical longitudinal fracture and no cross-fracture, indicating that at this temperature there was a decided tendency to secure blocky coke rather than that of a fingery shape. As in the previous test the material was dark in color.

Test No. 5 was run with a small sample of coal remaining from the Dover test, in an effort to duplicate the conditions of test No. 3, namely an average for T_1 of 600 deg. Although this coal came from an entirely different shipment from that used at St. Paul, the results were almost exactly the same as from the test No. 3, made at the same temperature.

By comparison of the results for the five tests, the large influence of temperature of coking upon the quantity and quality of gas is evident. In Fig. 2 is shown graphically the change in quantity of gas per pound of coal carbonized with changing temperature. In this connection it should be noted that the higher temperature results represent not only a more complete elimination of the volatile material from the coal, but also a decomposition of the heavier volatile material into the gaseous constituents. Naturally, as the vapors leaving the coal are subjected to this greater decomposition at higher temperature, the average heating value of the gas is diminished. This diminution of heating value per cubic foot is, however, by no means enough to offset the effect of the larger volume, as is shown by the fact that the B.t.u. in the gas per pound of coal carbonized at 840 deg. is almost double that at 600 deg.

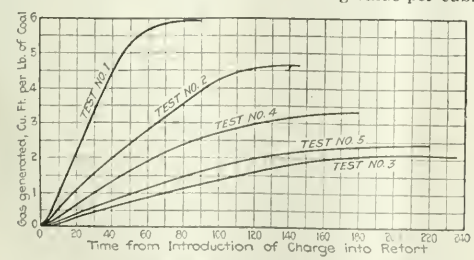


FIG. 3. GAS GENERATED IN EXPERIMENTAL-RETORT TESTS

Fig. 3 shows the influence of temperature upon the rate at which the gas is generated and, of course, also the influence of temperature upon the time required for complete gasification of the charge.

As would be expected, the amount of volatile matter left in the coke decreases as the temperature of coking increases; and correspondingly with more volatile matter in the coke the yield is higher. However, at the lower temperature the percentage of fine material is much greater and the quality of coke much inferior. In this connection, however, it should be noted that in none of the coking tests was it practicable to secure temperatures as high as are frequently used in oven practice with coals that are regarded as specially suited to the production of metallurgical coke. If such higher temperatures had been used another influence noted in connection with the St. Paul test would probably have appeared, namely, that at the high temperatures there is great tendency for the coke to be brittle, fingery and small, instead of fairly tough and blocky.

As pointed out above, great care should be exercised in drawing the conclusions from these few tests. However these few conclusions are strong confirmation of the results of the special oven tests made at St. Paul and are, therefore, a valuable bit of supplementary data, which it is hoped will be of interest to the byproduct coke-oven operators in general, but most especially to the operators who use Mid-Continent coals.

For sake of comparison there are included in Table IV data for other coals similar to the data given in Table III for the Bureau's tests of Orient coal. A general comparison of these data is interesting, but no detailed conclusions should be drawn, as comparison of such single tests is apt to be misleading.

AN OBJECTION to the use of powdered coal as fuel is that none of the byproducts is saved in this method of combustion. Some processes which include a saving of part of the volatile matter before the fuel is pulverized for use in that form would have conservation advantages.

Some Boiler-House Economies

By E. P. Humphrey
Lehigh, Penn.

SYNOPSIS—*In the economies effected at many collieries in recent years the boiler house has been often neglected. The amount of coal consumed for power purposes is often underestimated as increased load is frequently lost sight of. A carefully conducted test will in many cases rectify existing errors and point the way to greater efficiency in operation.*

THERE have appeared in *Coal Age* lately some highly interesting articles and discussions on the subject of fuel conservation in general, and the great waste of our natural resources not only in their production but for power-generating purposes. In looking over the various tonnage reports for the anthracite field one can find that about 12 per cent. of the coal prepared for shipment is consumed by the colliery plants for power, principally in making steam. In many cases the quality of the fuel burned at the colliery is poor, and this material would not find a ready market; but more often this is not the case.

At the present time much stress is being brought to bear upon the operator concerning his costs. The various operations in and about the mines have been speeded up and made more efficient because of the advent of electrically operated mining machinery. The breaker and outside forces have been trimmed down, machinery replacing much manual labor, but as is often the case the boiler house has been untouched. One of the reasons is that few, if any, plants have reliable knowledge of the amount of coal consumed. This is generally estimated, and the amount thus determined is used for each month, winter and summer, regardless of any change in the load.

Ignorance of True Operating Conditions

In this regard it may be of interest to relate a somewhat amusing instance of this very thing. A suspension was coming at an anthracite colliery and enough fuel, as estimated, was stocked to tide over the shutdown. All went well until the time had about half passed, when the supply was exhausted. No doubt when the fuel had been estimated originally it was nearly correct, but the increases in load had not been considered. This opened the eyes of the officials, who later ran some complete tests in order to ascertain the true operating conditions.

On the other hand, it seems as if there was a great mystery connected with the operation of a boiler plant. It is not uncommon in the ordinary colliery plant, when the fuel is muddy or inferior, for the steam pressure to go down. The bosses then start "yelling" at the firemen, causing them in some cases to "walk out," making much trouble. Many operators will dodge the boiler plant and let it worry along, believing that by letting it alone they keep out of trouble. Furthermore, they frequently give the firemen better coal than is really necessary, in order to keep them quiet and on the job.

The economic standing of a boiler plant may be had from the simple relation of the water evaporated per pound of coal as fired. This is not a difficult ratio to find, and in the following discussion it is the intention to show how simple and easy it is to determine this relation, what it should be and, if not, how to find and remedy the losses without too much theoretical detail.

Theoretically, one should get about 15 lb. of water evaporated, "from and at," per pound of coal, but this has never been done. With good coal and boiler conditions, 8 lb. has been the highest I actually know of for a hand-fired furnace. I was present at the test giving this result and which lasted 7 days. The coal contained the following sizes: Pea, 0.50 per cent.; buckwheat, 19.47; rice 18.96; barley, 43.77, and No. 4 buckwheat, 17.30 per cent. By analysis the coal had a heat value of 12,357 B.t.u. per pound. The ash as withdrawn from under the grates contained 25 per cent. fixed carbon. The sizing of the coal was as follows: $\frac{9}{16}$ in. for pea, $\frac{5}{16}$ in. for buckwheat, $\frac{1}{4}$ in. for rice, $\frac{3}{32}$ in. for barley and $\frac{1}{16}$ in. for No. 4 buckwheat, all round-mesh screens. The coal was clean and fired wet, carrying on an average of 7 per cent. hydroscopic moisture.

Average Evaporation in Hand-Fired Furnaces

The average evaporation in ordinary colliery work for hand-fired furnaces is from 3 to 5 lb. of water per pound of coal, with some plants working below this and some going above it. A great variety of conditions affect this result. In many cases the boiler plant receives less attention than any other aggregation of equipment at the colliery.

If the operator is to know whether his plant needs attention, he must make a fair test of the amount of coal burned and the water evaporated for a period of not less than 24 hours. This is the first and, you might say, the rough test. If the plant is larger than 1000 hp., this will mean some extra help to weigh the coal. If no other means are at hand, this can be done by cleaning the floor in front of the boilers and having the weighers load the coal in boxes or wheelbarrows, the tare being known, and dumping the coal in this cleared space, always keeping sufficient fuel at hand for the firemen, so that there will be no delays with consequent keeping of the fire door open.

Some have found it convenient to use a box of known capacity, which is always filled level full before dumping. This method is not exactly accurate, as the coal will lose from 3 to 6 per cent. of its moisture after standing over night, thus makig a difference in the true amount of material as fired. Conditions of coal supply are quite variable, so that the person conducting the test can work out his own method from them.

In measuring the water, various methods may be followed. Some plants are metered, but the best of meters slip some, so that they should be calibrated by running the water into known volumes and checking this with the meter reading and then using the proper factor. Others may have a convenient tank that can be measured. If neither of these is available, the pump can be calibrated, as to its capacity per revolution, by throttling its discharge so as to make the pressure the same as the boiler pressure, measuring the quantity

pumped, and carefully noting the number of revolutions. Then, when testing, a revolution counter may be used. The piping arrangement will be about as shown in the accompanying diagram.

The level of the water in the gage glasses should be marked at the start and the fed should be so regulated that at the finish of the test it will be at the same level. At plants where there are several fires to be cleaned that cannot be cleaned at the same time, it is best to start the test between cleaning periods. The thickness of the fuel should be measured at the start and at the finish, and if not the same the difference estimated.

In a test of this sort the operator wants the true operating conditions and for this reason should have a dependable person on hand to guard against any faking. In one instance in a plant consisting of four batteries, a fuel consumption test only was run. Believing that the consumption of each set was identical,

PIPING ARRANGEMENT FOR MEASURING WATER

even though of different makes of boilers, the test was run on only one battery. The final result for the entire plant was to be four times this unit's consumption. As it happened, in this case the firemen had been dissatisfied and wanted more money, so they forced this one battery and ran the total consumption up tremendously high, thus adding to their argument for a wage increase in consideration of the amount of coal they fired. A fuel-consumption test alone shows nothing as to the operating conditions. As mentioned above, the water evaporated in relation to the fuel burned is the true index. A sample of the ashes should be washed with water and its appearance noted. If possible, it should be analyzed.

The amount of water evaporated per pound of coal may be far from satisfactory. In such a case a real investigation should discover the trouble and show how to rectify it. A small sample of the coal from each barrow or box as fired should be placed in an air-tight container and the entire sample thus secured and analyzed. Frequently a large percentage of hygroscopic moisture is present. This water must be evaporated and the resulting steam superheated to the flue temperature. The heat loss for each 1 per cent. of moisture figured on coal of 13,000 B.t.u. thermal content is nearly one-tenth of 1 per cent., and it is not uncommon for colliery boiler fuel to run from 10 to 15 per cent. moisture. For the fine coal, which has often a tendency to cake, this moisture aids the combustion mechanically by tending to break up the fuel bed.

The ash content of the coal is the most important consideration next to the calorific value. Ordinary boiler coals generally carry from 18 to 25 per cent. of ash. This means that the heat value is cut down to about 75 to 85 per cent., besides the greater liability of clinkering and clogging the fuel bed, the higher drafts required and the additional expense for the ash disposal.

A large per cent. of unburned carbon may be present in the ash, and generally this runs from 5 to 25 per cent. The reasons for this may be the poor quality of the coal, poor condition of the grate bars, or forcing the fire too hard as well as careless cleaning of the fires, the fuel either not being sufficiently burned before cleaning or too much attention being given to shaking the grates and slicing. I have noticed also that when firing of fresh coal is performed over the pile of ashes that have just been pulled out of the furnace, that considerable loss is caused by the coal spilling from the fireman's shovel onto the ash pile.

The quality of coal burned is sometimes of the poorest. It may not have the culm all washed out, or if there is some stripping or river coal in it there may be considerable sand present. In one case where coal was carried to a small isolated steam plant having two return tubular boilers and where the fireman was the ashman, it was found that 4 tons of No. 1 buckwheat were required instead of 14 tons of Nos. 2 and 3 buckwheat, giving much better steaming with less ashes, this consideration alone saving the services of one man. Thus in certain cases it pays to use a high grade of fuel.

Sizing of Fuel Is Important

The sizing of the fuel is an important factor. Coal of uniform size burns with less draft on account of not packing. High drafts make blow holes, causing a tremendous waste of heat through the heating of all the excess air. I have found with hand-fired furnaces with stationary grates that far better results were obtained by not forcing a boiler beyond its rating. For example, in a 1000-hp. plant of four 250-hp. units, less coal was fired and less ashes made than when running on three boilers at 133 per cent. rating. In the latter case more coal was fired and the ashes were high in fixed carbon.

The feed water should be delivered to the boiler as hot as possible. Heating of the feed water by exhaust steam means a saving of about 1 per cent. of the fuel for each 11 deg. F. rise in temperature.

The exhaust from the auxiliaries should be turned into the heater and, if there are any other sources at hand, enough of these should be used to bring the water up to about 210 deg. F. for an open heater. An open heater is the most economical. In such a heater it requires 1 lb. of exhaust steam for each pound of water at 50 deg. to raise it to 210 deg. If there are no other sources available, turn live steam into the heater. There is of course no saving in this and no loss except that from radiation. The reason for doing it is that the feed water will be as hot as possible when entering the boiler, and will not chill it, causing leaks arising from unequal expansion, as in nearly every case boilers are fed intermittently. Even if fed by automatic

regulators (which sometimes do not feed constantly) cold water is not desirable. I believe, however, that feed water regulators should be installed, for they keep the water at the best steaming level and do away with a water tender.

The feed water should carry as little sediment, corrosive and scale-forming elements as possible. It may and should be treated if it contains any appreciable amount. There are several processes for doing this. Some treat the water cold, others hot. The hot process is apparently the best.

Scale, sediment and dusty flues decrease markedly the steaming ability of a boiler. Dirty and scaly flues should be carefully watched, as flues in this condition not only reduce the efficiency of the boiler but are dangerous as well. It is estimated that the scale and soot resistance to heat transfer is ten times that of the metal itself. Therefore the soot and dust should be blown from the tubes at least once a day.

The draft should be supplied by a blowing fan. Some plants employ two fans, one being held for emergency. It is good practice also to have two pumps. The pumps should be provided with a water pressure regulator which will govern these machines so as not to permit them to burst any pipes should all the valves be closed with full steam on the pump. Some plants supplement their blower equipment with steam blasts or steam turbine blowers. Either of these is less efficient as regards steam consumption than the blowing fan unit and should not be used except for emergency purposes. The value of a steam blower was well explained by W. D. Owens in his article in *Coal Age*, Jan. 9, 1919, page 53. in which he shows that 20 per cent. of the power of the blower plant is consumed in its own operation. Theoretically, it is more efficient to build a chimney of sufficient size and height to give the proper amount of drafts. This is not often practical because of the great height often necessary to produce sufficient draft, because of the load and the quality of coal. However, the chimney should be proportioned so that a slight vacuum, at least, is maintained above the fuel bed. When flames may be seen coming out around the fire doors, it indicates that more air and gases exist within the furnace than the chimney can handle. The practice of blowing a fire too hard, or employing chimneys too small, results in inefficiency as there is a large velocity of gases through the flues and the stack temperature will be high; furthermore, there is danger of warping the boiler front and burning off the fire doors.

The boiler doors, fire doors, air doors, inspection doors, and other openings into the setting, should all be examined for air leaks. This can be done with a candle. All leaks should be stopped up, as the loss through infiltration of excess air is tremendous. The amount of excess air present in the chimney can be found by running a flue gas analysis, which shows the amount of the products of combustion, thus determining the amount of excess air. If the setting is badly cracked it should be repaired. Some plant engineers plaster the boiler walls. Success has attended the use of making a plaster or putty for the cracks of the old pulverized magnesia pipe covering mixed with water. Inspection and cleaning doors that are not used often may be bricked up, while all leaks around the breeching and the base of the stack should be calked.

The baffles should not leak or be out of place. They should be in such shape as to at once prevent the gases from being either bypassed or choked. The damper in the stack should be so arranged that its position is known exactly.

For the best operation of the average colliery plant, not only from an economic standpoint, but to secure continuous operation, it is well to put a boiler-house foreman in charge. This man, of course, reports to the outside foreman. He has full charge of the plant, keeps the firemen's and ashmen's time, arranges the shifts, and being himself the waterman is on duty during the working hours of the colliery. All repairs to the boilers are under his care and supervision.

Some companies that operate several collieries employ a traveling fireman who is well versed in boiler economics and the handling of firemen. It is the duty of this official to make regular and sometimes irregular visits to the various plants to see how they are operating. It is hard to get experienced firemen, so that a part of this man's work is spent in teaching the "greenhorn."

If a plant is troubled with fluctuations in steam pressure it is wise to install a graphic pressure gage. With this machine in operation any sleeping on the night shift can be readily detected. In one instance a fireman, believing he could beat the detested gage, got his steam pressure up to the desired amount and then turned off the supply valve. The card then showed a perfectly smooth line without fluctuations. Of course, it did not take long to discover this subterfuge, and in the future to lock the apparatus.

If some of the operators had to pay for the coal burned, the operation of the boilers might be an entirely different story; for then they would know the tremendous amount of fuel they were consuming. On the other hand, if they could only realize that what coal is not burned could be sold, it would help some. As it is, however, in a great many cases the boiler house happens to be an evil that must be tolerated and they seem to be resigned to this belief. From what I have seen of the various colliery plants, there is little doubt that the majority of them could show a great improvement if they were placed in the hands of some person who carefully would follow up and improve their daily operation. I have noticed that there is now a strong tendency in this direction.

War-Time Studies of the Prices of Coal and Coke

The coal bill was of dominating interest in the United States and elsewhere during the war and it still commands wide attention. Studies of the prices of coal and coke from 1913 to 1918 were made by C. E. Lesher, of the United States Geological Survey, Department of the Interior, in coöperation with the United States Fuel Administration and the War Industries Board, and their results have just been published by the survey as an advance chapter of its report on the mineral resources of the United States in 1918.

Mr. Lesher's report shows in text, tables and diagrams the fluctuations in prices from the beginning of 1913 to the end of 1918, the restraint on prices exercised by Government control through the Fuel Administration, and the increases in prices that followed the advances in wages to mine labor.

About 80 per cent. of the bituminous coal produced

in the United States goes to the railroads, public utilities and manufacturing industries, which, taken together, represent a market that is very little affected by seasonable changes but that is subject to all the vicissitudes of business conditions—in prosperous and in dull times—that mark the ebb and flow of our industrial life. Of the remaining 20 per cent., 4 per cent. represents exports—an item so small and local as to have no effect on the total—and about 16 per cent. is taken by domestic consumers, whose use of coal is of course seasonable.

Bituminous coal is not stored except by the consumer, but moves directly from mine to user. Exceptions that do not affect the general validity of this statement are found in the stocks held in retail dealers' yards, in the coal held in railroad cars—both small items—and in the coal stored on docks at the head of the Great Lakes, where millions of tons, held for the northwestern trade, are piled up during the season of summer navigation for use in the winter, when the lakes are frozen over and shipments cannot be made.

Ability to get bituminous coal to the consumers, which involves not only the number and size of mines and the number of men but the number of railroads, engines, coal cars, switching yards and sidetracks, must be ample to meet the maximum demand. And if the capacity of the mines and the railroads must be kept up to meet the periodic and temporary big demand for coal, it is evident that in periods of slack demand a part of this huge plant must lie idle.

Conditions in 1917 and in the first nine months of 1918 were quite different from those in preceding years; demand generally exceeded supply and transportation was the principal factor limiting production.

Too Many Mines a Detriment

An obvious result of having more mines than are needed at times is the curtailment of output at periods of slack demand and a lowering of prices in an effort to attract business. The cost of production has not always determined the lowest level of price, for ignorance of cost or desire to maintain the working organizations at the mines have often operated to maintain output beyond demand, at times with serious effect on the credit of the industry. For years much coal has been taken from the ground without adequate returns to the producers. The lure of cheap cost of production from thick beds—as in parts of West Virginia and Illinois—and of high prices in prosperous years and periods of coal shortage has attracted to the business of producing coal many men who, once in, have borne loss year after year in the hope of retrieving their losses later.

These conditions in the bituminous-coal industry are significant and should be clearly recognized because they show why, in normal times, the price of bituminous coal is not subject to even moderately wide variations. The low levels are reached when those producers that are willing or able to reduce price supplied the demand. Need for the commodity and not low price induces the purchase of coal. High levels of price are reached when, under the incentive of big profits, production is speeded up and capacity increased to a point where demand is satisfied.

Another and an important reason for fairly stable prices of coal is found in the fact that labor represents nearly 80 per cent. of the total cost of production and that wages are pretty generally maintained through the unions. Coal miners' wages are fixed by agreements running from two to four years.

The general principles governing the prices in normal times thus set forth continued to operate through 1916 and until the middle of 1917, although in the later part of this period conditions were far from normal. A tremendous increase in demand, which began in the last quarter of 1916 and extended through 1918 until the armistice was declared in November, brought forth an increase in production to a point where the limit of railroad capacity was temporarily reached with the demand still unsatisfied. Because the demand could not be fully satisfied, prices in the fall of 1916 and in 1917 rose to almost unheard-of figures, until first voluntary and later Government control was exercised.

The history of the production of bituminous coal in the United States is a history of the growth of its manufacturing and other industries, but the history of the production of anthracite coal, nearly all of which has been mined in Pennsylvania, is conjoined with the history of the growth of population, for it is the fuel of the household.

Anthracite in Relation to Bituminous Coal

The anthracite mined in Pennsylvania amounts to only 15 per cent. of the coal produced in the country, and the anthracite industry is so notably centralized and limited and so large a part of its output goes to a single class of consumers—the householders—that Mr. Lesher treats this coal separately.

The demand for anthracite of prepared sizes—egg, stove, chestnut, pea—represents 60 per cent. of the total output. Pea coal was formerly considered a steaming coal, but since April, 1916, it has been classed as a domestic coal of prepared size, only buckwheat and smaller anthracite now being classed as steaming coals.

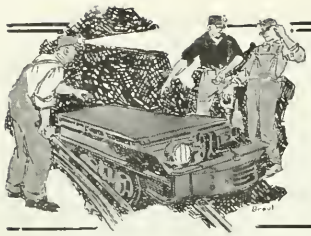
For many years anthracite has been sold at a reduced price in summer to encourage its purchase and storage by the householder, and though these summer reductions are not accompanied by a reduction in the wage of the miners the mining companies have found them very beneficial to the industry, because they permit more uniform operation of the mines throughout the year.

About 75 per cent. of the total output of anthracite is mined by a few companies, commonly known as the "railroad companies," as distinguished from the "independents." These larger companies issue regularly circulars giving prices, to which they generally adhere, but the independents sell above or below the prices quoted according to the market. Mr. Lesher's diagrams show the fluctuation of the prices of anthracite of all classes from 1913 to 1918, inclusive.

Taken all in all, Mr. Lesher's report is a valuable and interesting presentation of the statistics of a commanding feature of the coal industry during a critical period.

A copy of the report can be obtained free of charge from the Director of the United States Geological Survey at Washington, D. C.

Temperature and heat are not synonymous. Temperature is shown in the arbitrary divisions of the thermometer; the Fahrenheit scale has 212 deg. between zero and the boiling point of water. The zero point is 32 deg. below the freezing point of water. On the other hand, heat is a measured quantity—it is measured by the thermometer. As a unit—*e.g.*, the British thermal unit (B.t.u.)—it is the amount of heat necessary to raise one pound of distilled water 1 deg. F.



IDEAS AND SUGGESTIONS

PRACTICAL SCHEMES THAT MAKE THE DAY'S WORK EASIER

Get Ready!

By George N. Lantz
New Straitsville, Ohio

The newspapers this summer have been filled with advice to the coal consumer. "Buy Your Coal Now" has become as familiar as "I'm a Jazz Baby." The operator has taken occasion to point out the difficulties that will attend later efforts to purchase fuel. The coal associations have added their pleas, and speak of millions of tons to the individual operator's hundreds. The Geological Survey has put forth some interesting diagrams which apparently have not been noticed by those for whom they were intended. The result has been, that, while a few consumers have taken advantage of quick delivery and low cost, production has not been stimulated as much as had been hoped, and an overdemand may be expected this coming winter.

The wise operator will prepare for this, and, if preparations have not already been made, the month of October and a part of November will be an excellent time to make ready, while outside work may yet be done efficiently and inexpensively. Business is not yet so brisk as to prevent or delay needed repairs, and during the crop movement many idle days will be experienced during which everything may be made shipshape in the lull before the storm.

A judicious outlay of cash now may easily mean enhanced profits later on through easier production of higher-priced coal. It is almost sure to mean the ability to take care of old customers, which is good business, and may possibly signify the ability to gain new customers, which, also, is good business.

Have a look at the power plant. Power-plant installations are so varied that specific suggestions cannot well be made. Many mines receive their energy from a central station owned by the coal company or by a power company. Others have their boiler rooms and generate their own power. However, whether there is much or little machinery, the chief engineer should assure himself that the power plant, the heart of the works, is in tip-top shape, and supplied with packing, valves, tools, etc. He should inspect the repair shop and see that all needed material is at hand. He should do all that is needed to prevent a shutdown later.

Ventilation and drainage should be inspected. Ventilation equipment, being permanent, should require little or no additions, but it is well to be assured on this point. Pumps should be kept in proper shape and should be adequate to carry just a little heavier load than ordinary requirements demand, in order to be ready for an emergency.

Hoisting machinery, cutting machines and locomotives should be put in good order and kept that way. The smaller spares, and such larger ones as may be needed, should be on the ground. Keep up stock!

This is not a good time of year for cutting mine props, and seasoned timber may not be available in large quantity. Scattered props, however, can be gathered up and made ready for use. All loose lumber of value should be sorted and piled.

Bad ties should be replaced on both inside and outside tracks. The motor tracks should be well bonded, ballasted and drained. The outside track, at this time, is apt to be somewhat dirty. All ditches should be opened and all tracks cleaned. With coal and mud as high as the top of the rail, it doesn't take much of a snow to stop a motor, or make the use of a snow plow impossible. And we must not forget that we sometimes have snow in winter. While working on tracks, it is important to see that they are of proper gage.

Inspect the tipple or breaker. Whether such a building is equipped with costly machinery or gravity screens, some of the apparatus is likely to get out of order at some time, and now is the time to rectify incipient disability. Car retarders or car-moving devices, if needed, will soon pay for themselves.

Buildings should be put in proper condition for winter. The roofing may need some attention. Look for trouble. Piping may be partially uncovered. Telephone or power lines and wiring may need slight repairs. And the mine cars will want some grease. Probably most coal companies have a schedule requiring a greasing every six months. Probably, too, the cars have not been greased for eight or ten months. The car-greasing schedule seems to be the most easily neglected. Give the cars grease. They'll run better and last longer.

Stock up on feed. Provide comfortable quarters for the livestock. And if this is done for the animals, why not for the men? Buy those few window panes, and get a new stove for the "doghouse." Get the heating apparatus up to standard.

All of these things can be done as easily now as later. And, in the case of outside work, this can be performed much easier at present, and much more economically, instead of waiting till cold and snow add their disadvantages. Hauling, either by truck or team, is slower in winter with necessarily smaller loads. Get as much as possible done before winter is upon us.

Get ready for the demand. We must meet conditions as they exist. If consumers will not buy coal when we want to sell it, let's sell when they want to buy. Perhaps, since July 1, there has not been much room for coal in the cellars, anyway.

At any rate, let's quit wondering why we cannot produce all the coal in the summer, and spend the winter at Palm Beach, while the husky miner sits before the fire with his pipe and P. A. Let's turn the problem over to the psychologists, and let them explain why the consumers do not buy their coal in May and the coalmen their skates in July.

Instruction in Rescue Work

All of the local officials at a mine should from time to time be instructed in what they should do either collectively or singly in case of a mine explosion or of a fire within or without the mine that might endanger the men underground. Especially should all the officials and men in authority over work above ground be instructed as to their duties following such a disaster or accident. To this end, they should be shown where material and tools may be quickly obtained at the mine or supply stations, or from adjoining mines, and from the nearest jobbers, sawmills, planing mills and wholesale houses. The officials should be so instructed that in the absence of superior authority, they will be able to attend promptly to those things that are of the first importance. They should be instructed to consult a list of persons posted in the various offices, shops and power or engine houses, who should be immediately notified, giving particular attention to the summoning of the state mine inspector, rescue crews and doctors.

A Frogless Crossover

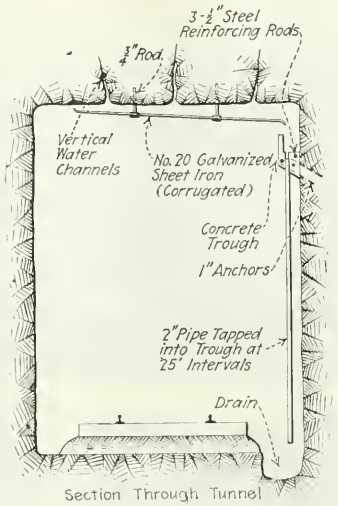
By Ralph W. Mayer
California, Penn.

A frogless crossover track is shown in the accompanying illustrations. Such crossovers are particularly advantageous where rope haulage is employed and some provisions for a crossing of tracks must be made. As may be clearly seen, the rails of the crossover are hinged at opposite sides of the main track. When it is desired to use the crossover these rails are swung into place, resting upon the rails of the main track. The free end of each movable rail when thus in place is held from moving by a fishplate bolted to the outside of the stationary rail, against which it is pressed by a forked rod actuated by a self-locking lever mechanism, the hand-lever member of which is provided with a weighted D-handle.

Since the movable rails, even though they may be of heavy cross-section, are of comparatively short length and hinged at one end, they may be swung into place and fastened there quickly and with little effort. For light, narrow-gage crossovers where the angle of crossing is a right angle or nearly so, the Oliver & Snider Steel Co. at some of its mines uses a short, solid, removable length of track. The rails are securely fastened together with bridle bars and braces. The flanges are cut away on the ends of the movable section so that the webs will slip into place between fishplates bolted to the stationary rails. The movable crossover section is kept beside the place where it will be used and when it is needed it is easily lifted into place; after it has served its purpose it may be as easily lifted out and put aside until it is needed again. The base of the crossover rails should be at the same elevation as the top of the permanent track rails.

Water Drain for Wet Roof

In driving a drift to be used as a main haulageway at a mine in Southeast Missouri, the workmen cut several water-bearing strata that continued to flow after the drift was completed. As a means of preventing the leakage of water from the roof, a system of collecting and draining, shown in the sketch, was satisfactorily installed at a moderate cost and with little consumption of time. As continuous dampness made the preservation of



WATER DRAIN FOR TUNNEL HAVING A WET ROOF

wooden construction difficult, concrete installation was decided upon. Considering that this latter type imposes practically no cost for maintenance, and that the wet part of the tunnel was short, the additional initial expense was considered justifiable and a permanent installation was provided.—*Engineering and Mining Journal.*

FROGLESS CROSSOVER TRACK, SHOWING FORKED ROD AND LOCKING LEVER (ON LEFT) AND RAILS REMOVED FROM UNDER TRACK (ON RIGHT)

DEPARTMENT OF HUMAN INTEREST

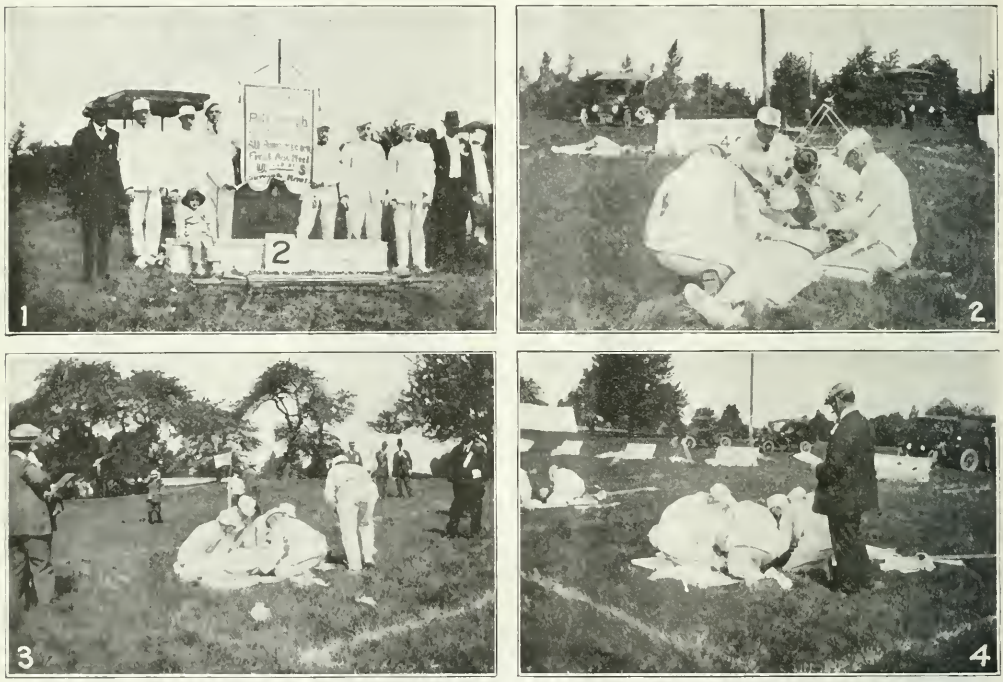
First-Aid Meet at Ebensburg

The fourth annual first-aid meet of the Inland, Argyle and Mountain coal companies, which was held at the Belmont field in Ebensburg, Penn., on Labor Day, was voted the most successful event held. The meet was originally scheduled to be held at Griffiths field, but due to the presence of a Chautauqua tent on the grounds, the site was changed to the somewhat more spacious grounds at Belmont field. Seven teams, representing the different operations of the above companies, paraded the main streets of the county seat of Cambria County, led by the Italian Society Band of Gallitzen, and later assembled before a small but appreciative crowd at nine o'clock in the morning. Practically all of the participants were ex-service men, which added interest to the competitions.

The first prize was a trip to Pittsburgh, to take part in the national contest to be held the last two days of September by the Bureau of Mines. Fourteen judges were selected from prominent physicians of Blair and Cambria Counties, in which Dr. T. U. Ferguson, of Gallitzen, acted as manager of events. Inasmuch as it was believed that the competition at the national meet would be lively, a close system of scoring was put into effect that the winners might experience the same careful scrutiny of their work that they would be later subjected to in Pittsburgh.

Three full team events were run off as follows: (1) Man is found with simple fracture of right elbow, compound fracture of left leg, arterial bleeding, dislocation of right hip, and a wound over left eye. (2) Treat a broken kneecap; dislocated right shoulder; fracture of jaw; and dislocated forefinger of right hand; place on stretcher. (3) Man is found unconscious on electric wire, face down, clothing burning; treat burns on front of chest and both arms.

The No. 2 team, captained by J. S. Jarvie, from the Argyle Coal Co., at Southfork, captured first prize and with it the honor to be the representative team at the national classic. The high score of 99.33 was made by the No. 2 team, and judging from the manner in which the men handled themselves on the field there is going to be some tough sledding ahead for any first-aid team



SCENES AT THE FOURTH ANNUAL FIRST-AID MEET AT EBENSBURG, PENN.
1—No. 2 team, which captured first prize and will represent the Argyle Coal Co. at the international meet at Pittsburgh. 2—No. 4 team, Inland Coal Co., last year's prize winners. 3—No. 1 team, Argyle Coal Co., winners of the second prize. 4—No. 7 team in action.

that expects easy sailing at Pittsburgh. Intent upon keeping as many of the prizes in the family as possible, the No. 1 team from the same mine at Southfork claimed second place with a commendable score of 97.88. Gold watches were received by each member of Captain John Sloan's No. 1 team. Closely pressing the second prize winners was Captain Ray Joseph's team from the Inland Coal Co., at Nettleton, who finished a strong third with a score of 97.33. Each member received an attractive gold stickpin. The surprise of the morning was furnished by the No. 4 team from the Inland Coal Co., at Gallitzen, which ran away with the first prize last Labor Day. The team finished seventh with a score of 92.66, which tends to bear out the old adage that youth will be served, as last year's event was held under abnormal conditions and the participants were conspicuous by their age.

Judge J. T. O'Connor, of Cambria County, officiated in the presentation of the prizes, during which choice bits of humor were interspersed. Following the meet a parade back to the main part of the city was held, from where the men dispersed to either get acquainted or renew acquaintance with one of the hotel meals for which Ebensburg has long been famous. Much of the credit for the manner in which the meet was run off, as well as the general good feeling that prevailed throughout, is due to genial M. J. Bracker, general superintendent of the three companies, who is a great favorite with the men.

Mine-Rescue and First-Aid Contest in British Columbia

By Robert Dunn
Victoria, B. C.

An international competition in mine-rescue and first-aid work took place at Nanaimo, B. C., on Labor Day, Sept. 1, under the auspices of the Vancouver Island Mine Safety Association. As it was the first meet held in western Canada that was attended by representatives of the coal-mining districts of the State of Washington, and the first for a number of years to bring teams from the Crow's Nest Pass coal field, eastern British Columbia, the event attracted unusual attention and the added interest stimulated those entering to special training.

The result, it is admitted frankly, was a disappointment to the Canadians. The men from the Pacific Coast Coal Co. won the British Columbia championship shield, and second place was taken by the team representing the Roslyn Fuel Co. Consequently, the trophy has left the Province for the first time. It must not be supposed that the British Columbians were anything but good losers. They congratulated the victors spontaneously and warmly, their sentiments being well expressed by Hon. William Sloan, Minister of Mines, when, in the course of the presentation of the prizes, he said that, while the visitors unquestionably had won on their merits and so were entitled to the hearty congratulations of which they had been the recipients, they would find the Canadians back next year determined to reverse the present decision.

There were nine teams entered. Besides the two from Washington State, the Canadian Western Fuel Co., of Nanaimo, B. C., had three; the Crow's Nest Pass Coal Co., Fernie, B. C., one; the Granby Company's Collieries, Cassidy's, one; and the Canadian Collieries (D), Ltd., two—one from the Extension and the other from the Cumberland mines. Of these the Cumberland team only was equipped with the Draeger apparatus. Those from the Roslyn company and from the Canadian Collieries (D), Ltd. (Extension) used the Paul, while the remaining six teams were provided with the Gibbs.

The usual boarded structure represented the mine and the problem, which was not varied, was that an explosion had occurred and the miner to be rescued had barricaded himself in against the gas, the ventilation, of course, having been cut off. It was simply stated that the said miner was alive, nothing being given as to whether he was injured or overcome. For this reason it is interesting comment that all the teams bore the patient from the mine on a stretcher, none taking advantage of the opportunity to merely walk him through the bad air to the surface with a breathing machine as protection. The judges were James Bagley, state mine inspector for Washington; R. Schonning, manager of

WINNERS OF THE DEPARTMENT OF MINES TROPHY

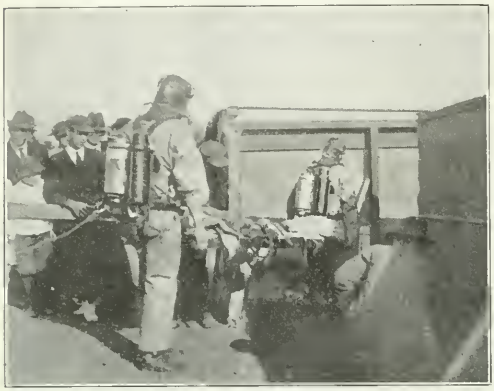
the United States Bureau of Mines staff, Washington State; George Wilkinson, chief inspector of mines for British Columbia; and Dudley Michel, instructor in first aid and mine rescue work for the Provincial Department of Mines.

An analysis of the marking of the judges is illuminating because it shows that the competition was won and lost, not in actual mine rescue work but on the testing benches where the judges—Messrs. Michel and Schonning—presided and where the apparatus of the contesting teams was subjected to a rigorous test prior to being buckled on the men. The Fernie team was the first to go through. It had no trouble with the Gibbs machines, escaping without a deduction because of "loose joints or connections." In mine work, however, 36 points were lost. A leak cost the Roslyn team 10 points while 24 were dropped in the mine. The Pacific Coast Coal Co.'s team, Black Diamond, winners of the shield and championship, were penalized 10 points for a leaky joint or connection and 15 for their performance in the mine. Laird's team, of the Western Fuel Co., lost 60 points for leaks in apparatus and five in mine work. The Extension team dropped 90 points for leaks in apparatus and 45 for its work in the mine. The remainder may be summarized as follows:

	Loose Joint or Connection	Mine Work
No. 2 team, Western Fuel Co., Nanaimo	30	40
Cumberland team, Canadian Collieries (D), Ltd	70	35
Granby Collieries (Cassidy's)	100	49
No. 3 team, Western Fuel Co., Nanaimo	30	20

It will be seen from the foregoing that there were two

teams which stood, in actual performance in the mine, head and shoulders above the others—the Pacific Coast Coal Co., Black Diamond, and No. 1 (Laird's) team of the Western Fuel Co., Nanaimo, B. C. Although, as stated at the outset, the Canadians are not disposed to withhold any of the credit due those who came from the other side and took the honors, they quite naturally feel that it is rather too bad that the decision should have gone against them solely because of minor leaks in apparatus, located through the severe test of soap suds



NO. 4 TEAM ENTERING MINE WITH STRETCHER

and penalized, when found, to the maximum extent. Mr. Laird and his men point out, too, that the apparatus which they used had previously been through the test, in the hands of the Fernie team, without a leak being found and that that experience no doubt accounted for what looseness subsequently developed

Of this there cannot be any doubt: that the Black Diamond and the Nanaimo teams were the best in actual mine rescue work on their showings in the competitions under review and that the Laird team, apart from the discrepancy found in its apparatus, must be congratulated on its performance in the mine. The men on the team did remarkably well.

In passing, it may be observed that the "soap sud" test no doubt was the result of the very keen competition between the Gibbs and the Paul apparatus and their representatives on the Pacific Coast. The former was represented by H. H. Sanderson, the western manager of the Mine Safety Appliance Co., and George Riggs, the factory expert; and the latter by A. G. Menny, of the American Atmos Corporation.

In the first-aid competitions the honors were fairly evenly divided, the results being as follows:

Department of Mines Cup: (1) J. W. Jemson's team, Nanaimo; (2) George Carson's team, Nanaimo.

One-Man Event: (1) J. S. Murphy, Pacific Coast Steel Co., and Julius Tonda, patient; (2) R. Charnock, Nanaimo, and J. McCourt, patient.

W. L. Coulson Cup: (1) Joe Barton's team, Nanaimo; (2) J. Brown's team, Nanaimo.

Juvenile Cup, open for annual competition and offered by the Vancouver Island Mine Safety Association: (1) Ladysmith, R. Ferguson, captain; (2) Nanaimo, R. Jackson, captain.

Two-Man Event: (1) Nanaimo, A. McNeill, captain; (2) Roslyn Fuel Company.

Open Event (open to all working miners): (1) Nanaimo, Joe Barton, captain; (2) Nanaimo, A. McNeill, captain.

First-Aid Contest at Jellico

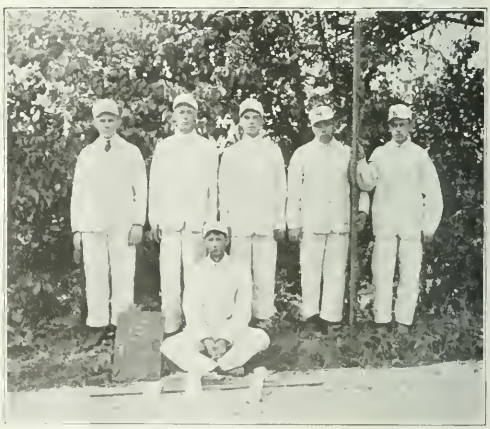
On Saturday, Aug. 23, a first-aid contest in which seven teams participated, was held at Jellico, Tenn., under the auspices of the Tennessee Coal Operators' Association and the Bureau of Mines. This contest was given to stimulate interest in first-aid work at the mines and to decide what team would represent the State of Tennessee at the national first-aid meet that was held at Pittsburgh, Penn., on Sept. 30 and Oct. 1.

One of the teams entered was sent by the Federal Coal Co., which is located at Arjay, Ky. Six of the teams represented Tennessee coal companies and one team came from the American Zinc Co. ore mines at Mascot, Tenn.

Four first-aid problems were given the teams: A one-man event, a two-man event and two full-team events. These problems represented injuries commonly met with in coal mining, consisting of fractures, cuts, bruises and electric shock. The penalties in each event were totaled against the team, thus eliminating the one- and two-man prizes. This was done in order to simplify the distribution of awards.

The American Zinc Co., of Mascot, Tenn., and the Highcliff Coal Co., of Pruden, Tenn., tied for first place. A one-man event was selected and the two teams contested to see who would be given first prize. The American Zinc Co. team won by a close margin.

The first prize was $325 and six gold watch fobs, the latter being donated by *Coal Age*. The cash prize was to be applied to the expenses of the team's trip to the national first-aid meeting at Pittsburgh. The



AMERICAN ZINC CO. TEAM, WINNERS OF FIRST PRIZE

second prize consisted of eight 25-lb. cans of carbide and six nickel-plated lamps.

The contest was witnessed by about 2000 people. Ice cream and soft drinks were served free to the miners and their families, the money expended for the refreshments being donated by the business people of Jellico.

The teams were instructed in first-aid work by J. M. Webb, of the Bureau of Mines, assisted by V. D. Splane, of the Bureau of Mines of Pittsburgh, Penn.

J. T. Moore, cashier of the Jellico Bank and Trust Co., of Jellico, Tenn., was chairman of the finance committee; J. M. Webb, of the Bureau of Mines, was chairman of the general committee.

NEWS FROM THE CAPITOL

BY PAUL WOOTON

Independent Operators Testify at Coal Industry Investigation

"Coal is at the present time in a somewhat go-as-you-please condition. I feel that there ought to be closer coöperation between the Government and those who produce this great necessity; that there ought to be a better knowledge of conditions available to those who legislate and to those who consume; that there ought to be some agency to which the coal operators may go and to which the consumers may go." This statement by Senator Frelinghuysen, the chairman of the subcommittee investigating the coal situation, as well as others made by him and by the questions he is asking, is taken to indicate that he will recommend a more intimate relationship between the Government and the coal industry.

While Senator Frelinghuysen had in mind when he made the foregoing statement the matter of statistics on coal consumption, he also has more in view, judging from the following verbatim extracts from his comment at last week's hearing:

"I am wondering whether or not the Government should have some one acting in an advisory capacity, procuring information for the benefit of all and bringing about a better coöperation without meddlesome interference, without a desire to confiscate, allowing the men who have owned property and who have built up this great industry to continue, but still studying conditions to bring about fair prices so that not only the consumer may benefit but also the operator may not be treated unfairly."

At last week's hearing practically all testimony taken had to do with the anthracite situation. A. B. Jessup, the vice president and general manager of the G. B. Markle Co., testified with regard to the situation from the standpoint of an independent operator. While Mr. Jessup was attempting to justify the increase charged by the independent operators over the price charged by the railroad companies, Senator Frelinghuysen interrupted with this question: "There were pretty large excess profits taxes paid by the mine owners, were there not, in the year 1918?" This question was followed a moment later by another: "Why was it necessary for those operators who were not losing money to advance their prices?" A portion of Mr. Jessup's answer is as follows:

"It probably was not necessary for some operators to advance prices, but many of them had low profits in the past and looked forward to low profits in the future. The excess profits tax automatically takes care of the excess profits of those who produce at low cost." To this Senator Frelinghuysen retorted: "Yes, but it does not take care of the consumer."

Explaining further in regard to the differential above the company price, Mr. Jessup said: "The whole trouble as I see it, is that the railroad company's price, on which this differential is computed, is wrong. It has been wrong for 20 years or more. The railroad coal company's price is such that they do not earn a fair return on their invested capital. The independents are required in normal market to compete with them on the basis on which the railroad companies themselves do not make more than 1 or 2 per cent. on their invested capital. These railroad coal companies and their associates have two sources of income: one the profit they may make on their coal operations, the other the profit they may make from hauling that coal to market. The individuals do not participate in the freight rate and therefore they must have a fair return which, with all the hazards of mining, ought not to be less than 10 per cent. on their invested capital. This differential only applies on 70 per cent. of the tonnage. Thirty per cent. of the tonnage is in steam sizes, and all the year round it is in competition with bituminous coal and therefore brings what it can in competition with bituminous coal. The 75c. differential spread over the whole output would be about 50c. a ton difference."

With regard to royalties, Mr. Jessup expressed the opinion that 70c. or 75c. would be asked now as compared with the 35c. which has prevailed for 20 years.

The chairman of the committee had some difficulty in understanding why, if coal costs $3.20 to produce in one mine and $6.30 in another, the consumer should not have the benefit of the low-cost production. He evidently was convinced by Messrs. Jessup and Dodson, who cited examples of farm products and copper, that the low-cost producer along with the high-cost producer receives the market price which the production of both tends to fix. "Strangely enough," said Mr. Dodson, "it just happens in the anthracite business that the low-cost operators are not demanding all that the market would pay them. I suppose they are doing that in order to steady market conditions, and because they feel that they are producing a necessity."

A striking statement came from Mr. Connell, another of the independent operators, during the discussion of the labor situation. "If the American public or the Senate," he said, "will allow themselves to be dominated by an organization of 700,000 men, which are included in the bituminous and anthracite United Mine Workers of America, and if they will allow them to be granted such wages and such hours of employment as they in their pleasure demand, and Congress is silent as to it, why should the American public expect the operator to be their sole protector in this matter?" This brought forth the following expression of opinion from the chairman: "I feel that if Congress goes out of its prerogatives to limit the hours a man can work and on

the other hand limit the price that a mine operator shall receive, that they must go to the limit. They must fix not only the prices of food that he eats, but they must also fix the scale of wages commensurate with the service rendered."

The chairman then called for a discussion of the radical tendency toward Government control and nationalization. Mr. Jessup's idea, expressed in that connection, is that there should be no control exercised over the industry in peace time such as that given the Fuel Administration during the war. He believes the filing of costs is proper in that it gives the Government an opportunity to see what is being done in the way of production costs. If there are abuses they can be developed from those figures, he pointed out. The same question was put to Mr. Connell, who said that the industry is in safer hands under the law of supply and demand than under Government regulation. He pointed out that after the Civil War anthracite prices went to $12 at the mines, which decreased as conditions became normal.

W. J. Thompson, secretary of the Anthracite Coal Operators Association, presented to the committee a tabulation of costs and realization of individual operators. His figures, which represent 60 per cent. of the output by individual companies, show the average cost per ton, January to July, as being $5.52. The average selling price during the same period was $5.20 per ton, a net loss of 32c. per ton. The average profit for individual operators on fresh-mined and bank coal during 1917 was 44c. per ton, Mr. Thompson stated.

Asks for Cooperation from Receivers and Shippers of Freight

Walker D. Hines, Director General of Railroads, on Sept. 22 authorized the following statement, asking the further coöperation of shippers and receivers of freight in promoting freight-car efficiency:

During the war, no one was more patriotically helpful than the American shipper. With zeal and efficiency he did his part in the common cause. The Railroad Administration had excellent opportunity to observe this attitude during the war and has appreciated heartily the subsequent continued coöperation of the great majority of the shippers. The time has now come for renewed efforts by both the Railroad Administration and the shippers and receivers of freight so that the nation's transportation service may be rendered with the greatest satisfaction possible under the circumstances.

An unusually heavy grain and coal movement, deferred repair and the construction of public highways in all sections of the country and the concentrated requirements of suddenly reviving business combined with the usual transportation requirements at this time of the year, threaten a serious lack of transportation facilities unless all parties interested coöperate in securing the greatest possible utility from the existing limited transportation facilities. In this connection attention is invited to the following extract from a recent public statement of the President:

"We have now got to do nothing less than bring our industries and our labor of every kind back to a normal basis after the greatest upheaval known to history, and the winter just ahead of us may bring suffering infinitely greater than the war brought upon us if we blunder or fail in the process. An admirable spirit of self-sacrifice, of patriotic devotion and of community action guided and inspired us while the fighting was on. We shall need all these now, and need them in a heightened degree, if we are to accomplish the first tasks of peace."

The Railroad Administration will do its full part. The Car Service Section in Washington and the various regional organizations are striving earnestly to secure a fair and just distribution of the existing equipment as well as to meet the requirements of individual shippers. Of the 100,000 new freight cars which the Railroad Administration ordered constructed, 59,409 had been completed on Sept. 13 and are now in service, and this number is being increased at the rate of over 900 each working day. Instructions have been issued to all regional directors to bend every effort to speed up road and yard movements, to secure heavier loading of equipment, to establish and maintain complete and accurate yard checks, to reduce the number of bad-order cars, to make prompt delivery to connections, to effect early deliveries at freighthouses and teamtracks, to reduce the number of freight cars used in the transportation of company material and to expedite the movement of grain cars in terminals. The hours of labor of car-shop employees have been increased and every effort is being made, both in railroad shops and in the shops of private concerns to whom the work is being let out, to reduce the number of bad-order cars.

I earnestly urge all shippers and receivers of freight to redouble their efforts to promote freight car efficiency. Shippers of freight can assist by loading all cars to full visible or carrying capacity; by prompt loading and release to the carrier; by ordering cars only when actually required; by eliminating the use of railway equipment in trap or transfer service when tonnage can be handled by motor truck or wagon; by reducing the diversion and reconsignment of cars to a minimum.

Receivers of freight can assist by prompt unloading of cars and notice thereof to the carrier; by ordering goods in quantities representing the full safe carrying capacity of cars and disregarding trade units; by ordering from the nearest available source; by pooling orders so as to secure full car load.

A resumption of intensive loading will not merely reduce the number of cars under load but will also relieve congested terminals where it is a question of track room rather than of equipment.

With a strong concerted effort on the part of the Railroad Administration and the shippers and receivers of freight, it is hoped that during the period of abnormally heavy traffic with which we are now confronted the nation's transportation needs may be met with reasonable satisfaction to all parties. I earnestly ask the continued and even more effective coöperation of all shippers and receivers of freight.

Strengthening of Patent Office

The Engineering Council's Patents Committee has been collaborating with a similar committee appointed by the National Research Council in the development of a scheme to improve the governmental methods of dealing with patents. The staff of the Patent Office is itself actively assisting in this effort. Out of the report prepared by the National Research Council, and approved and adopted by the Engineering Council as the report of its Patents Committee, remedial legislation has taken form. Three bills have been introduced, known as H. R. 5011 (a bill to make the Patent Office independent of the Department of the Interior or any other department, and to simplify the procedure of the courts with reference to assessment of damages or profits for infringement of patents), H. R. 5012 (a bill to establish a single Court of Patent Appeals) and H. R. 7010 (a bill to increase the force and augment the salaries in the Patent Office).

Chairman Charles A. Terry, of the Patent Committee, requests that representatives of the Engineering Council write to their congressman, urging the passage of these bills, and so far as convenient, request their friends to do likewise.

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The Workman Is Worthy of His Hire

IN A land of free schools and a system of education that renders it not only inexcusable but a positive crime for any child to grow up in ignorance, people have always regarded the professional educator with a considerable degree of respect. In the older days the teacher of the local school was held in an esteem second only to that of the clergyman or religious leader, and the income from his chosen profession while seldom bounteous was, in the majority of instances, at least equal to reasonable necessities. This held true alike for the girl who had charge of a kindergarten and for the spectacled, bewhiskered, absent-minded individual occupying a professor's chair in the most advanced college or university. Throughout all ages and times, however, while the purveyor or transmitter of learning might gain fame he never gained fortune; the reward for his services consisted of glory, not pelf.

The lot of the professional teacher, never a path of roses, has been rendered doubly difficult in the recent past because of the rising costs of commodities as compared with the standards of previous days. This burden has fallen particularly heavy upon the more elderly incumbents—upon instructors and professors in institutions of higher learning. The young man or woman teaching in a country school or in one of the grades in a town or city can in many instances change from the schoolroom to the factory or office, but the man whose sole experience in life has been confined to the classroom and the campus finds it not only extremely distasteful to alter his chosen profession, but discovers that in the industrial world he has little adaptability and no employer appears to have a niche open that he is capable of filling to advantage.

The effect upon the educational institutions themselves is equally disastrous. There is competition among colleges in many instances quite as keen as that existing between the athletic teams representing their respective student bodies. The reputation of any college or university depends upon the amount and quality of instructional work done, and the most gifted instructors can hardly be secured if the salary available is insufficient to provide a respectable living for the instructor and his family.

If any one will look through the "want ads" of any reputable technical journal at about this season of the year, or preferably a little earlier, he will find many inquiries for instructors and professors in various branches of engineering, but the salaries range from $900 per year for the subordinate positions up to about $5000 per year for the highest places (such as the best paid professorships) that any of these schools have to offer.

It is poor encouragement to the able-bodied, husky boy who is trying to decide whether he should go to college or get a job at once, to see men with technical education and years of experience drawing salaries about comparable with the wages of a hod-carrier, and which fall far short of the income of such trades as that of plumber or miner.

In order to obviate this condition some institutions with well organized alumni, such as Harvard, will shortly launch a campaign to establish an endowment fund or increase such funds of this character as already exist. In the case of Harvard, a minimum of eleven million dollars as an unrestricted endowment is sought.

While it possibly may be said, with much truth, that a college professor is "no better than anybody else," it is equally true that he should be treated no worse than anyone else. When locomotive engineers are drawing aggregate wages greater than the salaries of the governors of the states through which they run, when helpers in certain trades receive $8 per day and vast increases have been made in the remuneration paid to skilled, semi-skilled and unskilled labor, it seems about time that some sensible increase be made in the salaries of professional educators in general. Otherwise it will only be a question of time before the efficient instructor of youth will be as thoroughly extinct as the great auk or the bison.

Ex-Senator Hamilton Lewis assures us that the President is going to seek the socialization of the coal and oil industries. The President, having failed to run the railroads satisfactorily, is seeking to manage two other businesses. He must indeed be slow to recognize his failures if he is so anxious to add to them two others.

A Coming Machine

IN HIS upward course from savagery to civilization man has progressed by successive stages or ages—the Age of Stone, the Age of Bronze and the Age of Iron. We usually think that we now live in the latter, but in a more strict sense the present is in reality the Age of Machinery.

Until comparatively recent times the human hand performed practically every industrial operation that was performed—and did it poorly. Then came tools (crude affairs at first, but improved in design and quality from time to time) driven or operated by the energy of human muscles. And finally came instruments or implements actuated by animals, by water-power, or by the energy of heat, but in any case by some force greater than any that man himself could develop.

To most industries power, either mechanical or electrical, has been generally applied, and coal-mining is no exception. Most of the processes through which coal passes on its way from the face to the furnace are "powerized" to a greater or less extent. One process, however, in the vast majority of instances must still be performed by hand, or rather by shovel, hand-driven—the process of loading at the face.

Loading is the most expensive operation performed upon coal during production and preparation. Many attempts have been made to perfect a power shovel or loading machine; some have met with a degree of success, while others have been entire failures. This field for invention is both inviting and rich, and it is by no means beyond possibility, or perhaps even probability, that the next few years will see introduced a successful loading machine capable of application in beds of even average thickness.

Because of the fleeting character of news, the newspapers of the country can have but a local circulation. They are naturally disposed, therefore, to be in a degree sectional. But the technical press is and will be national unless it is too greatly harried by unjust postal zone laws.

Some Men Are Big Enough to Ignore Facts

DIRECTOR GENERAL HINES of the Railroad Administration, in his testimony for the Freylinghuysen committee, had the boldness to make the following statements: "The Railroad Administration is doing everything in its power to meet a transportation situation of unusual difficulty. We are utilizing every expedient that can be developed to enable us to transport, during the latter part of the year, the coal which the public omitted to buy in the early part of the year, and which it will want to buy in the latter part of the year."

The first composite statement is, perhaps, true. The Railroad Administration may now be doing everything in its power, and the transportation situation may be of unusual difficulty. But who is responsible for the situation? No one but Mr. Hines, who deliberately laid off shop hands when troops were being demobilized, and the Government was appealing to patriotic American business men to buy early, and so help the situation, and to take on the discharged soldiers.

The maximum of patriotism should be exhibited by those in the employ of the State. They must not be allowed to consider for a moment their reputation as managers or statesmen when the interest of the State points the other way. A jealousy for permanence in office or a desire for the plaudits of the people should not for one moment influence their action when a plain duty confronts them.

Clearly, a false economy might have deceived the people for a while as to the success of the management afforded by a socialistic administration of the railroads, but that personal advantage to Walker J. Hines should not have swayed him a moment when he reflected that to hold up the repair of cars would destroy our transportation system, make the losses on railroad business greater in the long run, dissatisfy the shopmen, make the mine workers restless, make work scarce and perhaps cause a panic. The public has no sympathy with Walker J. Hines. He tried to pull down the whole financial structure, and in doing so he dislodged a few stones on his own benighted head. The public cares nothing for his groans, knowing well his wounds were self-inflicted. They were not incurred in promoting the public welfare.

The complaint he makes against the public for not buying would be honorable if made by anyone but him. As he was the slowest of the buyers himself, why should he blame the public? It seems to be the obsession of the little minds of our present-day muckrakers to blame the public for pursuing the same courses that they follow, though they travel them with much less reason.

Mr. Hines would not buy coal. He always felt sure he could commandeer it when he pleased. The difficulties are largely of his own creation. Had the Railroad Administration bought coal, the act would have stimulated in real manner that buying which the railroad officials have verbally advocated. Mr. Hines will say the price for coal was too high, though the prices were well below those set by the Government. They were lower for him than for anyone else. But if they were too high for Mr. Hines, does he seriously propose to condemn others for arriving at the same conclusion? Were not his attempts to break the price to a level below actual cost the cause of the slow buying of the public?

Mr. Hines says: "In the first six months of the year traffic of all sorts, particularly coal traffic, was below normal." That is true; but, being so, why, in the name of common sense, is the Railroad Administration found at this time with its coal-hauling equipment crippled and on the repair tracks?

Simply because Mr. Hines waits till it rains to shingle his roof, hoping that when the rain falls he can make his neighbors assemble on the shingles and patch the leaks with temporary expedients such as embargoing, pooling, zoning, commandeering and workless days. Seeing he is so ready to speak ill of his neighbors, it is distressing to see how ready he is to call on their aid.

Walker D. Hines, you have indeed a "hard row to hoe!" Perhaps you reflect with regret that the hoeing is difficult solely because you yourself planted crooked rows.

What Will the Traffic Bear?

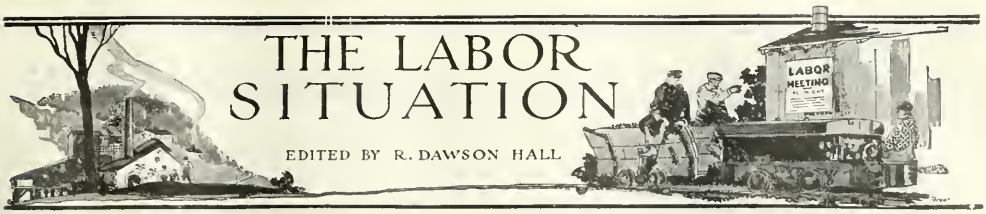
IN A world as intensely practical as the planet upon which we live, economic law is as inviolable as either the statutes of the land or the ten commandments. Those who transgress either are certain sooner or later to meet their just punishment.

The coal miners in convention have just adopted resolutions calling for increases in pay, decreases in working time and other "improvements" upon existing conditions. These alterations are vast and far-reaching. In a complex and interdependent social fabric they affect alike the adjacent and the uttermost fibers. The demands of the miners are not against their employers alone; they affect directly, or indirectly, or both, every man, woman and child upon the face of the earth. In the last analysis the increase asked, if granted, will find its way from the coal upon which it is first placed to any and every article of consumption into which that coal or its product in any wise enters, or which it in any wise touches.

It was an old and wise rule of railroading (applied in the days when we really had railroads) that no tariff or freight rate should be made "greater than the traffic will bear." A low tariff encouraged traffic; a high tariff discouraged it. The best results were obtained when the net product of tariff and traffic was a maximum.

This is true economics, and the mine workers might well give heed thereto. A high wage scale discourages production because it discourages consumption. A low wage scale encourages consumption, and this augments production. The logical wage scale would be the one that would secure to the miner the greatest yearly return.

Many conservative observers believe that insistence upon the conditions embodied in the resolutions recently adopted will be insistence upon a wrong economic principle. By charging the high wages demanded the miners not only will vastly raise the already high cost of living, but they will be charging "more than the traffic will bear."



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Labor developments of the current week have been many. It seems that the mania to strike is as contagious as the "flu," if not even more so; nor is the germ confined to any one trade or calling. The demands to be made by the United Mine Workers of America, assembled in convention at Cleveland, Ohio, have been formulated and are in many respects the most radical yet drawn up. They include demands for $8 per day for six hours' work and 60 per cent. increase on all tonnage, yardage and deadwork prices, a five-day week, time-and-one-half for overtime, the abolition of double shifts, elimination of the automatic penalty clause and the establishment of weekly paydays.

Even such demands as these have their humorous side. One of the delegates to the convention aptly stated conditions when he remarked that the committee had omitted just one important point, and that was that they had not demanded that the weekly pay be given in advance.

The miners say that unless these demands are granted in toto on or before Nov. 1 next, a strike will be inaugurated. The radical tendencies of the rank and file, and the unrest of manual workers everywhere, appear to have instilled in the breasts of the leaders a fear that unless the demands of the radicals are put to a test they (the leaders) will face political defeat and oblivion.

It need hardly be said that the public is unprepared to pay without a murmur the increased prices which the granting of these demands would entail. Consequently, it is believed by many that nothing short of a showdown will satisfy the miners. The resolutions as formulated by the committee are as follows:

1. We recommend that this report be accepted as a substitute for all wage-scale resolutions that have been presented to the convention.

2. We recommend that this convention demand a 60 per cent. increase to be applicable to all classifications of day labor and to all tonnage, yardage and deadwork rates throughout the Central Competitive Field.

3. We recommend that this convention demand that all wage agreements that are negotiated to replace existing agreements shall be based on a six-hour workday, from bank to bank, five days per week.

4. That all day labor shall be paid time-and-a-half for overtime and double time for all work done on Sundays and legal holidays.

5. That all agreements entered into by the United Mine Workers of America shall have incorporated therein a provision providing for a weekly payday.

6. That all double-shift work on coal shall be abolished except as may be necessary for development and ventilating purposes, and development for increased tonnage shall not be regarded as being a reason for double-shift work; it being understood that this rule shall not be applicable to new mines that are in the process of development.

7. That no automatic penalty clause shall be written into any agreement entered into by the United Mine Workers of America.

8. That all internal differences not covered by joint interstate agreement shall be referred back to the respective districts for adjustment.

9. That all contracts in the bituminous field shall be declared as having automatically expired Nov. 1, 1919, and that no sectional settlement shall be allowed and new contracts must run concurrently for a period of two years in all bituminous districts under our jurisdiction.

10. That agreements negotiated for outlying districts shall be retroactive and become effective on the date upon which the agreement for the Central Competitive Field becomes effective.

11. That no agreement for the Central Competitive Field shall be concluded until after this convention has been reconvened and the agreement has been ratified by the reconvened convention, which reconvened convention shall also define a policy to be applicable to outlying districts, and that the reconvened convention shall be held in Indianapolis, Ind., on such date as may be designated by the resident international officials.

12. We recommend that in event a satisfactory wage agreement is not secured for the Central Competitive Field before Nov. 1, 1919, to replace the one now in effect, that the international officials be authorized to and are hereby instructed to call a general strike of all bituminous miners and mine workers throughout the United States, the same to become effective Nov. 1, 1919.

13. That this convention go on record as favoring the ratification of the wage demands made by the anthracite miners in their Tri-State Convention, which was held in Wilkes-Barre, Penn., from Aug. 10 to 23 inclusive, and that we pledge to the anthracite mine workers our power and influence in aiding them to the fulfillment of their demands.

Nationalization Is Favored

It is said that conservative leaders of the mine workers do not favor nationalization of the mines, nor entertain the hope that the miners will succeed in nationalizing American industries. They dared not, however, or at least did not protest in the miners' convention when that body unanimously adopted a resolution calling for the nationalization of the coal industry. The resolution thus adopted sets forth that coal mining is indispensable to the economic life of the nation; that the coal resources are owned by private interests; that the coal is produced for the purpose of creating profits and is accompanied by great economic waste; that the natural resources, especially coal and timber, are developed under the present system of production with a wastage of from 30 to 50 per cent.; and that therefore the coal supply should be owned by the Commonwealth and be operated by and for the people; that the present generation owes a solemn duty to posterity to protect and administer the treasuries of nature; that it is the immediate duty of the American people to prevent the waste now taking place under private ownership of natural resources; and that the Government should take such steps as may be necessary to provide for the nationalization of the coal-mining industry.

The Plumb Plan Is Favored

It was further decided to "instruct our representatives to urge in the coming conference with the representatives of the railroad workers' unions, a working alliance for the purpose of securing the adoption of the Plumb plan for the nationalization of railroads as the initial step in the fight for the principles of nationalization, with the understanding that such alliance will continue to press the issue with unabated vigor until the principles of nationalization have been extended to embrace the coal-mining industry of the nation.

"And be it further resolved that our organization, for the reasons set forth above, carry its fight for nationalization of mines into the Dominion of Canada and throw its influence wherever possible behind our members in Canada to the accomplishment of that end."

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Prices and Wages

Letter No. 1—Kindly permit me to refer to the Foreword that appeared in *Coal Age*, Aug. 21, 1919, bearing on the question of whether prices produce wages or wages produce prices. In view of the stern legislative measures taken by the most eminent statesmen of today to restrain undue advance in values, it is not strange that popular opinion regards the present high prices of commodities as forcing labor to seek an increase of wages to enable wage earners to purchase the necessities of life.

There is, no doubt, great diversity of opinion regarding the manner in which prices and wages affect each other. Some will claim that wages dominate prices, which seems to be the opinion expressed in the Foreword to which I have referred. On the other hand, many hold the opinion that prices determine the wages of labor. I hope to see this question thoroughly discussed by readers, as it is both timely and important.

Preliminary Survey of the Situation

It cannot be denied that simple business policy will cause a tradesman to maintain that the present high wages paid for labor are responsible for the increased prices of the commodities he sells. The interest of the producer is to keep prices in advance of wages. The question is, therefore, one that is closely associated with business interests, and we cannot blame the wage earner for holding the opinion that the high cost of living requires the advance he seeks in wages.

No great effort is required to see the trend of the writer's argument in the Foreword, when he states, "Prices were the outcome of wages," or the meaning of his prophecy that "prices must rise rather than fall." The reason he gives for this condition is that "labor trusts would not permit the reduction of the compensation paid to manual workers." It is clear that, if wages are reduced while prices remain unchanged, the profits of trade will be increased. It must be admitted, however, that no purpose is served in raising prices, knowing that labor trusts will raise wages in like proportion. Such action would continue unceasingly, to the material advantage of no one; while the ultimate effect would be to reduce the purchasing power of money, to the detriment of everyone.

No extended vision is necessary to see the loss that must result from cheap money and high prices, in the commercial transactions of a nation with a country where prices are low. Imports are encouraged and exports discouraged. It is well known that commercial prosperity depends on a country's exports exceeding its imports. In other words, the profits of trade and commerce depend on the sales exceeding the purchases.

The fact is readily recognized that both the profits of business and the wages paid for labor are regulated by competition. Should either employers' organizations or labor trusts force their respective claims beyond the point where active and healthy competition would be destroyed, industry would be bound to suffer. The old saying holds true today, "Competition is the life of trade." It is the one factor that maintains an even balance between prices and wages and tends to keep conditions normal. Where there is no competition, prices may rise and the profits of trade increase, without the assurance of an equal increase in wages.

Supply and Demand Fix Prices and Competition Acts To Equalize

The fact must not be overlooked, however, that local and temporary circumstances may cause fluctuation in the rate of wages, just as the price of commodities will often vary on either side of the cost of production, depending on supply and demand, both in respect to labor and material. It must be remembered, also, that skilled labor will often command a wage out of proportion to the average wages of labor.

The claim that high prices produce high wages will only be rightly understood by those who realize that living conditions for the laboring classes demand that the cost of labor, in production, shall keep pace with the other elements that enter the problem. It may happen that high prices produce no effect to advance wages. For instance, prices depend on cost of production, which includes the cost of labor and material, freight charges, taxes and a fair allowance for the profits of business.

Now, an increase in the cost of any of these elements will surely boost the price of the articles produced. Thus, high prices may be due to excess profits, high freight charges, increased cost of raw material or excessive taxation; but there may be no corresponding increase in the wages paid for labor. As previously stated, supply and demand are the determining factors in every case, and equalization is brought about by competition, which serves to regulate both prices and wages in the industrial world. William Wesnedge.

Ladysmith, B. C., Canada.

Wages vs. Work Hours

Letter No. 1—Having read much in *Coal Age*, in reference to "the unreasonable demands of miners for higher wages, shorter hours," etc., I wish to express my own humble opinion on the subject of wages and hours. As a miner of western Pennsylvania during the past 18 years, I can only speak from experience in this district and to which my remarks will be confined.

A visit to a few of the many large mining camps, in the Pittsburgh field of western Pennsylvania, would be sufficient to convince anyone of the necessity for improvement of the condition of coal miners, in two respects. These are not, as some would suppose, wages

and hours of labor; but hours of labor and working and living conditions in and at the mines.

The wages paid miners are high enough, provided the men could have steady work. But, during the past ten years, coal miners, in this region, have only averaged from 50 to 70 per cent. of full time. While receiving a good daily wage, the miner's yearly income is poor and wholly inadequate to enable him to live and support his family as he should.

The Working Day of the Coal Mines

Regarding the hours of labor, W. H. Noone, writing on "Efficiency of Mine Workers," *Coal Age*, July 31, p. 204, gives the natural division of a 24-hr. day as consisting of eight hours of labor, eight hours of recreation and enjoyment and the remaining eight hours for the much needed rest of the body. Discussing the same subject, other writers have suggested reducing the working day to six hours, and William M. Chambers, discussing the same subject, Sept. 11, p. 461, draws attention to the fact that miners, in Illinois, are often "kept underground ten and even eleven hours a day."

The condition described by Mr. Chambers is not confined to Illinois mines. In the larger mines of this district, the miner is actually held eleven hours in the mine. Although the men work but eight hours in that time, the other three hours cannot be said to be hours of either rest or recreation, but are dreary hours of waiting in which the miner must kill time in various ways that are of no advantage to him but rather a strain on his constitution and impairs his health. Without the latter, he cannot be an efficient worker. Reason demands, therefore, that the coal miner, like men in other industries, should be given full eight hours from "bank to bank."

Miners Need Good Wash-Houses at the Mine

Now, a word in regard to miners' living conditions. Before all other workers, the man who toils in a coal mine should have provided for his use a wash-house at the plant. While many other industries have adopted the wash-house plan and provided a place where their workers can wash up before going home, the coal miners of this region, for the most part, are compelled to go home in their dirty, wet clothes. Not only does this impose an extra burden on the housewife, who must either provide and furnish a place and necessary materials for the men when they come out of the mine, or permit them to wash in the kitchen; but the exposure to the weather has proved fatal to many a miner living at a distance from the mine and compelled to make the trip home in all kinds of weather in his damp and often wet working clothes.

It can be said with truth that these conditions prevailing at mines have forced a large number of the better class of workers to leave the mines and seek other employment. The policy is a shortsighted one that so many coal operators adopt by not providing good working and living conditions for their men. In closing, then, let me say that the main issue is not a question of wages, but one that calls for a better distribution of the work underground, whereby the miner will be given eight hours for recreation and enjoyment and eight hours for rest and sleep, after performing his eight hours of labor. This would lift the miner from the condition of an underground savage to that of a good American citizen.

Avella, Penn. August Caramazi.

Child Labor in Mines

Letter No. 2—In connection with the interesting discussion regarding the employment of minors in and about mines the following correspondence giving a recent ruling of the Commissioner of Internal Revenue, on the Child-Labor Tax Law, a late act of Congress, will probably be of interest:

Sometimes in May last I addressed the following letter to Daniel C. Roper, Commissioner of Internal Revenue, Washington, D. C.:

Dear Sir:—We are operators of thirty-two mines in Central Pennsylvania, employing about 4,000 men. An integral part of our mine properties and leases consists of eight mining towns, thousands of acres of woodlands, farms, sawmills, etc. We permit the widows of men who have died by reason of accident in our mines or after faithful service, to stay in our houses and we try to help them as far as possible. Sons of these widows, sometimes boys between fourteen and sixteen years of age, seek work with us, which we would like to give them, knowing that they are the sole-supporters of their mothers. We request you, therefore, to kindly inform us if we can employ boys of this age, not in mine work, but giving them healthy occupation in our real estate department, in our woodlands or on our farms. Kindly inform us if, by employing these boys for this kind of work, we would be violating the Child Labor Tax Law and become subject to the penalty of an additional tax of 10 per cent. of our net profits as provided in Section 1200 of the War-Revenue Act.

After some correspondence, giving in detail the information requested by the commissioner, I received the following letter from J. Hagerman, deputy commissioner:

Dear Sir:—We appreciate the detailed statements in your letter of July 2, and the description of the work in which you contemplate employing minors under sixteen years of age, provided that their employment will not incur your liability to taxation under the provisions of the Child Labor Tax Law, applying to mines and quarries.

You state that the employment of children in your real-estate department involves the following:

"The real-estate department has charge of the houses, woodlands, the welfare work and the receation grounds of our company.

"We keep the roads and alleys cleaned in and about our dwelling houses, and can employ boys in cleaning up the rubbish, cutting weeds and keeping the grounds in order.

"We maintain playgrounds for the children and recreation halls etc., for the men and women, and these grounds have to be kept in order."

You also say you contemplate the work of boys as follows:

"We intend to employ boys in the woodlands, in the handling and stacking of props, mine ties, bark, etc., and in other light work along with the woodsmen employed."

The employment of minors, as described in your first statement, in cleaning up yards and alleys around dwelling houses and recreation halls owned by the coal-mining company, and in generally keeping the grounds about these buildings in order, does not come within the taxation intent of the law, even though the yards, alleys and grounds are owned by the company operating the coal mines and the names of such minors appear on the payroll of the company, always providing that such employment will not suffer or permit the minors to be in or about the mines.

The employment of boys in woodlands, as contemplated in your second statement, in the handling and stacking of props, mine ties, bark, etc., and in other light work along with the woodsmen employed, is not held to be employment in a mine, even though the woodlands are owned by the coal-mining company and the names of such boys appear on the payroll of the mining company.

However, the terms of the Child-Labor Tax Law provide that any person operating a mill, cannery, workshop,

factory or manufacturing establishment in which children under fourteen years are employed, or in which children between fourteen and sixteen years are employed or permitted to work contrary to certain specified standards as to hours, shall be subject to the tax. The law applying as thus stated, to mills covers also the cutting of timber for a sawmill as well as to all other departments connected with the operation of a sawmill. Therefore, the employment of boys in woodlands in connection with a sawmill, or whose duties take them in or about a sawmill, would come within the taxation intent of the law.

Coal Age is at liberty to publish this correspondence if it is deemed desirable.

J. P. Payor, Genl. Supt.,
Cresson, Penn. Pennsylvania Coal & Coke Corp.

Coal Mines in Scotland

Letter No. 1—Kindly permit me as a Scotchman, to refer to the short article that appeared in *Coal Age*, Sept. 4, p. 395, entitled "Coal Mining in France and Scotland." The article bears no name, but the writer, whoever he may be, draws his own conclusions between the managers of two coal mines that he claims to have visited, one in France and the other in Scotland. He will pardon me for saying that his remarks relating to the Scotland mine and its manager show either he has never been in Scotland, or he visited one of the wagon mines of the old school; and I want to speak a word in defense of the poor ignorant Scotch manager described by our friend in this article.

Anyone who is familiar with coal mining in Scotland will say that many of the mines are the most modern operations to be found in the world. The last mine where I worked before leaving Scotland was one of the best mines it has ever been my fortune to work in or visit. The mine hoisted 2000 tons in 8 hr., and the mine cars only held 1000 lb. each, so that there could have been no "go-as-you-please" work about the plant, as our friend would have us believe. I may add that there are shafts in Scotland, hoisting 4000 tons in 8 hr., from a depth of 2000 feet.

Requirements in Scottish Mines

Speaking of the hemp cable, in use in the French mine, it may be of interest to know that the Department of Mines in Scotland condemned the use of hemp cables in mines, 20 years ago. Tested steel-wire cables are required and these are allowed to be used only nine months in shafts over 500 ft. and twelve months where the depth is 500 ft. or less.

In France, the article states, a shaft must be inspected once a month. But, in Scotland, the manager must examine the shaft every week; and men are employed who do nothing else but look after the shaft and hoisting equipment. This is carefully examined every shift before the men go down into the mine, the rule being strictly enforced by the Department of Mines and the mine inspectors.

Evidently, our friend does not know that the Scottish Parliament, in 1903, passed a law requiring every shaft to employ two engineers at all times. He speaks about pillars of coal being left in these mines when everyone knows that Scotland is famed for its longwall work, where all the coal is taken out on the advancing method starting from the shaft bottom. He states the Scotch manager was "hardly above the level of an ordinary hewer." It is difficult to say where he gets the term "hewer," which is the English word for miner. The Scotch word for miner is "collier."

Speaking of managers of mines in Scotland, there are three grades; namely managers, under-managers and minebosses. It is seldom a Scotch collier ever gets above the under-manager. Most all mine managers are men with a college training and first-class mining engineers. The examinations required of candidates for managers and under-managers are as hard as any in the world required in the filling of these positions. A man cannot pass this examination, or even take the examination, unless he can run a first-motion engine.

Let me suggest, in closing, that my friend, whom I do not know and cannot address, would do well to go back to Scotland and see some real coal mines such as I am confident he has never seen.

John A. Douglas, Supt.,
Page, W. Va. Loop Creek Colliery Co..

Avoidable Degradation of Coal

Letter No. 1—I have been reading with great interest the article of Benedict Shubart, *Coal Age*, Sept. 4, p. 491, in which he discusses the avoidable degradaton, or reduction in sizes, produced in the preparation of coal for the market. This is an exceedingly interesting and important subject for discussion, as there are many factors that enter into the problem, and the trouble is not all due to the style of equipment employed for loading the coal, on the surface.

At the present time, it is my duty to study the conditions under which the miner is performing his work, with a view to selecting the kind of explosive he should use and instructing him how to place his shots so as to secure the best results and produce a larger percentage of lump coal. Observation convinces me that conditions at the working face are responsible for much of the degradation of the coal, although I will not deny that the manner of preparing, loading and transporting the coal, both in the mine and on the surface, plays an important part in reducing the size of the coal before it reaches the market. The point I would emphasize, however, is that more attention should be given to the manner of blasting the coal, especially where it is the practice to blast off the solid, as it is in the anthracite region.

Start Improvements at the Bottom, Coöperation Needed

Strange as it may seem the average coal operator appears to prefer to start from the outside when attempting to improve conditions in his business. Far better results would be accomplished if the work of improvement was to commence at the other end. "Start at the bottom" is my motto. It will often be found that 90 per cent. of the difficulties that lower the standard and quality of the coal arise from the lack of coöperation between those in charge of the work underground and on the surface.

There should always be a common aim and understanding of what is required. When the outside foreman complains that miners are sending out dirty coal, he should not be met with some reply tending to throw the blame on the man outside. Again, when large pieces of coal are loaded by miners, the complaint is often heard that too much time is required to break up the pieces or to get them out of the car. It would

seem that both the inside and outside foremen should get together for the purpose of producing the best results possible.

However, as I said before, more attention should be given to the miner, who must be taught to use more judgment and skill in the performance of his work. Blasting coal is a science that should be carefully studied. The charge of powder must be in proportion to its work. If the charge is too deeply laid poor results will be secured; and on the other hand, too light a shot will pulverize the coal and give equally poor results. Judgment and experience are required for the work of blasting.

Plan of Mine and Methods of Working Largely Responsible for Excessive Breakage

In the matter of securing more of the larger sizes of coal for the market, it is necessary to go further back in the development, and study the conditions that should determine the laying out of a mine and the method of working to be employed that will give the desired results. In the bituminous field, especially, the direction of driving the entries and rooms must be largely determined by the vertical cleavages of the coal, the inclination of the seam and the extent of the basin or property to be worked.

The room-and-pillar system of mining should not be employed where longwall will give better results. In longwall work, there is a great advantage in keeping the line of the working face parallel to the cleats in the coal. The careful study of these conditions, in the laying out of a mine, will often produce surprising results.

An important feature in reducing the amount of breakage, in the handling and loading of coal at the face, is the distance the coal must be shoveled or otherwise handled before it can be loaded into the car. On this account, the driving of chambers at a great width is often a serious disadvantage, because of the distance the coal must be handled to get it to the car where it can be loaded. To lessen the work of shoveling, it is very common practice, in the anthracite region, for a miner to arrange his shots so as to throw the coal toward the roadway. Where coal is mined on steep pitches much breakage is caused by loading the coal from chutes, and this will depend very much on the height of mine car used.

Handling the Coal From the Face to the Dump

When one follows the coal, from the time it is blasted out of the solid until it reaches the tipple, passes through the breaker and is finally loaded into the railroad car, he is often led to wonder that the percentage of large coal is not much less than the actual. By the application of modern machinery, great strides have been made, in recent years, in the economical handling of the products of our mines; and yet there is room for improvement all along the line.

I can remember when, some years ago, in a mine in South Wales, supposed to be one of the most uptodate operations in Great Britain, it was forbidden to load coal with the shovel. Each miner was furnished with two sheet-iron boxes, and we had to get down on our knees and scoop the coal into these boxes with our hands. Notwithstanding all this, when the coal reached the tipple it was placed in a rotary dump that stood about 10 ft. over a perforated transit.

At that time, everything that went through the 2-in. perforations was deducted from the miner's gross weight. The process was known as the "Billy Fairplay." Under the conditions prevailing there, it was not unusual for a miner to load from 15 to 20 tons of coal for which he received no pay. I could never find out where the "Fairplay" came in, unless it referred to the operator's side of the question. Richard Bowen.

West Pittston, Penn.

Safety in Mine Timbering

Letter No. 6—Kindly permit me to offer a few comments on the letter of "Mine Foreman," *Coal Age*, Aug. 28, p. 378, in which he seems to favor the suggestion made by someone, previously, to the effect that illustrations of the right and wrong methods of timbering should be made and posted where men could study them. He adds, "This would impress on many the way in which accidents often occur from improper timbering."

To my way of thinking, it might be all right to do this if it were possible to timber every place the same way. It is well known, however, that conditions make it necessary to adopt different ways of timbering, and these can be learned only by actual practice. Before a man can become a practical timberman, he must be a certified miner.

Employment of Uncertified Men as Timbermen and Facebosses Condemned

Under the mining law of Illinois, a man can secure a certificate as miner only by passing an examination before the Miners' Examining Board to show his knowledge of coal mining and the laws governing the work. In my judgment, no one but a certified miner is qualified to act as timberman. In no case should an uncertified miner be permitted to timber places where his own safety and that of other men depend on his work.

It is true that many facebosses are men who have started as trapperboys, later driving mules or running motors and finally reaching a position of driverboss and then faceboss. It appears to me, however, that the employment of a man as faceboss who is not a certified miner is a practical violation of the state mining law, inasmuch as he will have to direct the work and be responsible for the safety of certified men mining the coal under his supervision. The faceboss may have a man under him who is no better than himself in respect to his knowledge of setting timbers and may send him to timber a place for machinemen whose lives are thus placed in his hands. Their safety depends on the way the work is performed.

After an experience of 24 years in the mines as miner, driver, trackman, timberman, mine examiner and mineboss (foreman) I will say that safety in mine timbering can be brought to the highest standard only by the employment of practical men who possess the sense of honor to be fully qualified as certified men, before attempting such work.

Speaking of a squeeze occurring in a mine, my opinion is that it makes little difference what material is used to timber the workings if the pillars in the mine are not large enough and strong enough to support the overlying strata. If the bottom is soft and the great pressure on the pillars causes it to heave no amount of timber of any kind can stop it when it has once started.

My idea is, therefore, that the way in which the work is performed is of more importance than the material used in timbering. All depends on the knowledge of the mine manager (foreman), who must employ competent men and see that the work is done in a substantial and workmanlike manner.

Timber Agreement Between Superintendent and Mine Inspector Unfair to Foreman

Regarding the superintendent and mine inspector making a fixed agreement in respect to the timbering of a mine, it is my opinion that such an agreement would be unfair to the mine manager (foreman). In many cases, it will happen that the superintendent is a man who has worked up to his present position from that of a clerk in the office and who possesses only a theoretical knowledge of mining.

The mine manager is the man who is responsible for the lives of the men working in the mine. If he is a practical man, a certified miner who has passed his examination and proved his ability to take charge of a mine, he will not need a fixed rule for timbering, but will be guided solely by his own judgment and employ only certified men in the work of timbering.

Harrisburg, Ill. G. D. York.

Unpractical Examination Questions

Letter No. 8—Some time since I was looking over the issue of *Coal Age* for July 24, and my attention was arrested by the second question given on page 165 of that issue. The question asked for the dimensions of two airways having equal perimeters, the area of one being half again as large as that of the other.

While I do not ordinarily bother over such questions, this one seemed so simple that I started to work it out. I drew many diagrams of different forms, computing the area and perimeter of each.

After some time and labor, I found that a rectangular airway 6 x 9 ft., in section, had the same perimeter as one 3 x 12 ft., in section, the perimeter in each case being 30 ft. Also, the area of the first airway, $6 \times 9 = 54$ sq.ft., is half again as large as that of the second airway, $3 \times 12 = 36$ sq.ft.; thus, $36 \times 1\frac{1}{2} = 54$.

This did not and does not appeal to me, however, as a practical solution of the question, and I was pleased to see the solutions that were given later in *Coal Age*, Aug. 28, pp. 374 and 375. The last one given by Dave Hunter I believe is the most simple and practical solution that can be offered in answer to such a question.

Seneca, Ill. A. M. Brown, Jr.

Bolshevism in America

Letter No. 4—It is with much pleasure and satisfaction that I have read the letters on this subject that have appeared recently in *Coal Age*, and want to express the hope that the intelligent opinions expressed in these letters will have the effect of arousing the true citizens of America and cause them to mobilize in a manner to counteract the already mobilized Bolshevik forces in this country. Until this is done there will be no end of labor troubles that prevail today, not only here, but throughout the world.

In the mining region, especially, Bolshevism is the topic of the day. In my opinion, our coal producing centers are the homes of many Bolshevik agitators and followers. The latter are not generally animated by an intelligent desire for these doctrines, but, through their lack of intelligence, they allow themselves to be led by men who preach force and violence. Not a few already recognize that they have lowered their standard of living and not improved their conditions.

It is little wonder that the cost of living today is high, when workers all over the country are demanding high wages and shorter hours. It would seem that these workers think that the capital invested in the various industries is making such enormous profit that there can be no limit to their own demands. But, it must be remembered that to satisfy these demands of organized labor, it is necessary for producers to increase the cost of their products, and the result is no advantage to the consumer. In other words, stress, threats and violence are not the remedy for the high cost of living.

Strikes Prove Costly to All Concerned

The cost of a strike to the workers is not considered by the men who advise such a course, who do not stop to think whether men dependent on their daily wage can stand a week or a month of idleness. If such statistics were available, they would show that many a child and mother have lived in want because the breadwinner would not or could not stand the disgrace of being called an "unfair workman," or "scab."

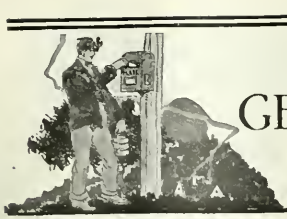
Strikers in all industries overlook the important fact that when a few hundred or thousand men walk out on strike, thousands of their countrymen suffer loss by being obliged to pay more for the necessities of life because production is curtailed. The more intelligent of men realize that the act of strikers is not confined in its effects to themselves, but is felt by a large community of people who are dependent on the products of their labor. Knowing this, it is the duty of every broad-minded citizen to coöperate with the Government in its efforts to adjust differences and restore the country to normal conditions. There is but one way to settle these existing difficulties, and that is for workers to cooperate with their employers for the welfare of the general public.

Cause for Decline in Money Value

It is quite true that the purchasing value of a dollar has grown rapidly less in the past few years, till it is scarcely more than one-half of what it was formerly. The principal cause for this condition can be traced to so large a class of workers who have fallen victims to Bolshevik activities.

Is it not high time that industrial workers in this country realized that the President has started a battle to reduce the high cost of living, but that he is helpless to gain this end if they themselves continue to demand higher wages which can only force still higher the cost of life's necessities? Let us, then, get together in an honest effort to restore normal conditions, which alone can bring the dollar back to its original value. Let us recognize that there is no American principle in the Bolshevik plan, which started in a foreign country and is now sowing its seeds of discontent in our own land. It is the duty of every honest worker to uncover and condemn whatever has the appearance of Bolshevism. By this means only can we insure its failure and come to enjoy the blessings that are ours.

Plymouth, Penn. Joseph R. Thomas.



INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Calculating Air Splits

Explain the method of calculating the natural division of 15,000 cu.ft. of air in the following three splits:

Split A,	6 x 10 ft.,	4000 ft. long;
Split B,	5 x 12 ft.,	6000 ft. long;
Split C,	5 x 8 ft.,	3500 ft. long.

West Terre Haute, Ind STUDENT.

These three airways have the following respective lengths, perimeters and areas:

	Size	Length	Perimeter	Area
A,	6 x 10 ft.,	4000 ft.	32 ft.	60 sq. ft.
B,	5 x 12 ft.,	6000 ft.	34 ft.	60 sq. ft.
C,	5 x 8 ft.	3500 ft.	26 ft.	40 sq. ft.

It shortens the operation to take the relative lengths, perimeters and areas, by cancelling the common factors in each, as follows: The relative lengths are 8, 12, 7; perimeters, 32, 34, 25; and areas, 3, 3, 2.

A, $a\sqrt{\frac{a}{lo}} = 3\sqrt{\frac{3}{8 \times 32}} = 0.325$ $\quad \frac{325}{792} \times 15{,}000 = 6155$ cu.ft.

B, $= 3\sqrt{\frac{3}{12 \times 34}} = 0.257$ $\quad \frac{257}{792} \times 15{,}000 = 4868$ cu.ft.

C, $= 2\sqrt{\frac{2}{7 \times 26}} = 0.210$ $\quad \frac{210}{792} \times 15{,}000 = 3977$ cu.ft.

Sum of potentials . . . 0.792 Total . . . 15,000 cu.ft.

Resistance of Mine-Track Curves

Kindly permit me to ask if there is any reliable formula or method of calculating the resistance due to a curve in the track, on a mine haulage road. We have one or two fairly sharp curves, on the main road in our mine, and I am interested in estimating, as nearly as possible, what is the resistance due to these curves.

———, Penn. MINE ENGINEER.

The resistance due to curves, in mine haulage, can only be estimated approximately. The chief factors on which it depends are the following: Gross weight hauled, wheelbase of cars or motor and the degree of curve or radius of curvature of the track.

Experiment has shown that the unit resistance of curves, or the resistance, in pounds per ton, per degree of curve, decreases as the gross weight hauled increases. Thus, the resistance per ton when hauling a *single car* was found to be two or three times greater than when hauling a *train of cars*, over the same road and on the same curve.

In railroad practice on the surface, a fair average resistance, per ton per degree of curve, is assumed as 0.8 lb. In mining practice, however, when hauling over a well-ballasted road in good condition, the resistance per ton per degree of curve is less, chiefly due to the shorter wheelbase of the mine cars, which seldom exceds 3 feet.

In mining practice, it is usual to estimate on the radius of curve, instead of the degree of curve.

A rule that is sometimes used to determine the resistance of mine-track curves is the following: Multiply one-fifth of the gross weight hauled (W), in pounds, by the wheelbase (B), in feet, and divide that product by the radius of the curve (R), in feet; thus,

$$R = \frac{BW}{5R}$$

When hauling a train of 20 or 25 cars, the constant (5), in this formula, may have a value of 6 or 7, depending on conditions that tend to decrease the resistance, such as excellent track, good rolling stock and relative number of cars making up the trip.

Sparking of Electric Motors

We have a four-pole, Imperial Electric Co. motor running our conveyor line which gives us quite a lot of trouble. The brushes spark and the commutator stays hot. The commutator has 109 segments and I wish to ask how the brushes should be placed to obtain the best results. The ring to which the brush holders are attached is stationary and I do not think, therefore, that the trouble could be from the brushes working too far forward or backward on the commutator.

———, W. Va. SUPERINTENDENT.

It would be difficult, if not impossible, to suggest the real cause and remedy for the sparking of the brushes on the motor mentioned by this correspondent. We do not recognize the name given in the inquiry and are unfamiliar with the type of motor mentioned. For this reason, we would advise direct correspondence with the manufacturer of the machine, who may be able to suggest the proper remedy.

As is well known, there are different types of brushes adapted to different services, depending largely on the speed of the motor and conditions surrounding its operation. Sparking at the brushes is very frequently caused by the overloading of the motor, which may be the case in this instance. Again, the brushes may not be adjusted properly.

If the motor is overloaded, the sparking may be somewhat lessened but cannot be wholly eliminated by shifting the brushes a little back on the motor. Anything that will cause the brushes to jump on the commutator, such as one or more high bars, rough surface or dirty brushes, eccentricity, or a sprung armature shaft, too high speed, etc., will cause sparking at the brushes.

The actual cause of the sparking, in any particular case, can only be determined and remedied by a careful inspection and familiarity with the machine. We would advise, also, correspondence with reliable manufacturers of brushes, who will generally be able to recommend a suitable type of brush to avoid the difficulty.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Miscellaneous Questions

(Answered by Request)

Ques.—If 40,000 cu.ft. per min. passes through an airway 9 x 6 ft. in section, what is the length of one side of a square airway through which 10,000 cu.ft. per min. will pass under the same pressure?

Ans.—For the same length of airway and unit pressure, the square of the quantity varies inversely as the perimeter of the airway and directly as the cube of its sectional area. Hence, the square of the quantity ratio is equal to the inverse perimeter ratio, times the cube of the area ratio. In this case, the perimeter and sectional area of the first airway are $2(6 + 9) = 30$ ft. and $6 \times 9 = 54$ sq.ft., respectively. Also calling one side of the square airway s, its perimeter and sectional area are $4s$ and s^2, respectively. The quantity ratio, in this case, is 4 : 1, and we write,

$$\left(\frac{4}{1}\right)^2 = \frac{4s}{30} \times \left(\frac{54}{s^2}\right)^3$$

which gives for the value of s

$$s^5 = \frac{4 \cdot 54^3}{4^2 \cdot 30} = \frac{54^3}{120} = 1312.2$$

$$s = \sqrt[5]{1312.2} = 4.2\ ft.$$

Hence, the side of a square airway that will pass 10,000 cu.ft. per min., under the same pressure that a 6×9 ft. airway of the same length will pass 40,000 cu.ft. per min., is 4.2 ft., and its sectional area is $4.2^2 = 17.64$ sq.ft.

Ques.—From the following data find the theoretical water gage: A fan driven by two coupled engines having cylinders 18 in. in diameter, length of stroke, 42 in., number of strokes per minute, 50, mean effective pressure, 16.8 lb. per sq.in., and developing 80 i.hp. is circulating 144,055 cu.ft. of air per min., and producing an actual water gage of 3 in. in the fan drift.

Ans.—Something is wrong in the statement of this question, as the indicated horsepower of a duplex 18 x 42-in. engine, making 50 strokes a minute, under a mean effective steam pressure of 16.8 lb. per sq. in., would develop a power of only

$$H = \frac{2 \times 16.8(0.7854 \times 18^2)3\frac{1}{2} \times 50}{33{,}000} = 45\tfrac{1}{3}\ i.hp.$$

But the effective power on the air, in the circulation of 144,055 cu.ft. of air against a 3-in. water gage is,

$$H = \frac{144{,}055(3 \cdot 5.2)}{33{,}000} = 68+\ hp.$$

Even assuming that, as the question states, the engine is developing 80 i.hp. in driving the fan, it is then only possible to estimate the *mechanical* efficiency of the fan and engine combined, which is $(100 \times 68) \div 80 = 85$ per cent. But, to find the theoretical water gage from the 3-in. gage effective in the fan drift, it is necessary to know the *manometric* efficiency, or the ratio of the effective to the theoretical pressure of gage, which is not the same as the mechanical efficiency found above.

Ques.—(a) What are the causes of creep and squeeze? (b) How would you guard against them? (c) How would you proceed to stop them?

Ans.—(a) A squeeze or creep occurring in a mine is the result of leaving insufficient pillar support. In other words, the pillars are too small for the depth of cover and thickness and strength of the coal, in the seam worked. The excessive roof pressure tends either to crush the coal or force the pillars into the soft bottom, causing it to heave. Either of these conditions is known as "squeeze or creep," in mining.

(b) To guard against the occurrence of squeeze or creep, it is necessary to leave adequate pillars to support the roof and take necessary precautions to prevent the heaving of a soft bottom. If the bottom is fireclay, it must be kept as dry as possible by providing good drainage.

(c) The most effective means of arresting a squeeze is to start a good fall of roof in the waste, and push the rapid extraction of pillars in adjoining sections of the mine.

Ques.—(a) How would you proceed to rescue men remaining in a mine after an explosion? (b) What difficulties would you be likely to encounter and how would you overcome them?

Ans.—(a) Call for volunteers and select from these the most experienced men and those familiar with the mine. Where trained rescue teams are available, these are given preference. Examine and make any needed temporary repairs to the ventilating apparatus. Organize two rescue parties, placing each in charge of a competent leader. Equip these men with safety lamps and all necessary tools and other supplies.

Enter the mine on the intake air, the men equipped with breathing apparatus going ahead as exploring parties, advancing as rapidly as possible but not faster than the air. The second or follow-up party makes necessary repairs, erecting brattices where these are wanted to carry the air forward and restore the circulation as rapidly as possible. In this manner each section of the mine must be explored and every effort made to rescue the men entombed in the workings.

(b) The difficulties to be encountered consist mainly in the lack of air circulating in the mine following an explosion, owing to doors and stoppings having been blown down and the means of ventilation destroyed by the blast. The passageways are filled with debris, timbers and fallen roof, broken cars and twisted iron, making progress slow and dangerous. Also the afterdamp that fills the mine is irrespirable and poisonous. These difficulties must be overcome by doing everything to restore the circulation of air and to remove the accumulated gases and the numerous obstructions in the roads and passageways.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

European Coal Situation

Reports Received From Consular Officers Abroad Show That the Need for Fuel Is Urgent and That the Time Is Ripe for American Coal to Obtain a Footing in Foreign Markets

GERMAN AUSTRIA

Consul General Albert Halstead,
Vienna, July 22

The figures quoted below were furnished by the correspondent for German Austria and Hungary of a prominent American newspaper, and, while unofficial, are believed to be accurate:

"As a result of the revolution German Austria lost all its sources of coal supply. Only 5000 tons per day—that is, 12 per cent. of the coal required in 1913 for railway, industrial and household purposes—is now produced in German Austria; 88 per cent. must be imported. As the German Austria coal is of a poor quality, the 12 per cent. must be reduced to 6 per cent. One of the activities most affected is the railroads.

"The German Austrian railroads made agreements with neighboring states for the supply of 177,890 tons of coal per month, but these promises have been fulfilled only to the extent of 109,650 tons per month, or 62 per cent. of the quantity agreed upon. Because of the small importations, the coal produced within the country has had to be used for various industries, and the 30,250 tons per month that usually were secured by the railroads from this source have been reduced to 26,800 tons.

"The railroads require 166,500 tons of coal per month, whereas the total amount which they now have is the 109,650 tons from foreign sources plus 26,800 tons from their own mines, making only 136,450 tons per month, or about 30,000 tons less than their requirements. The railroads say they ought to have a stock of 400,000 tons on hand, whereas they have only 32,200, or coal sufficient for about five days.

"The electric light and power plant in Vienna is so hard pressed for coal that a few days ago it found itself on the verge of being compelled to shut down. It called on the railroads in this emergency, and the railroads loaned the plant 5000 tons. At this time the electric light and power plant had on hand only 1500 tons of coal, or less than two days' supply. At the corresponding date in 1918 the plant had 40,000 tons of coal. The consumption of coal by the electric-light plant, even with its present greatly reduced service, is 800 tons per day, but on account of strikes in foreign mines and for other reasons the actual delivery of coal is brought down to 300 tons per day.

"The gas works of Vienna had on July 15 of this year a supply of only 26,000 tons of coal. On the corresponding date last year it had on hand 126,000 tons of coal. The electric plant on July 15, 1918 had a stock of 44,000 tons of coal, and on July 15 of this year it had only 2000 tons of coal on hand; four days later, July 19, its reserve was down to 1500 tons, or a loss of 500 tons in four days.

"It has been necessary to close the Vienna belt railway, part subway and part elevated, for lack of coal, and railway service during the war has been reduced to about 24 per cent. of the service in 1914."

It will be observed that the foregoing statement does not deal with the quantities of coal required for industries. This would be very much more than that needed by the various city undertakings. It will be further observed that the coal required for heating private dwellings is not taken into consideration. Without coal for the industries, industrial unrest must be augmented; without coal for the household, life in winter will be well-nigh intolerable.

The lack of fuel in Austria in serious.

DENMARK

Trade Commissioner Thormod O. Klath,
Copenhagen, July 14, 1919.

Throughout the war period Denmark had great difficulty in keeping up its fuel supply, and for some time many of the less essential industries were forced to close down. By practicing the strictest economy, however, supplemented by Government regulation and distribution of the supplies received, it was possible to get along. The imports gradually became less as the war continued, until at the end of 1918 the lowest point was reached.

The normal annual coal requirements of Denmark amount to over 3,000,000 tons, all of which must be imported, as there are no coal mines in the country. Of this amount the gas plants consume approximately 600,000 tons; electrical plants, 100,000; industrial plants 1,500,000, railroads 550,000; and household and miscellaneous uses about 250,000. Approximately 750,000 tons of coke are used annually, mostly for heating houses, of which 400,000 tons are imported and 350,000 tons produced by the Danish gas plants.

The following table shows (in metric tons of 2204.6 lb.) the imports of coal, coke and fuel briquets into Denmark for the years 1913 to 1918 inclusive, and the principal exporting countries:

Articles and Countries	1913	1914	1915	1916	1917	1918
Coal:						
Germany	189,211	131,321	109,715	508,115	644,058	687,101
United Kingdom—						
England	1,494,693	1,615,180	1,605,553	1,046,372	424,076	557,414
Scotland	1,401,293	1,374,762	1,469,452	1,197,851	388,320	494,910
Wales	32,057	54,157	39,860	48,105	11,103	9,415
Other countries	32,272	48,961	6,129	11,679	5,108	2,400
Total, coal	3,149,526	3,224,381	3,230,709	2,812,122	1,472,665	1,751,240
Coke	275,270	248,645	449,626	647,319	465,642	360,081
Briquets	148,557	139,455	183,647	245,366	187,505	117,561

It will be seen that the United Kingdom has been the chief source of Denmark's coal imports, and about 90 per cent. of the coke imported has also come from the United Kingdom. Germany has been next in importance in supplying coal. Especially during the last years Germany has sent a large amount of coal to Denmark to help pay for the foodstuffs from Denmark. The German coal in a measure also aided in keeping up the exchange rates between these two countries.

Early in the war, when the coal shortage first became felt, the Government laid down very strict rules looking to the conservation of coal. Street lighting was cut down to the minimum, the number of street cars was reduced, and fuel for household use was rationed. Electric current for lighting houses and stores was charged for at increased rates if more than the minimum quantity was used, and the same was true of gas. Stores and other places of business were compelled to close at an early hour to save fuel, and restaurants were allowed to serve hot dishes only between certain hours. All superfluous lighting of theaters was discontinued, and all theaters had to be closed by 10 o'clock. Practically all of these regulations were continued throughout the war and are still in effect in all parts of Denmark.

There are deposits of peat in various sections of Jutland (the continental portion of Denmark), and on the different islands. The total peat area has been estimated at 62,000 square miles. If an amount of peat were used annually equivalent to the heat value of 4,000,000 tons of bituminous coal, this supply would meet all of Denmark's fuel requirements for about 37 years. The lack of coal stimulated peat production, and 397,800 tons were produced in 1917, as compared with 285,000 tons in 1916.

Two tons of dried and prepared peat have approximately the same heat value as one ton of ordinary coal. However, peat is so bulky that it is difficult and wasteful to handle, and even though the original cost of peat is less than coal the final cost, after handling, is about the same as that of imported coal.

Peat has been used principally for domestic heating purposes, but also to some extent in industrial plants and as locomotive fuel. In many places the gas plants have been experimenting with peat in producing illuminating gas, but the consumption for this use has not been large. If the use of peat by the gas plants is developed to any extent, the production of coal-tar products, ammonia, etc., will undoubtedly form valuable byproducts.

About a year ago, the Danish Government fixed the maximum price of peat at $7 per ton at the moor and $8.60 per ton loaded in freight cars f.o.b. the seller's nearest railway station. The Government has done all in its power to encourage the production of peat and has given some financial assistance in the farm loans at low interest rates to producers. In 1917 there were in operation over 200 peat works that were partially supported by the Government.

The results obtained from peat fuel have been far more satisfactory. The large increase in peat production has been due chiefly to price-fixing by the Government and to other aid extended. These measures were taken, of course, to provide fuel for the country in an emergency, and when coal at a lower price and in sufficient quantities is again on the market the peat production will undoubtedly go back to its old basis.

The following figures show the output and number of factories producing machine-made peat in Denmark for certain years, the sudden increases for 1916 and 1917 being due to efforts to replace the usual supply of imported coal shut out by the war:

Year	Factories, Number	Output, Tons
1902	39	46,760
1907	53	63,948
1912	90	84,788
1914	97	86,849
1915	99	95,145
1916	204	285,000
1917	747	397,846

Brown coal (lignite) is a comparatively new product in Denmark, it having recently been discovered in Jutland. It is very similar to the brown coal found in many parts of Germany, although its heat value is said to be much less. Brown coal has been used extensively for a number of years in Germany, where it is found in large quantities and is of good quality. As fuel in the German glass industry, which is located near the brown-coal deposits, it has been of much importance. The use of brown coal in Denmark, however, will always be insignificant. Its greatest value will be for use in cement factories near the deposits in Jutland and for making fuel briquets in combination with peat and coal tar.

Normally about 315,000 tons of wood

are cut for fuel, equivalent in heat value to about 150,000 tons of coal. During the autumn of 1916 and the spring of 1917 about 765,000 tons of wood fuel were cut, due to the urgent demand. The cut will have to be reduced in the future, however, in order to keep up the scant forests of the country. During the coal scarcity large amounts of wood to be used as fuel were imported from Sweden and Norway.

The foregoing shows the conditions of the Danish fuel supply at the end of the war, and since the signing of the armistice conditions have not improved. The quantity of coal received from Germany has dropped to almost nothing, and great difficulty has been encountered in obtaining English coal. The English market is the largest source of supply at present, but even though Danish importers send their own ships to England, endless delays are met before the vessels can be loaded and return with cargoes. Sometimes a ship must wait three or even four weeks in the English ports before it can be loaded with coal.

As a result Danish coal importers have been looking to the United States as a possible source of supply. Orders to the amount of two or three hundred thousand tons have already been placed in the United States, a large part of which is for the use of the Danish Government railways. This American coal costs from $28 to $30 per ton c.i.f. Danish ports.

After considerable delay and many difficulties in obtaining shipping, a coal company of Copenhagen has succeeded in bringing to Denmark the first boatload of American coal that has ever been landed here. The first steamer arrived at Aarhus the latter part of June, and the second ship has just arrived at Copenhagen. There has been some question as to the quality of the American coal, but this doubt has already been dispelled. The manager of a local importing company stated that in his opinion the American coal is equal to, if not better than, the best English coal.

So long as the English and German coal is so scarce and so expensive, there is an opportunity for the United States to supply coal to Denmark. However, when conditions become nearer to normal in these two exporting countries, it is doubtful whether the American product can compete because of high freights.

It is undoubtedly true that American shipping could be more profitably employed than in carrying coal over the Atlantic to supply the factories and railways of Europe. This is especially true when the ships must return to the United States with little or no freight. The ideal situation, of course, would be to send cargoes of manufactured goods to supply the numerous wants of these countries.

If American coal is to be sent to Denmark or other Scandinavian country permanently, the American coal-exporting companies should take over some of the larger coal concerns operating at the principal ports. The coal could be used as bunkers for American ships in this part of the world. There would then be no need for American ships to rely on foreign bunker coal, as is now the case, and the control that foreign countries now exercise over American shipping would be entirely removed. This matter is worthy of serious consideration by American shipping and coal interests.

ITALY

Trade Commissioner H. C. MacLean,
Rome, July 28, 1919.

An industrial nation without coal is helpless, yet that is the situation which confronts Italy at the present moment. Italy has been accustomed to import practically all its coal from England, and England now finds itself unable to continue this supply as heretofore.

The Italian Minister of Transportation, speaking before the Chamber of Deputies on July 26, stated that the stocks of coal on hand for the railroads and navy were sufficient only for 14 days, including that on vessels being unloaded, in lighters, and on docks. Industry and transportation are so interdependent that one can not be deprived of coal to benefit the other, yet Italy's supply of coal will not permit both to operate to the customary extent.

The production of coal in England has decreased to a point where it is predicted that there will remain only a surplus of 15,000,000 tons per annum, instead of the 77,000,000 tons formerly exported and England has been obliged to limit the exports of coal to Italy to about 330,000 tons per month, for both private and Government account, which is less than one-half the quantity expected. On top of this has come notice that for the time being, at least, all shipments must be suspended.

Belgium, which furnished Italy about 20,000 tons per month, has prohibited the exportation of coal. Imports from France have been insufficient to afford any relief. Germany can supply Italy only after the requirements of France have been taken care of, which leaves Italy little basis for hope in this direction.

All eyes are turned toward the United States as the only country with a sufficient production to cope with the situation, but the shortage of tonnage has so far prevented the movement of adequate quantities of coal. By sending its own vessels, Italy has succeeded in assuring the shipment of 102,000 tons of American coal in July, as compared with 67,000 tons in June, and every effort is being made to provide additional tonnage. However, the difficulty in arranging credits to cover purchases and the extreme depreciation of the Italian lira abroad increase the difficulties already existing.

The following figures show Italy's imports of coal from 1913 to date, in metric tons of 2204.6 pounds:

Year	From United States	From England	From France	From Germany	From Other Countries	Total Imports
1913	92,000	9,397,000	162,000	968,000	215,000	10,834,000
1914	292,000	8,485,000	67,000	.....	915,000	9,759,000
1915	1,742,000	6,090,000	25,000	.....	512,000	8,369,000
1916	1,057,000	6,997,000	4,000	.....	7,000	8,065,000
1917	451,000	4,563,000	20,000	.....	3,000	5,037,000
1918	47,000	4,322,000	1,467,000	.....	5,000	5,840,000
1919 (6 months)	138,000	2,662,000	197,000	.....	54,000	2,996,000

Since 1916, it will be noted, Italy has been receiving only about one-half of the amount of coal normally consumed. Unless imports can be increased to approximately pre-war figures, the quick reconstitution of Italian industry, which is a matter of such vital importance to the country at the present time, will be impossible.

Under existing conditions it has even been found necessary to adopt measures to reduce even the present limited consumption of coal. At a meeting held on July 28 the Ministry of Transportation decided to further limit the passenger service on the railroads as well as on certain navigation lines. New trains, which had been added during the past few months but which are not absolutely indispensable, will be withdrawn Aug. 1. It was also feared that it would be necessary to limit the consumption of gas, but for the time being such action will not be taken.

SPAIN

Commercial Attaché Chester Lloyd Jones,
Madrid, June 28, 1919.

Heretofore the dependence of Spain on Great Britain for coal has extended even to the supply of the army and the national arsenals. An effort is being made this year to use the national product in these establishments, according to a report recently made to the president of the commission for the Study of Coal Resources. A decision to rely on the local product would have at the present time a social as well as an industrial bearing, inasmuch as many of the mines have large stocks of coal on hand, and if public purchases were not arranged there would arise labor troubles because of the necessity of closing down many of the works. It is urged also that transportation conditions are at present more favorable than in the winter, and that therefore it would be advisable for the Government to accumulate at this time a supply of the coal needed for its activities.

To carry out these objects the Minister of Abastecimientos (supplies) recently issued two royal orders directed to the Minister of War and the Minister of Marine asking that they state the amount of coal which they feel it would be advisable to have in storage for the use of their departments for a period of six or eight months. By another royal order on June 28 a similar request was addressed to the Departments of Fomento (promotion), Public Instruction, Treasury, State, and Justice. Coal dealers and individual consumers are urged to place their orders at once with the mines, and the Ministry of Abastecimientos gives the assurance that it will aid by all means in its power the efforts to avoid a coal famine such as occurred during the past winter.

The prices for foreign coal show some tendency to fall, due to the receipt of cargoes from Great Britain. Cardiff nut coal is quoted in Barcelona at 175 pesetas a ton, sea coal at 170, cobbles anthracite at 234, Newcastle at 185. [The normal exchange value of the Spanish peseta is 80.193.]

Coal exists in many parts of Persia and is at present being worked in at least two localities. Tabriz is supplied with coal from a neighboring mine, and Teheran coal has to a large extent taken the place of wood as fuel.

Foreign Coal Trade Opportunity

A company in England desires to purchase coal in any quantity and quality available. Quotations should be given c.i.f. Liverpool and London. Reference. The address may be obtained from the Bureau of Foreign and Domestic Commerce, Washington, D. C., or any of its district and cooperative offices. Refer to File No. 30,693.

Exports of Coal from Newcastle, Australia

Coal exported from Newcastle to points beyond the State of New South Wales for the period of six months ended June 30, 1919, states a recent consular report, amounted to 1,355,492 tons, which is a decrease of 343,829 tons from the 1,699,321 tons shipped during the corresponding period of 1918. A considerable proportion of the falling off of the interstate trade may be attributed to the strike of the coastwise seamen.

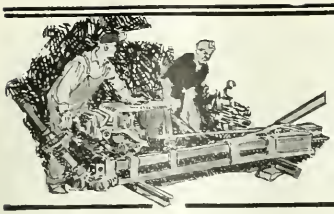
The amount shipped includes bunker coal, and in many cases the amount mentioned as being exported to a particular destination may have comprised simply the bunker coal required by the vessel to proceed to that port. The following table gives the relative amounts and destination of the coal shipments for the two periods mentioned:

Destination	Six Months Ended June 30 1918 Tons	1919 Tons
Victoria	695,491	485,828
South Australia	481,859	279,182
West Australia	44,210	63,267
Queensland	62,080	27,026
Tasmania	50,890	25,675
New Zealand	165,323	195,747
Sandwich Islands	1,200	27,850
Philippine Islands	11,850	9,477
Chile	2,414	17,450
United States	9,260	4,022
Noumea	11,421	12,717
Nauru	5,625	3,710
India	33,975	7,189
Society Islands	14,312	.....
Fiji	34,866	9,635
Java	2,698	42,511
New Hebrides	1,160	.....
New Guinea	9,941	5,882
Ocean Islands	6,208	3,036
Solomon Islands	2,081	.....
Alaska	606	.....
Hongkong	3,570	8,122
Straits Settlements	1,550	35,171
United Kingdom	15,097	75,374
Marshall Islands	403	.....
Gilbert Islands	1,275	411
Guam	25,477	.....
Canada	3,041	.....
South Africa	1,438	3,565
Tonga	.....	6,716
Peru	.....	3,511
Japan	.....	425
Mauritius	.....	789
Sweden	.....	1,204
Total	1,699,321	1,355,492

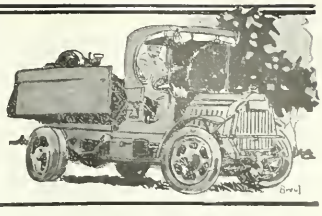
Exports during August amounted to $76,000,000 more than in July, being valued at $646,000,000. In August last year the total was $527,000,000. For the eight months ended with August exports were valued at $5,275,000,000 against $4,009,000,000 in 1918.

M. Loucheur, the French Minister of Reconstruction, in view of the alarming diminution in the output, amounting in some cases to as much as 50 per cent., has commissioned M. Defline, Director of Mines, to make an investigation with the coöperation of the Societe de l'Industrie Minerale. Commissions of Inquiry have already been appointed in the various coal fields.

Coal is being supplied to steamships, including warships of all nations, in transit through the Panama Canal, delivered and trimmed in bunkers, at $11.50 per ton of 2240 lb. at either Cristobal or Balboa. For ships not in transit through the Canal, $11.50 per ton at Cristobal and $13.50 per ton at Balboa. For ships taking less than carload lots from plants or less than 25 tons from lighters, the price is $13 per ton at Cristobal, $15 at Balboa.



COAL AND COKE NEWS



Harrisburg, Penn.

Question of abolition or continuation of state ten per cent. differential interesting people. Commissioner Donaldson opposed to differential. Governor Sproul thinks state fund should have a hearing.

Whether the ten per cent. differential in favor of the State Workmen's Insurance Fund, in writing compensation liability insurance, will be abolished on Jan. 1, 1920, or whether it will be continued until some future date, is a question which is interesting the insurance people. Insurance Commissioner Donaldson, who holds, in his letter to the State Board in charge of the fund, that the matter of abolishing the differential is wholly within his discretion, will be asked to submit the question to the board. Mr. Donaldson is opposed to the differential and believes that all compensation insurance should be on a parity, state fund or not. He has held that view for years.

Governor William C. Sproul, who was not advised as to the Donaldson plan until after the action had been made public, states, "I think that the state fund's side of this matter should be gone into. To my mind the state fund should have a hearing, too." Further than that the governor would not comment.

Mr. Donaldson replied a few days ago to the governor's request that the matter he held in abeyance, with a letter which said that action had already been taken by him under the act of 1919.

Judging from the governor's remarks, the matter will be taken up by the board, whose members in years gone by held that they had advisory powers at least on rates. Whether Mr. Donaldson will insist on the differential abolition or decide to make a trial awhile longer is the interesting question here.

Charleston, W. Va.

Most serious car shortage of calendar year in C. & O. territory. Railroad reverts to old practice. Gives all cars to mines furnishing railroad coal. Vigorous protest lodged. New River field gets 50 to 60 per cent. car supply. Production, 100,000 tons. Impossible to care for contract customers. Mines working half time in Kanawha field.

At no time during the present calendar year has there been a more serious car shortage, at least in mining territory supplied by the Chesapeake & Ohio Ry., than during the week ended Sept. 20, when production was not only seriously restricted but operations absolutely paralyzed for several days. Indeed during the latter part of the week the supply was under 40 per cent. in some parts of C. & O. territory. In other words, there was a 60 per cent. loss from a shortage of cars alone, the result of which was, of course, to force a total suspension of operations at many points. While the shortage in other parts of the state was not so serious, yet it made itself felt even in other districts.

To make matters worse the C. & O. had reverted to the old practice of giving what cars were available to mines furnishing it with railroad fuel, so that while some mines received a 100 per cent. supply, other mines received no cars at all. This of course created widespread discontent among operators, culminating in a vigorous protest lodged with the director general of railroads as well as with the general superintendent of the C. & O.; the only information elicited being that the company was unable to purchase coal and, therefore, had either to confiscate fuel, or else to favor the mines from which it obtained its supply of coal.

The very pronounced shortage made it absolutely impossible for mines to even meet contract requirements, either as to smokeless fuel or as to gas, splint and byproduct coals. Producers seek to make it plain that were the railroads furnishing an adequate car supply, they would have little difficulty in securing sufficient fuel; as then it would be possible for producers not only to take care of contracts but to let railroads have a larger supply of fuel; the railroads, however, are averse to buying coal unless they can secure it at ridiculously low prices. Prevailing high prices exist on paper only, as far as West Virginia producers are concerned, simply because they are having the time of their life even supplying fuel at contract prices fixed early in the year.

While export shipments by way of tidewater were somewhat larger during the week ended Sept. 20, there was not a sufficiently large production to enable operators to forward much tonnage either of smokeless, gas or splint to tide. Labor troubles to some extent also checked production.

As showing just how inadequate the supply of cars in the New River region was during the third week of September, it is only necessary to state that on Sept. 20 there were no less than 47 mines in the New River field without a single car available for loading. Taking the district as a whole, actual figures disclose the fact that the mines had only a 40 per cent. supply on the twentieth. The shortage was prevalent throughout the week and, while not so acute earlier in the period, yet was so serious as to seriously handicap producers in getting out coal; the supply throughout the week not averaging more than 50 or 60 per cent. No assurances were given of any improvement with respect to loading facilities, the situation apparently going from bad to worse. Production for the week is estimated at being less than 100,000 tons, an extremely serious situation for a district producing smokeless coal, a large part of which is being exported.

In the New River, as in other fields, operators were finding it absolutely impossible to take care of contract customers. Labor conditions still interfered with production to some extent but not so much so as in previous weeks. There was still no production at mines opposing the "closed shop," which forms a part of the wage contract now in force, and union miners were seeking work elsewhere, but other producers were not inclined to employ men in such cases. Strikes at mines producing what is known as "low coal" had all been settled with one exception. Insofar as it was possible to learn, the volume of New River coal exported was somewhat larger than during previous weeks when vessels were scarce.

An absence of cars at many operations completely disorganized operations in the Kanawha field throughout the week ended Sept. 20, conditions going from bad to worse as the week progressed, so that production was at quite low ebb; mines on an average were not able to work more than half time during the week. The car supply ranged from 70 per cent., at the outset of the weekly period, to 50 per cent. when the week's work was ended. Consequently little more than about 100,000 tons of coal were produced—not enough to enable producers to meet their contract obligations, much less to meet the growing demand for coal. As Kanawha producers are not even able to meet contracts, prevailing high prices do not represent prices being received for coal now being delivered.

Huntington, W. Va.

Logan field suffers loss in output in second week in September due to scarcity of cars. Production 55 per cent. Little prospect of improvement for third week of September. Labor trouble not anticipated.

An increase in the loss of working time, amounting to more than six hundred hours, cost the Logan district, during the week ending Sept. 13, almost 50,000 tons, such a loss being attributable to a falling car supply. In other words out of a total of 2457 hours lost in the Logan district, 2162 hours were lost because of the scarcity of cars; the total tonnage loss from a car shortage amounting to 140,000 tons as against 91,000 tons for the previous week. The percentage of loss from the meagre car supply rose from 38 to almost 40 per cent., while the total loss in production was increased from 34 to almost 45 per cent., or from 114,000 to 160,000 tons.

With the shortage of cars so pronounced of course production was cut down, slumping from 219,000 to 199,000 tons, a loss of about 20,000 tons; production for the week thus being restricted to about 55 per cent of full time capacity. As less than a thousand tons were lost because of a shortage of miners and only 10,000 tons because of mine disability, it will be evident that the car shortage was the principal factor in so greatly reducing the output in the Logan field. There was little promise of any improvement with respect to the car supply of the Guyan field during the third week of September, the Chesapeake & Ohio still being unable to secure enough cars from connections to keep all mines supplied. Both during the week ended Sept. 13 and during the week ended Sept. 20, not only were mines limited to part time operation but there were many instances where it was necessary to suspend operations pending the arrival of empties. Market conditions had no part in holding back production, there being an ample demand for all coal the mines of the Guyan field were able to produce.

On the eve of an investigation of conditions existing in the Logan field, growing out of charges made by the United Mine Workers, there was little evidence on the surface of any labor trouble in the district and miners in the field were working regularly insofar as the limited car supply would permit and were apparently satisfied as to wages and general living conditions.

Total loadings on the C. & O. for the month of August, as made public by that company at its Huntington offices, amounted to 39,000 cars or slightly less than 2,000,000 tons for the month; the decrease as compared with previous months being attributable to the railroad shopmen's strike early in August.

Fairmont, W. Va.

Third week in September one of the best production periods of the year. Heavy shipments eastward. Increase in tonnage west. Cars scarce on Western Maryland and Coal and Coke railroads. Effect of steel strike on output of coal and coke.

The week ended Sept. 20 stood out in bas relief as one of the best production periods of the year in the Fairmont region; the output being eclipsed in only one other weekly period during 1919—the week ended Aug. 23. The tonnage loaded on the Monongah division of the Baltimore & Ohio amounted to 325,000 while for the region as a whole the production was only a few hundred tons short of 400,000 tons; 7984 cars of coal being loaded and shipped in the region. The mines succeeded in overshadowing production for the corresponding period of 1918.

All previous records for the month of September were eclipsed in the shipment of coal eastward, amounting in all to 5629 cars. Western shipments, amounting in all to 920 cars of coal, were the heaviest of the year. At the same time there was a perceptible increase in western shipments of coke. Tidewater shipments grew in volume insofar as Curtis Bay was concerned, there being 1120 cars of coal shipped to that point; the heaviest tonnage for the year with the exception of the week ended Aug. 23. On the other hand, there was a marked decline in the tonnage flowing to St. George's piers.

There appeared to be a stronger market for northern West Virginia coal at the Lakes, shipments to such points showing an increase over previous weeks. Embargoes were still checking tidewater shipments to some extent.

In sharp contrast to conditions in the Fairmont region were those in other northern West Virginia fields, where mines were experiencing much trouble in securing cars. Empties were a negligible quantity on the Western Maryland R.R.; mines along that road were marking time and producing little coal. Coal loading equipment was also exceedingly scarce on the Coal and Coke division of the B. & O. R.R. At one point in the northern West Virginia fields on the twentieth no cars were to be had. Coal is being confiscated in some instances by one of the roads operating in the northern part of the state.

Speculation is rife as to what effect the steel strike will have on the production as well as on the price of coal produced in northern West Virginia fields. While prices have been slightly affected, changes have been almost imperceptible. So far as can be learned the volume of coal being shipped to steel plants is not exceptionally large. Coke production will be affected to a greater extent than coal, should the steel strike be protracted.

Bluefield, W. Va.

Pocahontas field increases output in second week in September. Car supply better. Export and contract trade in fair shape. Production slightly increased in Williamson field.

Marked improvement in the car supply in the Pocahontas region enabled mines in that region to materially increase their output during the week ended Sept. 13, the increase amounting to 56,000 tons, restoring the output to the figure reached in July and upon one or two occasions since then. In short from 282,000 tons for the week ended Sept. 6, production was advanced to 338,000 tons. This was accomplished by virtue of the fact that the loss from a shortage of cars was reduced from 153,000 to 116,000 tons, or a decrease in the loss of 42,000 tons.

During the previous week the shortage had become so serious that many mines had to suspend operations, operators entertering vigorous complaints, which apparently had some effect judging from the improvement in the car supply. With more cars available it was possible for Pocahontas producers to take care of export shipments as well as to make delivery of coal on contracts and to overcome to a slight extent the growing shortage of smokeless coal.

During the second week of September several large export shipments were started overseas and much coal for bunkering was shipped to tidewater. Shipments of Pocahontas coal to western points was comparatively limited although in greater volume than during the previous week. While the production of coke was not quite as heavy as during the previous week, production as a whole was maintained, there having been 12,819 tons of coal coked, some of it for inland western markets at a substantial price.

While figures covering production in the Williamson field are not available, production was increased slightly in that region owing to an improvement in the car supply, which has been for several weeks affecting production to the extent of about 25 per cent.

PENNSYLVANIA

Anthracite

Mt. Carmel—Recently a miner died as the result of injuries received from a fall of rock at Sayre colliery near here. This was the first fatality for a Lehigh Coal Co. mine in the entire district for the present year, which is a remarkably good showing.

Hazleton—The contract expired recently, which is said to have been made ten years ago by the contractor who has been doing the stripping for the G. B. Markle Co., at Ebervale and Oakdale, in the Black Creek basin north of this place. To strip the valuable Mammoth seam here, a score or more of steam shovels and other equipment in proportion was used; the contractor has just turned this property over to the Markle company. Other sections of this basin will be stripped and a large ditch dug to keep the waters of the valley out of the strippings and the mines here. An article descriptive of this mammoth stripping appearing in the Sept. 25, 1915, issue *Coal Age*, under the title of "Large Stripping Operation."

Harrisburg—Under the provision of a new act of assembly, approved recently, it is unlawful for any person to change his name or assume a different name unless such change is made pursuant to proceedings in court and approved by the court. It is believed that the act is aimed mainly at a certain class of foreign-speaking men employed about the mines, who go from colliery to colliery using a new name in each place of employment, evading payment of debts and taxes and also evading punishment or dicipline for violations of the mine laws. Such men have been known to be discharged at one mine for smoking in safety lamp districts, and a few days later were found working in another section of the same mine under a new name.

Shenandoah—A suit to force the sale of 973 acres of coal land in Locust Mountain was filed in court recently, and an injunction applied for. The Girard Mammoth Coal Co., a concern mining coal in a tract acquired by Stephen Girard, figures prominently in the proceedings. Defendants include J. Crosby Brown, Philadelphia, the Wentz Corporation, New York, the Home Missionary Society, of Philadelphia, Pennsylvania Company for insurance of Lives and Annuities; W. H. Ingram, Thomas De Witt Cuyler and Charles Tate, New York. Girard Mammoth Co. asks that the Raven Run Coal Co. be restrained from declaring void their lease, on which the Raven Run Co. is now operating. The present suit is the culmination of a series of disputes between the lessees and those controlling the coal lands involved.

Bituminous

Washington—The directors of the Houston Coal Co. have leased their Arnold mine to the Pittsburgh Mining Co., which is composed of Brownsville capitalists. The Houston Coal Co. is still operating its Pacton and McBurney mines.

Somerset—The Bittner and Walker mines, at North Somerset, Penn., have been sold to the Cosgrove Coal Co., of Johnstown, Penn., the consideration being private. The property includes 300 acres of coal and mining plant. James A. Meehan will superintend operations.

Iselin—The Brown Coal Co. has completed its Galion steel hoist and tipple, at Clarksburg (Indiana County), near here, and will begin loading the coal this week. The Brown company purchased the old "Hart" operation, which was the first mine opened in the Pittsburgh seam here for custom coal many years ago.

Mount Savage—It is reported that C. J. Rowe & Bros., Meyersdale, Penn., have purchased the entire equipment and leased the 2,000 acres of the old Bond and Parker mines at Barrelsville, near here in Allegany County, Md. Until recently these mines were operated by the Georges Creek Parker Coal Co. The lessees will install a conveyer belt system. The same company recently purchased the entire stock of the Big Vein Coal Co., of Mount Savage, and are mining coal under that name.

Blairsville—F. G. Davis has reopened two of his mines in the Pittsburgh seam here (Indiana County), and has a production of about 100 tons per day. He has announced that he will reopen the old mine on the Campbell farm, just north of Blairsville, in the near future.

Another historic land-mark of Indiana County passed out of existence when the old Smith mine, just north of here, was abandoned a few days ago. It was operated by the Robert Smith Coal Co., at Smith Station, on the Indiana branch of the Pennsylvania railroad. It was one of the oldest operating mines in Pennsylvania, being opened in 1823, thus making it 96 years old. It had been in continuous operation since its opening. It was the first mine in Indiana County to make shipments by rail, and has always been used to coal the engines of the Indiana branch trains. The tipple and other buildings are being dismantled and moved away.

WEST VIRGINIA

Charleston—According to announcement just made, equipment for five of the mine rescue stations recently established has been received and installed, the five stations being at Elkins, Wheeling, Fairmont, Mt. Hope and Charleston. While no permanent headquarters have been found yet for the rescue stations at Wheeling and Charleston, it is expected that it will be possible to find suitable headquarters in the near future. The training of crews at the various stations will be started at once. Should the occasion arise, any of the five stations are prepared to answer an emergency call.

While wagon mine operators have not been able so far to get into the market, owing to the fact that railroad companies will not furnish them cars, nevertheless the prediction is made that such mines will become potent factors in supplying many markets with coal during the coming winter, when there is apt to be a most pronounced shortage of domestic coal. This shortage is expected to bring about a return of the activities seen two years ago when wagon mines in West Virginia furnished about a million tons of coal in the space of a year. Under present market conditions wagon mines can be profitably operated, but for the last month there has been an order standing both as to the Baltimore & Ohio and the Monongahela railroads, in northern West Virginia, not to supply wagon mines with open top cars owing to the general shortage of cars; only a few days ago the Morgantown & Kingwood also promulgated a similar order.

OHIO

Martins Ferry—The Jones Coal Co.'s mine has resumed operations after being almost entirely idle for a period of a year. The company has erected a loading platform at the Pennsylvania siding here. Last year it loaded on the Wheeling & Lake Erie.

St. Clairsville—The Pursglove-Maher Coal Co. has purchased a large tract of land in the southeastern part of the town, on which they will build 100 houses. These will house employees who work at the company's mines in this vicinity. The addition to the town will be independent of the large number of miners' homes owned at the mines. Special train service and low commutation fares are obtained by the company to its mines for the employees residing here.

Pomeroy—The Vulcan Coal Co., of Pittsburgh, has sold its mine at this place, Meigs County, Ohio, to Jefferson and Belmont county men for $200,000. The company will operate the mine which has 2,000 tons daily capacity and 800 acres of unmined coal.

In buying the coal, the company also secured a large amount of surface which will be used for town purposes, present plans calling for the erection of 50 houses in the immediate future, with the possibility of more going up within the next year

Windsor—The Beach Bottom mine of the Richland Coal Co. was sold recently to West Penn. interests of the American Gas and Electric Co. This property is in Ashtabula County in the extreme northeastern part of Ohio. The deal is said to include the transfer of over 4000 acres of valuable coal land. No intimation of the purchase price would be made by the officials. This in no manner affects other interests of the Richland company, it is said. It is developed that the purchase was made to supply coal for the big Windsor plant. Although the present production of the mine is stated to be about 400,000 tons annuallly, it is expected that the new owners will increase production by at least 50 per cent. The tipple is close to the power plant.

Cincinnati—The Ohio is to do its part in filling the bins with coal, on which depends the business and comfort of other river towns and cities, says a dispatch. Orders issued by Colonel Lansing B. Beach, U. S. division engineer in charge, directed the starting of the first "navigation wave" of the present season. The wave was to begin at Dam No. 14. In anticipation of it, coal fleets assembled at the loading places adjacent to the mines on the Ohio and Kanawha rivers. Millions of bushels of coal were on the barges ready for the start. Should circumstances make it necessary, the "waves" will be operated about every two weeks, if the shippers are able to make use of them that frequently.

INDIANA

Hammond—The second battery of 60 coke ovens of the Mark Manufacturing Co., Indiana Harbor, has begun production with a capacity of 1200 tons of coal daily. This makes a total of 120 ovens in operation, and two additionl batteries of 60 ovens each are planned.

Terre Haute—The engine room and boiler house at the Wizard mine of the

Hall-Zimmerman Coal Co., near West Terre Haute, in Sugar Creek Township, was destroyed by fire. Not much damage was done to the tipple, as the fire department of this place rendered valuable assistance. About 200 miners were at work in the mine when the fire broke out, but they made their escape through an opening to the Deep Vein Coal Co.'s workings adjoining.

ILLINOIS

Springfield—The first-aid team from Gillespie won the state championship cup in the mine-rescue contest at the arsenal here. Second place was won by the team from the Harrisburg rescue station. The team from mine No. 8 of the Madison Coal Corporation, Carterville, made the third highest average. The three teams will represent Illinois in the national first-aid contest to be held in Pittsburgh, Sept. 28 and 29 and Oct. 1. Twenty teams took part in the competition. The contest was conducted under the auspices of the United Mine Workers, various operators' associations and the state Department of Mines and Minerals, assisted by the Federal Bureau of Mines.

Benton—The directors of the Modern Coal Co. recently completed the organization of the Southern Gem Coal Co., which has taken over the mine of the Modern Coal Co. at Sesser, the West Frankfort Coal Co. mine at West Frankfort, and the Crown Coal Co. mine at Winkle, together with a large acreage of coal land in Franklin, Perry and Jefferson counties. The following officers were elected: Jesse Dimond, of Chicago and Benton, president; Thomas Horn, St. Louis, vice president; Herman Rea, of St. Louis and Christopher, secretary; John Dillavou, of Champaign, treasurer. It is the intention of the new company to mine coal on an extensive scale and to develop their holdings rapidly. The company plans to sink a new mine in Goode Township in the northwest corner of Franklin County; to make improvements at the West Frankfort and Winkle mines, and work will probably be commenced at an early date on the sinking of a mine near Waltonville in Jefferson County. The company has already secured options on Jefferson County coal land, in connection with that already owned.

The big Middlefork mine of the United States Fuel Co., in Franklin County, is becoming one of the largest plants of its kind in the state; its washer is said to be one of the largest in the country. The United States Fuel Co., of the United States Steel Corporation, is now erecting a large coke-oven plant near the Middlefork mine; when completed the plant will cover nearly 25 acres of ground. The company has recently purchased 70,000 acres of land adjacent to the mine and three miles east of here. A new town, known as Steel City, has been laid out and lots are being sold rapidly. The Middlefork mine now employs between 900 to 1200 men and, with the coking industry being launched, many more will be taken on later.

The Franklin County Coal and Mining Co. has completed a modern mine immediately north of the Steel City townsite and this mine is now being operated steadily. It is probable that within 18 months, the town will have a population of several thousand. The United States Steel Corporation has spent millions of dollars buying thousands of acres of coal lands in this section.

KENTUCKY

Louisville—Representatives of the coal mining interests of Harlan County, Kentucky, recently discussed the car shortage and other problems of the operators in this field with a number of senators from Kentucky and other southern states. The operators are seeking concerted action looking to improved transportation for the product of their mines to market.

Elkhorn City—G. A. Corson, president of the Corson Byproduct Coal Corporation, of this place, has sold his holdings in this company. Mr. Corson is understood to have owned 54 per cent. of the stock of this concern. The purchaser was F. J. Mitchell, of Hellier, Ky., one of the pioneers of the Elkhorn field. The deal is said to have involved upward of $100,000. It is expected that R. W. Shumway, a mining engineer of Pikeville, Ky., will take charge of operations, as general manager.

London—A strong revival of industrial activity in Laurel County is quite noticeable. Coal mining plants at Viva, East Bernstadt, Lilly, Pittsburg and other places in the county, which have been shut down for several months this year are now in operation. Many of the miners who left this county last year for the coal fields of Harlan, Perry and Dell counties are returning. The opening of new coal fields in Laurel County, as soon as contemplated railroad extensions can be made, is being discussed here. Laurel County coal has been mined for the last 40 years this being the oldest mining county in southeastern Kentucky.

Lumber mills in all parts of the county are running at capacity to supply local and foreign demands, and the surplus of labor, which a few months ago seemed imminent, is now more than taken up by the mines, mills and various road construction projects. The Louisville & Nashville R.R. is spending more than $1,000,000 in constructing yard extensions in Corbin.

Personals

James R. Riggs, who has been appointed assistant secretary of agriculture of the United States, has been prominently identified with the coal development of Sullivan County, Indiana.

R. Z. Virgin, formerly in charge of mine extension work in various sections of West Virginia, has become associated with the Carnegie Institute of Technology, Pittsburgh, Penn. He is to be connected with the co-operative department of mining engineering at the institution.

George P. Brennan has resigned from his position in the engineering department of the Hillman Coal and Coke Co., at Brownsville, Penn. He has returned to his home at Scottdale, Penn., to take charge of the estate of his father, the late J. P. Brennan, who had large coal and coke interests in Fayette County, Penn.

James R. McNeil, who recently resigned his position as manager of No. 11 colliery of the Dominion Coal Co., has assumed charge of the Florence mine, of the Nova Scotia Steel and Coal Co. This appointment follows closely upon the engagement of **M. A. S. McNeil** as superintendent of mines of the Scotia company and **D. H. McLean** as manager of this company's Princess mines. Both of the latter also severed their connection with the Dominion company to go with the Scotia corporation.

Howard Cross, president of the company which recently acquired the plant of the Knob Coal Co., in Monongalia County, W. Va., is also interested in a number of other coal operations, as follows: He is general manager of the Carroll Cross Coal Co., of Emoryville, W. Va.; vice president of the Elk Garden Big Vein Coal Co.; general manager of the Emory Run Coal Co., of Mineral County, W. Va.; general manager of the Hartman Run Coal Co., near Morgantown, W. Va., and president of the Ino Coal Co., of Morgantown.

James Russel Fleming has been appointed Research Associate in Mining Engineering of the University of Illinois in the Engineering Experiment Station. Since he was graduated from the University of Pittsburgh in 1911, with the degree of Engineer of Mines, he has had the following experience in connection with mining: Assistant mining engineer with the United States Bureau of Mines 1912-17; since Dec., 1918, he has been engaged in part-time work for the United States Bureau of Mines and in practical engineering work.

Carl Scholz has been elected vice president and general manager of the Raleigh-Wyoming Coal Co., a West Virginia corporation, with headquarters in Charleston, W. Va.

This company will immediately commence the development of two mines. One will mine the Beckley seam, on the head waters of the Guyandotte River; this operation will be a shaft mine about 700 ft. deep. The other mine will be in the Eagle seam, on the head waters of the Coal River. Both operations will be equipped with modern machinery and are expected to become large producers.

Obituary

George Herbert Smith, export manager of the Berwind-White Coal Mining Co., No. 1 Broadway, New York, died on Sept. 10 at the Post-Graduate Hospital. Mr. Smith was in his fifty-second year.

Henry Bonnell, aged 54 years, a business man and owner of large coal interests, died recently at Cambridge Springs, Penn.

Industrial News

Marrowbone, Ky.—The Marrowbone Mining Co. is planning development of a large acreage located on Marrowbone Creek and paralleling the present property.

Cleveland, O.—Harvey L. Wells, of this place, is understood to have completed negotiations for the purchase of extensive coal properties in the vicinity of Morgantown, W. Va. Plans for development at an early date are now in process of formation.

South Milwaukee, Wis.—The Bucyrus Co., of this place, announces the opening of an office in the American Trust Bldg., Cleveland, Ohio, in charge of E. G. Lewis, district sales manager.

Thornton, Ky.—A. C. Craft, Thornton, has recently completed negotiations for the leasing of coal properties in the Thornton Creek district, and it is understood that plans are now in process of formation for immediate development work.

New York, N. Y.—F. H. Niles & Co., Inc., announce the following apointments: G. P. Goodman, formerly with the Hisey-Wolf Machine Co., takes charge of the company's portable tool department. Other changes in the Niles company are the appointment of F. H. Crawford, as secretary, and J. E. Haetten, as sales manager.

Bluefield, W. Va.—Announcement has been made by the Black Eagle Coal Co. that its offices are to be moved from Richmond, Va. to Graham, Va. The company recently changed hands, Tazewell County business men acquiring a controlling interest in it. The company's mines are located in Harding County, Ky., where a large output is produced.

Huntington, W. Va.—The Hyatt Roller Bearing Co., of New York, has established a branch office at this place. H. G. Nash, of the Huntington district, will be in charge of this office. The haulage problems of the mines in this district will receive the special attention of Mr. Nash and his assistants.

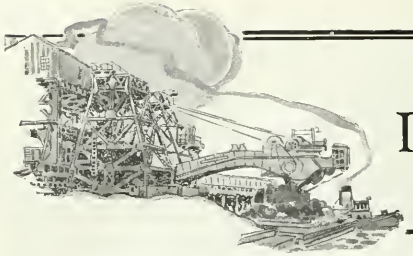
Valparaiso, Ind.—The Chicago Mica Co., of this place, has recently acquired the services of L. T. Frederick as consulting engineer and production manager. Mr. Frederick was formerly process engineer of the Westinghouse Electric & Manufacturing Co., of Pittsburgh, Penn. He has had a broad experience in the manufacture and application of all lines of electrical insulation.

Aurora, Ill.—The Barber-Greene Co., of this place, recently began work on the construction of a 90 x 180-ft. addition to its plant. This is the second time this year that additions have proved necessary to handle the work of this concern. The new building will be used as the assembly department and will be modern throughout. It is hoped to have this work finished within 60 to 90 days.

Huntington, W. Va.—The Ohio Valley Mine Car Co., manufacturer of mine cars and auxiliary equipment, has awarded a contract to the Huntington Iron Works, Huntington, for the erection of two new additions to its plant, for increased capacity. The structures will be of brick and steel construction, about 90 x 150 and 40 x 140 feet, respectively. E. E. Brown is manager.

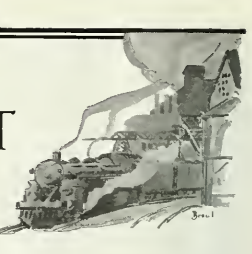
Chicago, Ill.—Announcement is made by the Williamsport Wire Rope Co., Williamsport, Penn., of the establishment of a branch office and warehouse at this place under the direction of C. M. Ballard, formerly connected with the Williamsport organization at Cleveland, Ohio. The Chicago office is located at 122 South Michigan Ave., and the warehouse at 755 West Quincy St. This new Chicago branch is the latest step in the development of the Williamsport's distribution organization. The concern now can guarantee immediate shipment from Chicago to customers in the territory served from that point.

Himler, W. Va.—The Himler Coal Co. is arranging for the installation of the necessary mining machinery, equipment, etc., for the development of about 1400 acres of coal properties located in the vicinity of Warfield, Ky., to have an ultimate capacity of about 2000 tons per day. Work was recently started on the construction of a new railroad bridge across Tug River and a 1½-mile siding to have a capacity of 2500 tons of coal, estimated to cost about $130,000. The development plans of the company include the erection of about 40 miners' houses. Martin Himler is president and manager; and E. Melring, Kermit, W. Va., is construction engineer.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



WEEKLY REVIEW

Coal market listless. Steam sizes of bituminous moving slowly. Domestic demand in Middle West is good. Prices being maintained. Anthracite steam demand slow, domestic sizes in short supply.

The coal market is devoid of any particular interest. Inquiry for the steam sizes is only scattering and confined to small tonnages. The strike in the iron and steel industry has greatly curtailed the consumption of steam, gas and by-product coal, particularly in the Ohio district. In the Middle West the demand for domestic coal is keen and operators are behind in their orders. Prices as a rule are firm, though recessions have been noted.

The main topic of conversation in coal circles this week is the steel strike. Next to this come the demands framed by the mine workers at their recent convention in Cleveland, which embrace a 60 per cent. increase in wages and a six-hour day for five days a week. Operators will express no opinion as to the outcome of the mine workers' requests until the matter has been thrashed out by the representatives of both sides at meetings now being held in Buffalo.

Demand for the steam anthracite coals is somewhat improved over last week. Domestic sizes of hard coal, like egg and stove, are still being eagerly sought and, as in the past, the supply is unequal to the demand.

WEEKLY COAL PRODUCTION

A continued increase in the output of bituminous coal during the week ended September 13 carried production to the highest point attained this year. The total output, including lignite and coal made into coke, is estimated at 11,080,000 net tons as compared with 9,633,000 tons during the preceding week, an increase of 15 per cent. It is even 418,000 tons, or 4 per cent., higher than the production during the week of Aug. 23, which set a new mark for the year.

The drop in output during the week of Labor Day now proves to be due to observance of the holiday and not to a decline in the rate of production during the working days remaining. For the first time since January, the curve of 1919 performance has overtaken the line of 1917.

The output of anthracite during the week ended Sept. 13 is estimated at 1,564,000 net tons. This was only 64,000 tons more than the production during the preceding week, which was interrupted by the Labor Day holiday. It was 19 per cent. less than during the last week of August, which set the record for this year.

It is necessary to bear in mind that the week ended Sept. 6 included Labor Day. In districts where the labor unions are strong, the day was generally observed as a holiday, in others it was observed but little if at all. In some of the districts it was observed at certain mines and not at others. Over the country as a whole roughly one-third of the capacity worked as usual. The closing down of the other two-thirds naturally cut into the total output for the week but performance during the remaining working days was better than usual. The percentage of full-time capacity realized in actual output was 70.3, the highest mark attained since last January.

Time taken by the miners for holidays and demonstrations in excess of Labor Day was effective in curtailing output in central Pennsylvania, New River and Winding Gulf, western Kentucky, and especially in the Southwest. In Kansas and Missouri, for example, losses attributed to extra holidays amounted to 11.6 per cent. of full-time capacity. These losses were largely compensated for by the gradual improvement of the labor situation in Illinois which attended the cessation of recent strikes.

Reports of a sluggish market are still occasionally received, especially from Ohio, Alabama, the Hazard field and the Rocky Mountain region. In the country at large losses due to no market amounted to only 2.1 per cent. of full-time capacity.

The closing of many mines on Labor Day assisted the railroads in catching up with the demand for empties. In consequence, fewer complaints of car shortage were received. With three exceptions—Westmoreland, central and western Pennsylvania—all districts reported an improvement in car supply. Even with a five-day week, however, many mines could not get all the cars needed. Taking the country as a whole, their losses of output amounted to 18.9 per cent. of full-time capacity, nearly twice as much as all other causes of loss combined. A 100-per cent. car supply would have increased the week's production by some hundreds of thousands of tons.

The production of beehive coke during the week of Sept. 13 (441,312 net tons) fell slightly short of the high mark established the week before. The decrease was 6400 tons, or 1.4 per cent. With the exception of the preceding week, however, the output was higher than had been attained in any week since Feb. 22. The cumulative production since the beginning of the year stands now at some 8,000,000 tons less than during the corresponding months of 1918. The decrease appears to be due not to a deficit in the supply but to a decrease in demand and to the increasing substitution of byproduct for beehive coke.

The tonnage of bituminous coal dumped at lower lake ports during the week ended Sept. 7 was 27 per cent. less than that of the preceding week and less than half the amount reported for the corresponding week of 1918. The total tonnage dumped from the beginning of the season to date is 16,702,012, a million and a quarter tons, or 7 per cent., less than during the same period last year. The decrease in comparison with 1918 is explained in part by the general decline in consumption which followed the armistice, in part by the large stocks accumulated last year by consumers at the head of the lakes and carried over into the season of 1919.

Atlantic Seaboard

NEW YORK

Anthracite situation steadier and demand slackens. Local dealers satisfied with year's business and do not look for any trouble this winter. Oil making inroads on the steam sizes and steps may be taken to educate public to the use of buckwheat. Bituminous situation not yet affected by the steel strike. Shipments not increased. Demand is easy but prices remain firm.

Anthracite—The situation is becoming steadier. Demand is not so urgent and the market is settling down to a firm basis. Movement of coal here has been on a good basis and the local retail trade is not in a position where a temporary relaxation in receipts would be seriously felt. While some of the dealers have unfilled orders, these are mostly for egg and stove, which at the moment are in no better position as regards supplies than for the past several weeks. Chestnut, which has been the easiest of the three larger sizes, is now being rapidly absorbed.

The trade here is devoting much of its time to considering ways and means for keeping down the surplus of the steam sizes, particularly buckwheat. The inroads being threatened on the trade by the oil interests are becoming more serious and the producers are realizing that something must be done. Some of the trade believe that the remedy lies in educating the public to the use of buckwheat for heating homes and that all that would be necessary will be the installation of furnaces equipped for burning this size coal.

Rice and barley are in small demand with stocks piling up, many of the producers having already stored large quantities of these sizes.

Bituminous—The local market has not yet felt the effects of the steel strike, unless it can be said that less coal is being sent here because of the many individual mine strikes due to sympathy for the steel workers. These were numerous the first few days of the trouble among the steel workers and as a result less coal was forwarded to tidewater. But this cut in shipments did not seriously hamper conditions here. Demand was not heavy and the trade was amply provided for.

A feature of the local conditions is the steadiness of the quotations for the various grades which, with the exception of a few instances, remain on practically the same basis as last week. Shippers here have not yet had occasion to lower prices in order to move their supplies and are not likely to do so unless the producers find it necessary to divert considerable of the tonnage usually taken by the steel companies to tidewater.

At this writing there is no big supply of gas or coking coals here.

The demand for coals for export is heavy and appears to be increasing. The only hindrance to a much larger trade is the lack of bottoms. Shipments from the southern ports are being held up because of the commandeering of considerable tonnages by the Navy Department. This order takes away from the trade the high grades suitable for the Navy vessels and it will be Dec. 1, some shippers believe, before shipments of these grades can be resumed to foreign countries.

With producers holding back excessive shipments to this market unless there is an order for their coals, there is little likelihood of an overcrowded situation developing here followed by a break in prices.

There is considerable coal in the various pools and quotations for coal, f.o.b. at the pier range about as follows: Pools No. 1, 9 and 71, $5.55@$5.90; No. 10, $5.15@$5.35; No. 11, $4.90@$5.10; and Nos. 18 and 41, $4.80@$4.90.

Quotations for spot coals, net tons, at the mine range about as follows:

	Spot
South Fork (best)	$3.25@$3.50
Cambria (best)	3.00@ 3.25
Cambria (ordinary)	2.60@ 2.90
Clearfield (best)	3.00@ 3.25
Clearfield (ordinary)	2.60@ 2.90
Reynoldsville	2.85@ 2.90
Quemahoning	3.25@ 3.50
Somerset (medium)	3.00@ 3.25
Somerset (poor)	2.50@ 2.75
Western Maryland	2.50@ 2.75
Fairmont	2.50@ 2.65
Fairmont ¾ in.	3.10@ 3.25
Latrobe	2.60@ 2.90
Greensburg	2.75@ 3.00
Westmoreland, ¾ in.	3.50@ 3.75
Westmoreland run-of-mine	3.20@ 3.35

PHILADELPHIA

Anthracite retail demand unabated. Orders pile up. Pea plentiful and moving fairly well. No increased mines prices likely for October. Steam situation better, but all sizes plentiful. Bituminous arrives in good volume. Contract deliveries heavy.

Anthracite—Without question the retail demand for coal keeps up. With the exception of pea coal the dealers have had no stock of coal on hand whatever. The few who did manage to accumulate a little chestnut are working into their piles and the market will soon be bare of this size. The call for nut is equally as strong as that for stove now. And the need for egg also remains unfilled. Many dealers have been carrying orders for this size all summer and still unable to make delivery. In numerous instances customers tired of waiting gladly took some other size. The only size that can be had without difficulty is pea, as all dealers maintain large stocks of this size.

Ever since the individual shippers jumped prices with so little notice most dealers have been somewhat wary about accepting business at a fixed price. Even those dealing exclusively in company coal have

been using a certain amount of caution, as rumors have been frequent that even the companies might increase their schedule. However, for October it is certain that the company shippers will continue at the winter circular which became effective Sept. 1. With the individuals it is not quite certain, although it is generally felt that not even they will attempt to add anything to the price this month.

The steam coals are showing some slight improvement. Buckwheat is going well but with still plenty to be had, especially from the larger companies. Probably less of this coal can be bought off price from the individual shippers now, and this in itself would appear to be a sign indicating a better situation. Rice and barley are only in fair call, but even they are inclined to display improvement with some shippers.

Bituminous—One thing about bituminous at the present time is that any one wanting a car of it has very little difficulty in having his needs met. The tide embargoes have been mainly responsible for this situation and some shippers have had difficulty in working off accumulated tonnage. Contract customers are getting heavy shipments, and as long as they are willing to accumulate stocks the market can be said to be in good shape.

The prices per net ton at this time are about as follows:

Georges Creek Big Vein	$3.10@3.25
South Fork Miller Vein	3.10@3.25
Clearfield (ordinary)	2.75@2.90
Somerset (ordinary)	2.70@2.85
Fairmont lump	3.20@3.30
Fairmont mine-run	3.00@3.10
Fairmont slack	2.50@2.60
Fairmont lump (ordinary)	2.95@3.00
Fairmont mine-run (ordinary)	2.70@2.80
Fairmont slack (ordinary)	2.50@2.65

BALTIMORE

With liberal supply of coal at tide and hundred per cent. run of empties in some coal regions the price list has begun to tumble in these steel-strike days. Exports continue to grow and another pier is ordered open. Anthracite rates to be advanced.

Bituminous—Owing to the steel strike many cars have been released from service in that industry, and quite a few of the coal-mining regions are now running a 100 per cent. supply of empties. The Locust Point pier of the B. & O. has been opened to relieve the congestion at tide, where particular grades of coal were jammed in every direction, while others badly needed here could not come in because of strict embargoes. This reopening for harbor and bunker business, along with some fast work in export loading at the other piers, cleared out some of the congestion, and coal of high-grade steam varities which had been scarce began to pour in under permit. All shipments are controlled under the embargoes by permits and this is making for a more even handling. With all classes of soft coal now in liberal supply and with strike conditions cutting down call on line points, fuel is offering here at mine-basis prices to the trade considerably below recent levels.

The best low-volatile coals are now offering to the trade at about $3.25 although some sales are recorded up to $3.40. Good-to-specialized coals are selling at from $3.15@3.29. Fair-to-good coals in many cases are offering at from $2.60@2.80, while mixed lots are to be had at times as low as $2.15. Gas coals show the widest fall, for while some of the specials are holding around $3.25, there are offerings of Fairmont three-quarter as low as $2.50. Run-of-mine is bringing about $2.35 and slack $2.25.

The export business here is tremendous. For the week ending Sept. 20 a total of 75,369 tons of cargo coal was loaded. This makes a loading for the first three weeks of September on foreign account of 207,725 tons, and as these same coal carriers took out 32,991 tons of bunker coal, the total loading on this export movement was 240,716 tons.

Anthracite—The hard-coal dealers here spent a part of the week at least in discussing the coming price for October. It was taken for granted generally that an advance would be made. In some quarters it was felt that a 25c advance on all grades might cover the situation enough to satisfy some in the trade, but there is undoubtedly a sentiment in a large part of the trade that an advance of more than 25c a ton will be necessary. What the exchange meets at the close of the present week it is likely that final action will be taken to settle the October price list. Meanwhile orders are at present comparatively light.

Lake Markets

PITTSBURGH

Iron and steel strike curtails consumption of steam, gas and byproduct coal. Lake movement not affected. Market exhibits occasional soft spots.

Even since the completion at the Cleveland convention of the miners' wage scale demands, the coal operators of the Pittsburgh district have refrained from any public expression of opinion on the subject, and no official or semi-official statement is available.

The strike in the iron and steel industry touches the coal industry in several respects. Thus far it has not interfered with the movement of lake coal, and it is very improbable that it will. While the Seamen's Union, which has membership of a fraction of the men on the lake coal and ore fleet, the rest of the men being unorganized, is one of the 24 unions paraded as sponsors for the "General committee for organizing iron and steel workers," not only have the vessel men not struck but the executive board has not at this writing even decided the question it considers is before it, whether or not it will take a strike vote of the membership. The lake vessels are moving as usual except that on account of nearly all the private ore-receiving docks, attached to blast-furnace plants, being tied up by the strike and the railroad docks having to use dock ore instead of through ore, the boats have long waits for unloading and their round trips are lengthened. The lake coal movement is near its end in any event.

The iron and steel strike has greatly decreased the receipt of coal by steel plants. Practically all the steel plants and rolling mills in the Mahoning valley are down, with fully half the Shenango valley, and the coal consumption by mills in the Pittsburgh district is decreased by approximately one-third. The Allegheny and Kiskiminetas valleys are out one-third or more. Men at mines supplying the Vandergrift plant threatened to strike if the coal supply to the plant were not shut off, but trouble on that score was averted by the Cleveland convention declaring against sympathetic strikes, obviously because it had a big enough contest of its own in prospect.

The movement of coal to byproduct plants is greatly decreased through the closing of the byproduct plants at Youngstown of the Republic, Youngstown Sheet and Tube and Brier Hill companies, about 500 ovens in all, normally consuming 13,000 or 14,000 tons daily, while the Cleveland plant of American Steel and Wire is also down. The Lorain and Farrell plants are operating and the great Clairton plant is reported operating more than 50 per cent., its full consumption being about 20,000 tons daily. Its coal, however, comes wholly from the Connellsville region.

The market has exhibited occasional weakness in spots and there is a somewhat easier tone all around. Regular prices are approximately as follows: Slack $1.80@2; mine-run, $2.40@2.50; screened gas, $2.60@2.80, per net ton at mine, Pittsburgh district.

BUFFALO

Everything unsettled. Bituminous prices not strong. Anthracite plenty in lake trade only. Next to none in local trade.

Bituminous—The trade is anything but satisfactory. Buffalo is a steel-strike center and will not try to do much business in that line right away. The furnaces are shutting down, to wait till the men get enough of striking. The chances are that coal will be plenty soon and that prices will not be strong. Sales will be made with much caution. It is already reported that some fancy coals, which have been commanding a premium, are weakening, though that must have been in anticipation of the result of the strike.

Quotations remain at $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No 8 lump, $4.65 for same three-quarter, $4.20 for mine-run, $4.10 for all slack, $4.60 for smokeless and $5.70 for Pennsylvania smithing.

Anthracite—The late strikes of miners in two of the leading companies has so cut down shipments that nearly all that comes this way has been turned into the lake trade, so that while that keeps up well the city is pretty nearly bare of coal and the consumers are clamoring for a supply. The miners' strikes are over and the coal begins to come in again, but with industrial conditions what they are the movement is doubtful. Lake vessel owners are looking for a sympathetic strike on the part of their seamen.

Anthracite shipments by lake continue much better than any other branch of the trade, as the coal must be moved this fall if at all. Shipments for the week were 128,391 net tons, of which 82,491 tons cleared for Duluth or Superior, consignee's option; 22,500 tons for Chicago; 10,600 tons for Milwaukee; 7200 tons for Waukegan; 2800 tons for Manitowoc; 2400 tons for Racine and 400 tons for St. Ignace.

CLEVELAND

Receipts of bituminous coal are about normal, while consumption in northern Ohio, due to the steel strike, is off about 45 per cent. Retail dealers are beginning to catch up on their orders for anthracite and Pocahontas. All prices remain firm.

Bituminous—Cleveland and northern Ohio, which includes the Youngstown district, appear to be the storm center of the nation-wide steel strike. The industry in Cleveland and northern Ohio is estimated to consume from 40 to 45 per cent. of the coal brought into the territory, and the industry is only able to operate at 10 to 15 per cent. of capacity. Thus, coal consumption in Cleveland and northern Ohio has been cut almost squarely in two. The coal the iron and steel industry is unable to absorb is going to other users, who are only too glad to get it.

Less and less talk is heard of prices. It seems accepted by all that the present quotations will hold for some time, barring the fluctuations either way that come with the ebb and flow of the market. Car supply and labor continue to bother at the southern and eastern Ohio mines. The Ohio mines are operating from 55 to 60 per cent of capacity.

Anthracite and Pocahontas—Although receipts of both grades have not increased perceptibly, retail dealers are rapidly catching up with orders and deliveries within two weeks of placement are now being made. The tendency in both grades constantly is upward, and further price advances are threatened.

Lake Trade—Although lake sailors are voting whether they will strike in sympathy with steel mill workmen, no walkouts have yet occurred. The movement to the lakes continues about one-third of normal. Lake Erie docks are dumping from 1750 to 2300 cars of bituminous coal a day.

DETROIT

Sluggish demand and a narrow market continue prominent features of the bituminous trade in Detroit.

Bituminous—Neither the consumers of steam coal nor the buyers of domestic stock have developed the interest in the market that conditions of the trade would seem to warrant. While the situation in the Detroit market remains on an unsatisfactory basis, jobbers say their customers outside Detroit are calling for coal cautiously and that they have little difficulty in placing all the stock they can get.

Prices are holding rather steady despite the slack demand. Hocking domestic lump is being quoted at the mines on a net-ton basis at $3.50@3.75; egg is selling at $3@3.25; mine-run is offered at $2.25@2.50 and slack at about $2. Run-of-mine West Virginia lump brings about $4, with egg quoted at $3.50@3.75 and mine-run at $2.75, while nut, pea and slack ranges from $2.25 to about $2.50. Receipts of smokeless are light and prices are somewhat uncertain, though quotations on mine-run are given as approximately $3.75, with lump around $5@5.50.

Anthracite—With only small amounts of anthracite in the hands of local retailers and a considerable proportion of the local consumers yet to be supplied the outlook is not altogether cheerful for many of the buyers who have delayed providing for winter needs. The dealers say many will have to accept bituminous as a substitute, unless conditions show greater improvement than now seems possible.

Lake Trade—With shipments over lake routes again approaching normal, following the end of the dock workers' strike, suspension of shipments is threatened by an impending strike of seamen on ore-carrying vessels.

COLUMBUS

The Ohio coal trade is less active than was the case several weeks ago. Steam demand is not as strong as formerly while domestic sizes are still firm.

The chief feature of the coal trade is the demand for domestic sizes, which is holding up extremely well in every locality. Pocahontas, while quite scarce, is coming into the local market. There is a good demand for West Virginia splints and certain Kentucky grades. Hocking lump is

still moving in large quantities and the same is true of Pomeroy Bend coal. Retail prices are firm although the wide range in quotations is passing away. Hocking lump sells at $5.75@6.25, while Pocahontas is quoted in the neighborhood of $9.

Steam business is a little slow as the result of fair reserve stocks and uncertainty in the future. Strikes are having their effect on the trade, although Ohio coals are not affected so much as some other varieties. The eastern Ohio field is the most influenced by the steel strike. Steam prices have weakened a little under the influence of reduced demand.

The lake trade is still lively, with the car shortage taken into consideration. Shipments are going forward steadily and every effort is being made to get the required tonnage to the Northwest as early as possible. The lake movement is progressing satisfactorily despite the upper lake strike. Congestion on the upper lake docks is passing away.

CINCINNATI

Prices remain firm. Car supply still hampers output. Domestic demand lacking.

Prices on all kinds of coal being sold by the wholesalers and retailers to the consuming public in the Cincinnati district remain firm and steady with prices tending upward, if anything. The car supply at the mines in the districts supplying Cincinnati and vicinity has not improved to any extent in the past week. Miners in the Ohio field especially continue to complain because they can not get in full time because of car shortage.

Domestic trade at this time is not what the dealers expected it to be. There is not the usual rush, although the prices continue to climb and the supplies continue to grow smaller. Many domestic consumers have installed double heating systems—coal and gas—and intend to use the latter until actually forced to start the coal furnace.

BIRMINGHAM

Demand from commercial trade just about equals production in the district. Domestic trade very active as far as inquiry goes, orders being turned down in most cases account inability of mines to furnish coal.

Current orders and bookings at the mines are sufficient to take the full output at the mines, due to crippled operating conditions, otherwise there would be a surplus supply of steam fuel. Rail lines, in the main, have practically no stocks on hand, and will no doubt be forced to buy coal in the open market in the near future, as contract deliveries are not sufficient to allow any stocking. Quotations on steam coal are holding up well and prices range as follows per net ton mines: Big Seam, $2.30@2.60; Black Creek and Cahaba, $3.45@3.86; Pratt, $2.85@3.00.

The limited supply of domestic coal prohibits the possibility of a runaway market. Domestic producers, with few exceptions, are sticking to the schedule of prices, based on Government schedules adopted Apr. 1 and increasing 10 cents per ton through the month of September.

Coke

CONNELLSVILLE

Furnace coke requirements greatly decreased by iron and steel strike and market prices practically nominal. Foundry coke not materially affected.

The iron and steel strike could well have been expected to work complete havoc in the coke trade, and the best that can be said is that the situation is no nearly so bad as it might be. Nearly a week before the date for which the strike was scheduled, Sept. 22, suspension orders began, and while this gave the coke trade notice of what might be expected and lessened the suddenness, there are claims in some quarters that the furnaces that decided in advance to bank might have been able to operate after all. Practically all the Shenango valley furnaces north of New Castle are down, together with all the Mahoning Valley furnaces and the majority of those in the Buffalo district. The scattered western Pennsylvania furnaces are in blast, with an occasional exception. As to the Pittsburgh district proper the Connellsville coke trade may be said not to be affected, since there is scarcely any idleness of furnaces except those that are tributary to the Clairton byproduct plant. It is running somewhat over 50 per cent., but is thus drawing less coal than usual from Connellsville.

Operators undertook to operate fewer days per week and eventually to blow out ovens, to restrict production to the requirements, but furnace coke nevertheless became a drug on the market at once, and some lots were offered at sharply cut prices. The general market is regarded as off only about 25c., though it is practically nominal at any price.

Foundry coke has continued in good demand, but if the strike is prolonged for many weeks the demand is likely to be restricted by pig iron supplies of foundries diminishing. Meanwhile foundry coke is approximately as strong as formerly. We quote furnace at $4.50@4.75 and foundry at $6@6.50, per net ton at ovens.

Middle Western

GENERAL REVIEW

Domestic coal continues to be in brisk demand. Curious situation in Middle West. Car shortage still troubles operators.

The coal market in the Middle West territory continues in a vigorous state of activity. Domestic coal, as has been the case for the last six or eight weeks, is in very good demand; in fact, the average operator, with an average coal, is at least a month behind in his domestic business. Varying reports come in as to the steam-coal situation. Some of the largest operators and distributors report their surplus steam coals sold at top prices, while others, equally prominent in the trade, say that the steam market has eased up a little since last week. Sales of screenings are reported, so far this week, at from $1.65 to $2.25 per ton mines—the price depending not so much on the quality of the coal as on the ability of the producer to find an eager buyer. Some of our largest consumers of steam coal have shown unmistakable signs of panic. They are undoubtedly worrying over the labor situation.

There has developed in the Middle West a rather curious situation. We learn from operators and jobbers who supply the Indiana, Ohio and Michigan retail trade that the average coal dealer is not a bit concerned, as sales of coals are consequently moving rather slowly into these states. Further west, in the Illinois, Iowa, Wisconsin territory, dealers are placing their orders right and left, and bending all their energies toward stocking their customers' and their own yards with a plentiful supply of coal. The situation on steam sizes is exactly opposite. In Illinois, Iowa, Wisconsin and Minnesota the demand, on the whole, for mine-run or screenings is not too strong, while in the Indiana, Ohio and Michigan districts we hear that the demand for steam coal is excellent; in fact, sales of nut, pea and slack from Kentucky and Virginia are reported as high as $2.50 to $2.60, with mine-run from the same districts at from $2.85 to $3.25. It is our opinion that the domestic trade in Michigan, say, and the steam trade in Illinois, could well afford to purchase coal a little more heavily. Time will show, and very soon, whether or not our conclusions are correct.

The two big handicaps to the coal industry—the car shortage and labor unrest—continue about the same. Operators on the I. C., the C. & E. I., the Big 4 and a few other railroads are raising their voices to Heaven and Washington, D. C., in vain efforts for relief. One result has been obtained, however, as it is said our popular Director General of Railroads had admitted that there is a car shortage—a thing, we understand, he denied a little while back. The labor unrest in the Illinois field continues, and we hear that the insurgent army of miners are now in Franklin County. The visits of this group of radicals always result in mines being idle for a day or so, but we are told that they have made few converts of late in southern Illinois.

CHICAGO

Large railroad order placed with Indiana mines. Domestic situation strong. Eastern coal hard to get.

Some sizable sales on steam coal have been reported here during the last few days. One railroad that operates exclusively in and about Chicago made a fairly large purchase of coal to be placed in storage, insurance, as it were, against a shortage this winter or a strike in the coal fields this fall. The order referred to was placed with Indiana mines, and was large enough to absorb all loose coal on the Indiana market, thus strengthening it materially. We are advised that Indiana got the business instead of Illinois because of a 4c. differential in freight in favor of Indiana coal.

The domestic situation in Chicago continues strong and active. Retailers say that the mines are behind on orders for lump, egg and nut, and that some mines are only taking business on a basis of price current at time of shipment. Eastern coal is getting more scarce from day to day, while it is practically impossible to purchase anthracite, although deliveries are being made in a fairly satisfactory measure on old orders.

MILWAUKEE

Coal market continues quiet. Shippers protest advance in freight rates to Southern Wisconsin points. Egg anthracite sold out. Good supply of coke.

The coal market remains quiet. There is a comfortable supply of everything just now, except stove size anthracite, which is out of the market. Prices continue without change. Coke moves slowly, with large stocks on hand. The reserve coke supply may come in handy should a prolonged strike in the iron industry paralyze the coal movement up the lakes. Lack of rolling stock checks shipments to the interior. This condition is liable to continue because of the grain movement. Things are dull along the docks, with few vessels under the hoists. Receipts thus far this season aggregate 617,154 tons of anthracite and 2,208,108 tons of soft coal, a gain of 165,617 tons of the former and a loss of 299,641 tons compared with the record of last year during the same period.

Coal rates from Milwaukee to Southern Wisconsin points have been increased 10 to 30c. per ton by the Federal Fuel Administration, and the Wisconsin Railway Commission has filed a protest and requested a rehearing. The change will be to the advantage of Illinois coal producers. The increase to Whitewater, Lima Center, Milton, Milton Junction, London and Deerfield is 30c. per ton, and to Edgerton, Cottage Grove, Mendota and Waunakee 20c. per ton. To 19 other points the increase is 10c. per ton.

ST. LOUIS

A quiet and easy market continues with no surplus coal and nothing unusual in the way of demand. Country call is good for domestic and easy for steam.

The situation locally continues much as it has been for the past few weeks, with no surplus coal from any of the fields and no unusual demand for anything but high-grade fuel.

The Standard market is far better on country coal than on St. Louis coal. For that reason as much coal from the Standard field as can be shipped is sent outside. Six-inch lump, 3 x 6 egg and 2 x 3 nut is bringing from $2.75@3 a ton. Two-inch lump is bringing from $2.50@2.75, and screenings are from $1.50@1.75, with mine-run at about $2.25. In the city this coal is selling for about $2.50@2.75 for the domestic sizes, with screenings at about $1.25 and mine run at about $2.

The railroad tonnage is extremely heavy from this field at this time on account of the scarcity of cars and the scarcity of coal in Kansas and in the southwestern fields. The Northwest is also drawing heavily on the railroad coal, but this is coming chiefly from the Mt. Olive district.

More Mt. Olive coal of the domestic sizes is moving into St. Louis than has moved in at any previous time in several years. This is on account of the price being maintained the same as it was all summer; namely, about $2.40 for 3-in. lump and up to $2.50 and $2.75 for the other domestic sizes. A heavy tonnage of this is moving to the Kansas City, Omaha and Chicago markets. The outside price is from $2.85@3 for domestic sizes.

Nearly all of the steam sizes from this territory are under contract.

The situation in the Carterville field of Williamson and Franklin Counties is not changed. The chief trouble is car shortage. There has been a little labor trouble in one or two places in the Franklin County field, but this has been fixed up and if it were not for the car shortage a record-breaking tonnage would result. As it is, the mines on some roads are working but two or three days a week. Three days a week is considered good working time. The Missouri Pacific and Illinois Central are in a somewhat better shape than they were, but are still far from being anywhere near satisfactory. The only thing that is a little easy is screenings from one or two mines. Other than that the field is oversold for several weeks. There is no chance of getting caught up.

COAL AGE

Volume 16 New York, October 9, 1919 Number 15

Once Again We Greet You

By R. Dawson Hall.

COAL AGE appears today for the second time since the printing employees of New York City indulged in their unfortunate walkout. It was feared at first that the magazine would have to appear partly as regularly printed matter and partly written upon a typewriter and zincographed, but though much was prepared for printing in that piebald form, no need for such an ingenious expedient was found necessary. It appears, therefore, like an old familiar friend, with only a few unusual features, and in future issues a closer approach will be made to former standards.

The strike is not ended, but the delay in the production of Coal Age is. Slowly and surely your paper and our paper will pass from our hands to yours. The pleasure of editing and serving your interests will again be ours, and we trust it will be only in degree greater than the pleasure you will experience in receiving that weekly printed communication.

For there is no little pleasure in performing this, or indeed any service—a fact that too many of us often forget. As the years roll by, the work we have done for the world and for our neighbors is the principal benison conferred upon us. What we can do, not what we can seize, gives us the greater satisfaction.

The 153 magazines and 400 technical papers in New York City, and also the job printers, have alike been shut down by the remarkable tangle between the New York locals and the International organization. They are at length cutting themselves loose by printing or publishing away from New York City, where saner counsels prevail. Eventually some order in the publishing business will be reestablished, and Coal Age will be printed without a hitch in New York City or elsewhere.

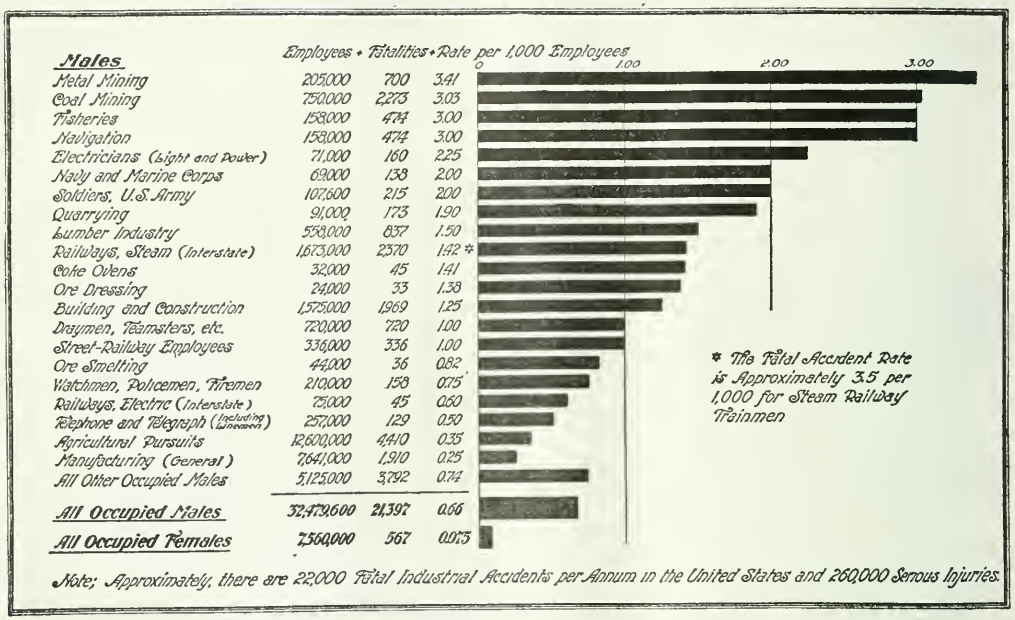
The laws of supply and demand have somewhat generally been ignored, and the law of organized grabbing has taken its place. The longshoreman is trying to get more money at the expense of the mine worker, who buys the food and other articles the longshoreman unloads. The mine worker is trying to make the longshoreman pay more for coal. The milkman is striking to make the barber exchange more money and services for milk, and the barber strikes to compel the milkman to pay more for a shave. The pressman is striking to make the farmer subscribe more liberally for his weekly farm journal, and the farmer is preparing to join up with the American Federation of Labor, so that he can demand with success that the pressman and his family pay more for bread.

So it goes in a world that we were told a little while ago would be organized for mutual service and brotherhood. What a travesty of the League of Nations is the plotting and scheming of one body of workmen to outvie another in the unreason and turbulence of its demands, and to pride itself, not on the large measure of its service or the faithfulness of its ideals, but on its ability to paralyze the public safety and destroy the public comfort.

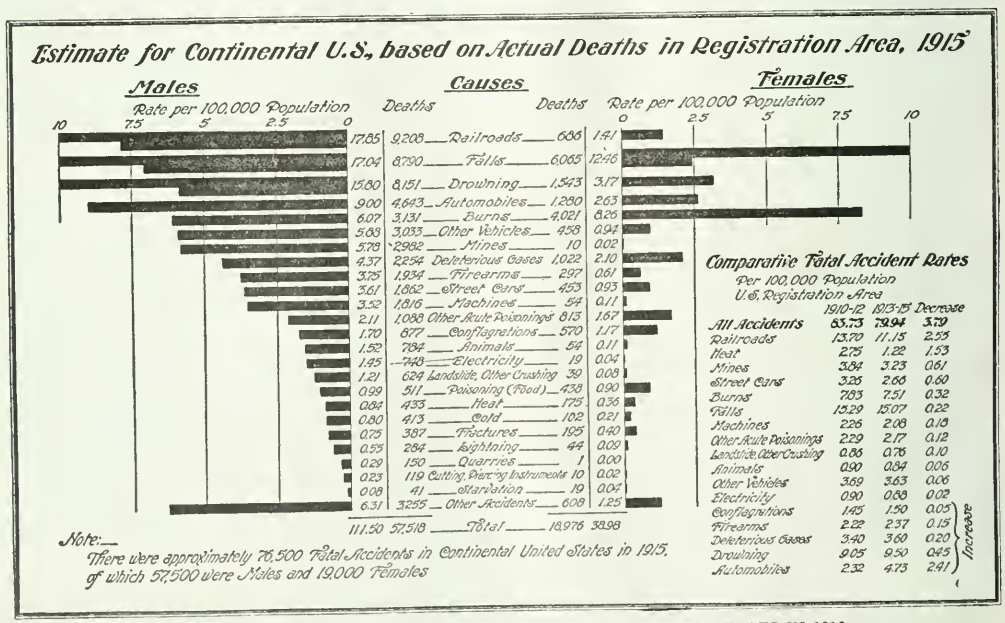
How can a large and irregularly civilized world be knit together when we cannot settle our own domestic problems in peace and amity? Can we believe in the good faith and justice of other nations till our own good faith and justice are proved beyond cavil?

America Grows Less Careless

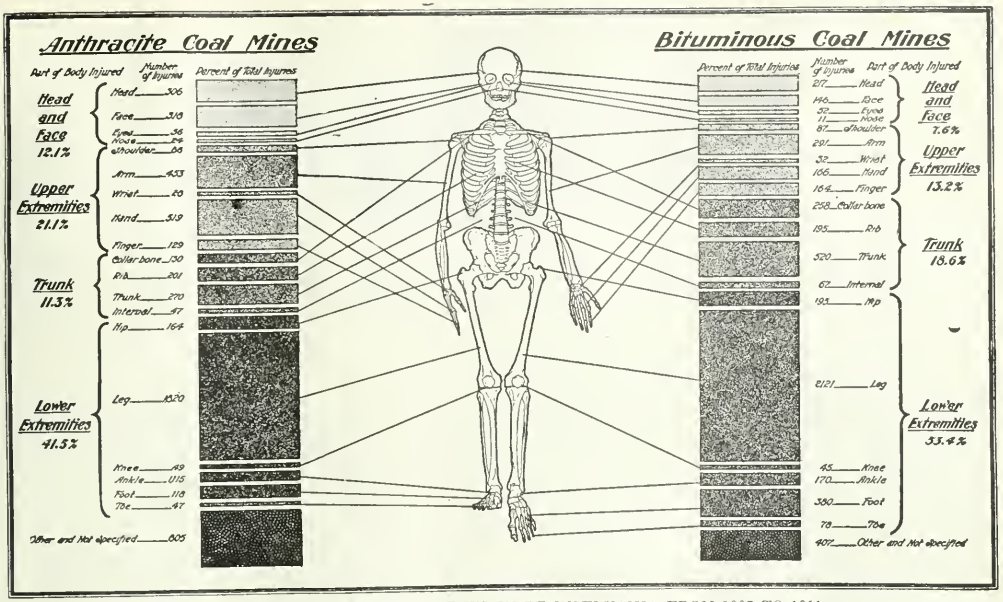
THE figures quoted below in this article are an advance summary of the mortality statistics for 1917 received by the National Safety Council from the Bureau of the Census of the United States Department of Commerce. The charts reproduced were prepared by the statistical department of the Prudential Insurance Company of America. As a result of the accident-prevention movement the total of acci-


Males
Employees
Fatalities
Rate per 1,000 Employees
0
1.00
2.00
3.00
Metal Mining 205,000 700 3.41
Coal Mining 750,000 2,273 3.03
Fisheries 158,000 474 3.00
Navigation 158,000 474 3.00
Electricians (Light and Power) 71,000 160 2.25
Navy and Marine Corps 69,000 138 2.00
Soldiers, U.S. Army 107,600 215 2.00
Quarrying 91,000 173 1.90
Lumber Industry 558,000 837 1.50
Railways, Steam (Interstate) 1,673,000 2,370 1.42 *
Coke Ovens 32,000 45 1.41
Ore Dressing 24,000 33 1.38
Building and Construction 1,575,000 1,969 1.25
Draymen, Teamsters, etc. 720,000 720 1.00
Street-Railway Employees 336,000 336 1.00
Ore Smelting 44,000 36 0.82
Watchmen, Policemen, Firemen 210,000 158 0.75
Railways, Electric (Interstate) 75,000 45 0.60
Telephone and Telegraph (Including Messengers) 257,000 129 0.50
Agricultural Pursuits 12,600,000 4,410 0.35
Manufacturing (General) 7,641,000 1,910 0.25
All Other Occupied Males 5,125,000 3,792 0.74
All Occupied Males 32,473,600 21,397 0.66
All Occupied Females 7,560,000 567 0.075
* The Fatal Accident Rate is Approximately 3.5 per 1,000 for Steam Railway Trainmen
Note: Approximately, there are 22,000 Fatal Industrial Accidents per Annum in the United States and 260,000 Serious Injuries.

MORTALITY FROM ACCIDENTS IN THE UNITED STATES IN 1915


Estimate for Continental U.S., based on Actual Deaths in Registration Area, 1915
Males
Rate per 100,000 Population
Deaths
Causes
Deaths
Rate per 100,000 Population
Females
17.85 9,208 Railroads 666 1.41
17.04 8,790 Falls 6,065 12.86
15.80 8,151 Drowning 1,543 3.17
9.00 4,643 Automobiles 1,280 2.63
6.07 3,131 Burns 4,021 8.26
5.83 3,033 Other Vehicles 458 0.94
5.78 2982 Mines 10 0.02
4.37 2,254 Deleterious Gases 1,022 2.10
3.75 1,934 Firearms 297 0.61
3.61 1,862 Street Cars 453 0.93
3.52 1,816 Machines 54 0.11
2.11 1,088 Other Acute Poisonings 813 1.67
1.70 877 Conflagrations 570 1.17
1.52 784 Animals 54 0.11
1.45 748 Electricity 19 0.04
1.21 624 Landslide, Other Crushing 39 0.08
0.99 511 Poisoning (Food) 438 0.90
0.84 433 Heat 175 0.36
0.80 413 Cold 102 0.21
0.75 387 Fractures 195 0.40
0.55 284 Lightning 44 0.09
0.29 150 Quarries 1 0.00
0.23 119 Cutting, Piercing Instruments 10 0.02
0.08 41 Starvation 19 0.04
6.31 3255 Other Accidents 608 1.25
111.50 57,518 Total 18,976 38.98
Comparative Fatal Accident Rates
Per 100,000 Population
U.S. Registration Area
1910-12 1913-15 Decrease
All Accidents 83.73 79.94 3.79
Railroads 13.70 11.15 2.55
Heat 2.75 1.22 1.53
Mines 3.84 3.23 0.61
Street Cars 3.26 2.66 0.60
Burns 7.83 7.51 0.32
Falls 15.29 15.07 0.22
Machines 2.26 2.08 0.18
Other Acute Poisonings 2.29 2.17 0.12
Landslide Other Crushing 0.86 0.76 0.10
Animals 0.90 0.84 0.06
Other Vehicles 3.69 3.63 0.06
Electricity 0.90 0.88 0.02
Conflagrations 1.45 1.50 0.05
Firearms 2.22 2.37 0.15
Deleterious Gases 3.40 3.60 0.20
Drowning 9.05 9.50 0.45
Automobiles 2.32 4.73 2.41
Increase
Note:
There were approximately 76,500 Fatal Accidents in Continental United States in 1915, of which 57,500 were Males and 19,000 Females

ESTIMATED FATAL INDUSTRIAL ACCIDENTS IN THE UNITED STATES IN 1916



NONFATAL COAL MINING ACCIDENTS IN PENNSYLVANIA FROM 1907 TO 1911

dental deaths in the death-registration area of continental United States during 1917 was reduced by approximately 6500 as compared to the previous year.

The total number of deaths caused by accidents during 1917 as reported in the summary was 53,544 as against 60,072 during the previous year. Inasmuch as the death-registration area of the country takes in only 70 per cent. of the population, it is apparent from the report of the Census Bureau that more than 76,000 persons were killed in accident throughout the United States in that year.

The greatest number of deaths charged to any one accidental cause—11,114, or 14.8 per 100,000—is shown for falls. The rate for this cause varies but slightly from year to year.

Next to falls, the greatest number of accidental deaths—8649, or 11.5 per 100,000—resulted from railroad accidents and injuries. This rate is greater than the corresponding rates for 1914, 1915 and 1916 (10.7, 9.9 and 11.3 respectively) but is lower than that for any year from 1906—the first year for which deaths from this cause were reported separately—to 1913, inclusive.

Burns—excluding those received in conflagrations and in railroad, street car and automobile accidents—were responsible for 6830 deaths, or 9.1 per 100,000. The death rate from burns was greater than that for the preceding year, 8 per 100,000, and was also greater than the rate for any earlier year covered by the bureau's records, with the exception of 1907.

Deaths from automobile accidents and injuries in 1917 totaled 6724, or 8.9 per 100,000 population. This rate has risen rapidly from year to year, but not so rapidly as the rate of increase in the number of automobiles in use.

Accidental drowning caused 5550 deaths, or 7.4 per 100,000. This rate is considerably less than that for any preceding year since 1910, and is also decidedly below the average for the decade 1901-1910.

Deaths due to accidental asphyxiation (except in conflagrations) numbered 3375, or 4.5 per 100,000. This rate is somewhat higher than that for any year during the preceding ten-year period.

Mine accidents and injuries resulted in 2623 deaths, or 3.5 per 100,000. This rate is greater than the rates for the preceding three years and for 1912, but is lower than those for other recent years.

Deaths due to injuries by vehicles other than railroad cars, street cars and automobiles numbered 2326, or 3.1 per 100,000. The rate from this cause has declined somewhat during the past ten years, probably because of the decrease in the use of horse-drawn vehicles.

Deaths resulting from street-car accidents numbered 2277, corresponding to a rate of 3 per 100,000. This rate is greater than those for two years preceding and is the same as that for 1912, but is less than the rates for other recent years.

Machinery accidents caused 2112 deaths, or 2.8 per 100,000, a rate materially greater than that for any preceding year covered by the bureau's records.

The unhappy primacy of mining as a source of deaths from injury per thousand employees accentuates the need of further vigilance. For the whole nation's accident rate, mining is only seventh in importance; but as it affects a small number of people its incident on that population is quite severe. Railroads, falls, drowning, automobiles, burns and venicular accidents other than those from automobiles are liable to occur to both males and females, and to men of all occupations. Mining accidents happen to a restricted class of men. That the death rate from accident in this class rates seventh is a matter for continued careful consideration.

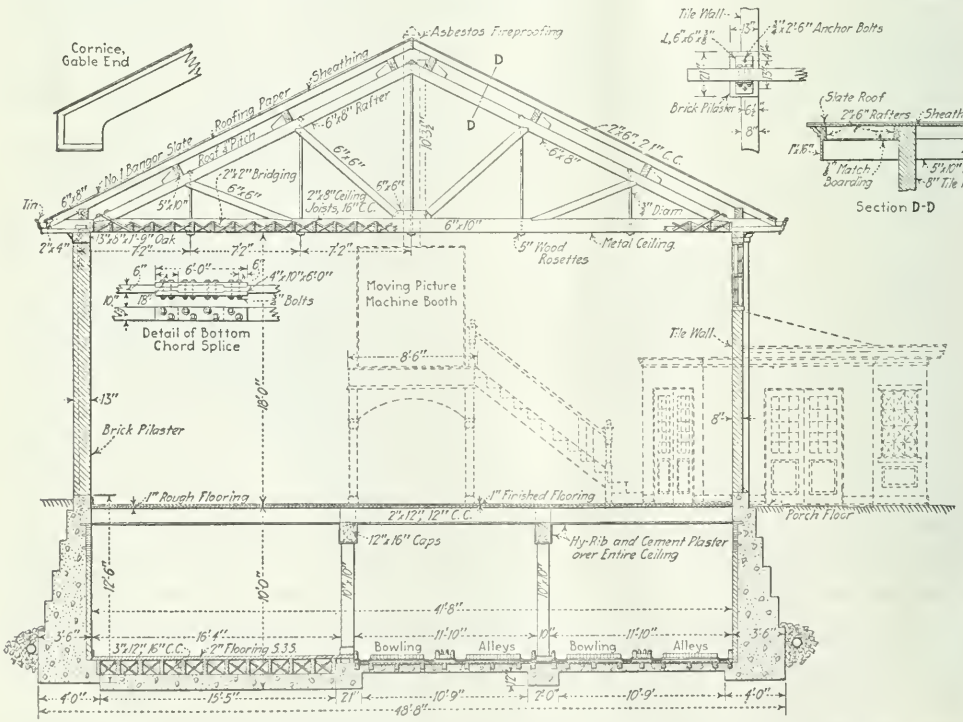
A Community Amusement Building

By Donald J. Baker
Pittsburgh, Penn.

As part of a general scheme to keep the men at home, a community amusement house has been constructed at the Isabella mine of the Hecla Coal and Coke Co., at Hillcoke, Penn. The building has been in operation since February, and from the start it justified the cause for which it was built. The idea of the value of a community amusement building at outlying mines originated with W. L. Affelder, of the Hillman Coal and Coke Co., of which the Hecla company is a subsidiary.

One of the biggest problems that the officials of any coal company have to face is to keep the men contented at mining operations that are situated some little distance from towns where amusements are available. In years past the general policy throughout western Pennsylvania has been for the operators to follow the lines of least resistance and not consider the all-important factor of the morale of the miner. But as labor was plentiful, no serious results followed and men were attracted to a coal plant by the wage and not by any variance of working conditions. The end of the war, however, has found the country menaced by a shortage of labor which, combined with the advent of prohibition, has awakened the coal miner to the sense of seeking out those places of employment that offered the greatest improved working conditions.

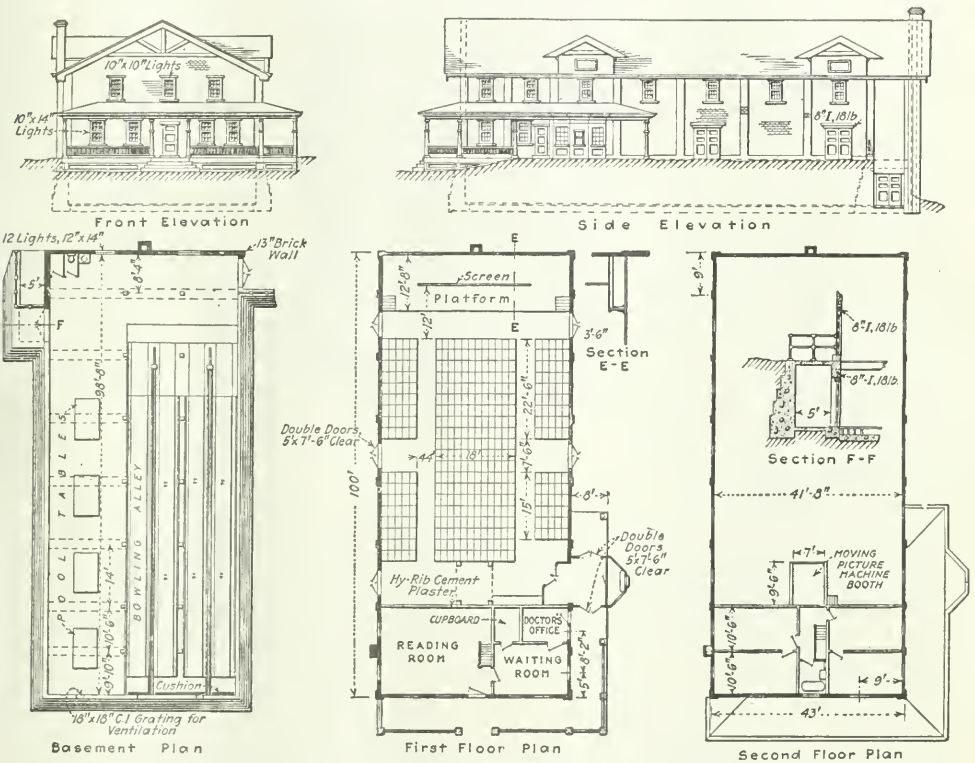
The old adage of "All work and no play makes Jack a dull boy" has come to the fore with startling



CONSTRUCTION DETAILS OF THE COMMUNITY BUILDING OF THE ISABELLA MINE AT HILLCOKE

significance. On the other hand, if the men are attracted by wages alone, one thing is certain: there will be a rush in the evening for those towns where recreation is possible. This is particularly true during the week ends. It has been proved that the men, especially the single ones, will often overstay their visit on Sunday and not be present when "Reveille" is sounded on Monday morning. As this type of employee is usually the one who is either motorman or spragger, a serious tie-up at the mine occurs with painful regularity. So the idea of bringing the amusements to the men was welcomed by them. The type of community amusement house was carefully thought out with respect to design and fixtures before the experiment was with the bowling alleys. A two-chair barber shop is located in one corner of the room near the pool tables. The basement is extremely well lighted with 49 lights, many of which are of the chandelier type. This gives one light for approximately every 100 sq.ft. of floor space. A nominal fee is charged for the use of the alleys and tables, merely to discriminate between the prospective users. A portion of this money that accumulates is later returned to the men as prizes in tournaments that are frequently held.

The second floor of the building is used as a moving picture theater. A seating capacity of 310 furnishes ample space for all who care to attend. The interior is lighted by chandeliers, and a spacious stage is available



PLANS AND ELEVATIONS OF THE COMMUNITY AMUSEMENT BUILDING AT HILLCOKE

tried. The result has been so satisfactory that the building has been adopted as a model for all other operations of the Hillman Coal and Coke Company.

The building at Hillcoke is centrally located within the town, which has a population of 1200. It is of stucco-tile construction with fiber roofing. It is 100 ft. long by 43 ft. wide and is steam heated throughout. There is a basement and main floor, and a suite of rooms on a second floor for the use of a welfare director. D. G. Fitzgerald is in charge of the community and welfare work at the Isabella mine.

The basement of the building houses the bowling alleys, pool tables and a barber shop. Four Brunswick-Balke Collendar Co. bowling alleys are well lighted with 28 lights. There are four pool tables situated on the opposite side of the basement and running parallel for other forms of entertainment. An electrically operated piano is one of the features of the theater. Six- and eleven-cent charges are made for admission, which is for the purpose of discrimination and priority, as in the case of the bowling alleys and pool tables. Only the best of photoplays are shown, but in particular those that are rich in action. One night of each week is set aside as a "free" night, when "movies" from the Bureau of Mines, the Visual Bureau of the University of Pittsburgh, and other educational films are shown.

The theater serves as a church on Sunday, as well as for general public gatherings including school teachers' institutes, etc. This coming winter it is planned to vary the program with lectures, musicales and concerts, and vaudeville.

The fore part of the second floor is utilized as a

reading and rest room and is made doubly cheerful by reason of a large open fireplace. A state library is part of the equipment. This contains for the greater part books of fiction. All of the leading technical papers and periodicals are available for the grown-ups, while juvenile magazines are subscribed to for the children. A girl is placed in charge of the library whose duty it is to offer suggestions on the reading material available. Adjacent to the library is the doctor's office, containing several rooms.

Space for a playground is found in a vacant lot adjoining the building, the equipment for which has already been received and will be installed at an opportune time in the near future. Among the numerous duties of the welfare superintendent is included the organization of a band and orchestra. Peace gardens are encouraged among the boys and the town. An attempt will be made soon toward organizing a branch of the Camp Fire Girls as well as an organization of Boy Scouts. It is the desire of the officials to have the building self-sustaining. Any profits accumulating from the moving-picture returns will be used for the promulgation of other forms of welfare work.

The Vicious Postal Zone Law

By Senator Arthur Capper*

It has been argued that the postal zone increases apply only to the advertising sections of magazines. This is perfectly true as a statement of the mere words of the postal zone law.

It is not true as a statement of facts.

For a periodical or a newspaper is a unit from cover to cover. It is one unit of bulk that is never broken. The argument that the increased postage merely affects advertising is virtually the same as if it were argued that the postal zone legislation had provided that the upper half of a magazine should pay postal zone rates and the lower half flat rates. It would be a mere bookkeeping separation that would not in the least affect the postage cost to the reader, for the reader—who is the ultimate consumer—takes the magazine as it comes, and the cost of the magazine is its cost as a unit, and its postage cost to him is its entire cost as a unit, no matter how ingeniously or intricately one may subdivide the component parts.

There is one other important factor, also, which I feel many sincere and ordinarily keen-minded citizens have overlooked, and that is, that the magazine and newspaper differ from every other commodity—if you wish to consider newspapers and magazines as merely commodities—in the fact that it is the only "commodity" that is sold to the consumer at less than its actual cost of manufacture!

And a newspaper or magazine is the only "commodity" of which this is true.

Now as to the advertising and whether it should pay a higher rate than the body of the magazine. I think I have answered half of that question when I point out that the periodical and newspaper is the only product that is sold for less than its cost of manufacture, and that this fact is made possible by the advertising. Advertising is nothing but a bulletin board—the bulletin board of our economic, wealth-producing, business life.

Advertising is the one great factor in modern wealth production that enables wealth to be distributed almost instantaneously; a generation or so ago the same result could not have been accomplished without years of hand-to-hand selling and expensive, slow, personal salesmanship. You, as a thinking citizen, know what any restriction upon advertising would do to the wealth production of this nation. Congress itself saw this, and when means of war taxation were being carefully discussed and every channel was being developed, it was deliberately decided that the destructive economic effects that would follow the taxation of advertising would be too great and too dangerous to attempt.

Now then as to the allegations of the cost transmission of this second-class meter through the mails.

The figures upon which the absurd allegations of second-class deficits are made were compiled by the Post Office Department in 1908 and 1909—eleven years ago! So unreliable were they even then that when the U. S. Postal Commission, headed by the Hon. Charles E. Hughes, investigated them two years after their compilation, they were officially discredited as being no indication of what the costs were for the various divisions of second-class matter! Moreover, the Post Office Department since that date has taken pride in stating that it has in enormous and basic ways cheapened the postal cost of second-class matter.

The most unfortunate part of this postal zone legislation is that it is an insidious and dangerous attempt to set back postal history 70 years and reëstablish the universally condemned principle of postal cost determining the postal rates. It abolishes the sound postal principle of equal postage to all parts of our nation. The rural free delivery—one of the most vital and important postal functions—is conducted at almost a total loss, and if this vicious and unsound cost principle is once established the demoralization of our splendid postal principles is only a matter of logic and of time.

*Chairman of the Senate Commitee on Expenditures in the Department of Agriculture and Former Governor of Kansas

Scientific Control of Boiler Equipment

It is often stated that boilers are uneconomical because too much air is admitted to the furnaces, and that all excess of air beyond what is necessary for the complete combustion of the fuel is a dead loss. This is not true. All combustion that must be carried out economically must have not less than 120 to 140 per cent. of theoretically necessary air. If maximum output is required, the amount of excess air necessary is 90 to 100 per cent. If it is attempted to use less than this quantity, it will be found the output becomesless.

There is a strange delusion, widely entertained, that forced draft enables a pound of coal to be burned in 18 lb. of air, while natural draft requires 24 lb. of air. If the same economy is to be realized, the same quantity of air must be used, quite independent of the means by which the draft is produced. Forced draft merely increases the output at the expense of the thermal efficiency.

The evaporation of a given quantity of water from a given boiler at a given rate of combustion requires the same quantity of air to be passed into the furnace, no matter what may be the calorific value of the fuel per pound. The time taken will also be in inverse proportion to the calorific value of the fuel. The rate of firing must, of course, be suited to the class of fuel. The rate of combustion mentioned above is the number of heat units developed per pound of air passed into the furnace. For maximum economy this is from 620 to 640. For maximum output, it is from 750 to 780.

WHO'S WHO IN COAL MINING

C. W. PRICE

THE safety movement is so new, and we are so deeply immersed in it, that we hardly realize how immensely it is changing matters. When at length we look back at its beginning through the mists of history, we may view its leading men much as we are beginning to view the men and women of the early days of the Red Cross movement. They will no longer be regarded as innovators, mere stirrers-up of the industrial waters, whose activity tiresomely and often uselessly adds to the labors and decreases the spare moments of industrial managers. What the safety engineers have initiated will be looked upon as a permanent asset of the nation, a gift of the forefathers to those that come after, a kindly beneficence from a benign past.

It is hard just now to tell who will earn the plaudits of the future for yeoman service in the cause of safety, but C. W. Price, now general manager of the National Safety Council, and former assistant to the Industrial Commission of Wisconsin, which has, for many years, led in promoting human welfare and education, may well be among those thus celebrated in our industrial, and even in our national, annals. For the public will some day realize that even war is small and insignificant compared with its three less blustering brothers — accident, disease and the destruction wrought by mutual distrust—and is not by any means the biggest curse to which mankind is subject.

The "accident prevention career" of C. W. Price may be said to have begun 19 years ago when the International Harvester Co. placed him in charge of what was then known as "welfare work" in its Chicago plant. The harvester company is commonly recognized as one of the pioneers of safety work in America, because Mr. Price in his development of the welfare department of the company early sensed the need for a definite accident prevention movement within the plant and immediately set about creating it. That was about 12 years ago.

In 1912, when the Wisconsin Industrial Commission was organized, its members began to look around for a man with the experience and ability to carry on educational safety work, a man who could sell the safety idea to both employers and employees—truly a rarity in those days. The work done by Mr. Price at the International Harvester plant had come to the attention of the Wisconsin authorities, and so the position of "Assistant to the Wisconsin Industrial Commission" was offered to him. He accepted and found himself in a job that was brand new in the fullest sense of the word, for nowhere in America had anyone ever attempted to do what the Wisconsin commission proposed.

Mr. Price organized the educational work of the Wisconsin commission along lines that have since been followed in practically every other state where accident prevention work is being carried on as a state function. This work included the development of safe standards in the industries of Wisconsin to the advantage alike of employers and employees. In organizing the accident prevention machinery of the Wisconsin commission Mr. Price visited every large factory in that state and put into motion in every plant visited a safety organization that was thereafter to carry on the good work of its own motion. During this period Mr. Price also helped in the general organization of the inspection department of the commission on a basis that induced the close coöperation of employers with the state, something that was considered well nigh revolutionary in those days.

In the fall of 1912, incidental to the convention of the Association of Iron and Steel Electrical Engineers, there was held at Milwaukee, Wis., a meeting during which the idea of a National Safety Council was born. Of course, Mr. Price was one of the parents. A year later, at a meeting in New York, the National Safety Council was formally organized, and Mr. Price was elected a member of the Executive Committee. He served in this capacity for five years and in turn was vice president and director of exhibits of the council.

The work of the Wisconsin commission having become well established and the demand for the services of the National Safety Council increasing steadily, Mr. Price in the latter part of 1916 left the Wisconsin commission to become field secretary for the council. In this capacity Mr. Price took an active and important part in the development of local councils including that of the Western Pennsylvania Division at Pittsburgh and later the Central Mississippi Valley Division at St. Louis.

During the war the National Safety Council donated the services of Mr. Price to the War Department of the United States Government for four months, in which time he visited practically every navy yard and arsenal and with the coöperation of other talented safety organizers placed these branches of Uncle Sam's war machine on a safe basis.

In February of last year Mr. Price was withdrawn from the field by the Executive Committee of the Council and appointed general manager to succeed W. H. Cameron, who had resigned to become manager of industrial relations for the Eastman Kodak Company.

A genial man is C. W., as his photograph clearly shows. His personality grows on those with whom he is associated. The present is the first safety convention that has been under his direction. It sustained fully the reputation of those which were held in other years under the management of Mr. Cameron.

Coal has Leading Place in Session of American Institute of Mining and Metallurgical Engineers

By R. Dawson Hall
Managing Editor, Coal Age

WHEN the American Institute of Mining and Metallurgical Engineers met on Monday, Sept. 22, at the Congress Hotel, Chicago, Ill., it soon developed that the coal sessions would overshadow all others in importance and that the coal problem would be the branch of mining that would be most assiduously studied. To coal had been devoted no less than three sessions; but that was not all. The question of mine taxation is as much a coal subject as it is one relating to any other mineral wealth, though it is true, the element of financial risk is greater in the opening and exploitation of other deposits, and the coal resources available are more readily computed than are those of most other minerals. As mine taxation was most capably discussed in coöperation with the Internal Revenue Department and in relation to a most excellent paper by L. C. Graton, of the National Resources Section of the Bureau of Internal Revenue, several coal men who were present at the meeting deprived themselves of the pleasure of attending one of the coal sessions in order to listen to the discussion on Mine Taxation. Notable among these was R. V. Norris, who talked most interestingly on the taxation problem.

As for trips, it was early learned that the Gary steel works excursion would have to be abandoned. The important visits therefore were to the La Salle district, with its coal operations, and to the Franklin County coal mines. An impromtu trip to the works of the Sullivan Machinery Co., for at least many of the coal men, took the place of the abandoned steel-works excursion, the visit being made in the morning of Tuesday, Sept. 23.

COAL SESSIONS BEGAN EARLY

The coal sessions opened on Monday morning in the Elizabethan Room of the hotel by the presentation of E. A. Holbrook's paper on "Research in the Coal-Mining Industry," Carl Scholz presiding. Mr. Holbrook was, unfortunately, not present to do his paper justice. The article that followed—"Some Factors That Affect the Washability of Coal," by Thomas Fraser and H. F. Yancey—presented by the former and discussed by both authors, showed that in Franklin County, Illinois, where the percentage of sulphur at one mine rose to 3.51 per cent., the "organic" sulphur content was 1.67 per cent. Thus 48 per cent. of the sulphur was organic and not pyritic or sulphatic and therefore could not be reached by washing. Adding to that the infinitesimal pyrite particles which cannot be washed out and the pyritic which can only be separated by tabling or flotation, it is easy to see that jig washing will do little to remove the ultimate sulphur where the most unfavorable conditions exist.

In Pike County, Kentucky, is a bed which fortunately needs little, if any, sulphur reduction. The sulphur content is only 0.46 per cent., of this only 0.13 per cent., or 28 per cent. of the whole sulphur content, is pyritic. The organic sulphur, which runs 0.33 per cent., supplies the rest of the sulphur content, which is of course as much as 72 per cent. of the whole quantity. This figure is well worth holding in mind: practically one-fourth pyritic sulphur and three-fourths organic sulphur.

No wonder with facts like these C. A. Meissner, well known as a coke expert, later declared that we shall have to modify our ideas as to the manner in which sulphur shall be removed and yet more as to the degree to which this can be done. Guy H. Elmore well said at a subsequent session that no longer can we confidently state, as we did in years past, that careful washing would always remove half the sulphur and that the bulk of that half was to be found in the ash and was removable with it.

The next two papers "A Use Classification of Coal," by George H. Ashley, and "Distribution of Anthracite," by A. S. Learoyd were presented, but not adequately discussed, the authors not being able to attend. It is unfortunate that Mr. Ashley's splendid paper has been so passed over by the Institute, but there is no reason why it should not be submitted for the attention of the members at some time when the author is present and able to give the members the full benefit of his discussion, accompanying this by charts showing the geographic distribution of coal by classes.

FREE SULPHUR AND FREE IRON MUST BE RECKONED WITH

R. Dawson Hall, at the close of the session, pointed out the ability of free sulphur and free iron in the presence of water to combine and form bisulphide of iron, thus creating much heat. The question arises, of course, whether any of the organic sulphur will act in any way as if free. When coal is coked half the organic sulphur appears to carry over into the coke just as does the pyritic sulphur. That, however, does not show that there is not in a degree some sulphur that is held in loose combination.

The smell of the smoke from a half-ignited coke oven would seem to suggest the presence of such a sulphur. Nor does the ultimate reduction in organic sulphur of 50 per cent. in the coking process show that in the lignites and peats there is only 50 per cent. of such less-stable sulphur. Now that the presence of organic sulphur seems to be satisfactorily proved, it would be well worth while to try to find out just how stable it is in the presence of heat in the various forms in which it exists.

In most coal piles there is some form of free iron—a driftbolt in a trestle, a coupling pin, a nail or some like form of the element. Could not the combination of the iron and sulphur be a possible source of heat? It seems that the action of combination between these two elements would be more potent to form heat than the oxidation of pyrite or the oxidation or hydration of coal. It is only a suggestion, valueless perhaps, but not wholly improbable.

At the afternoon session Carl Scholz also presided. This sitting opened with the presentation by C. M. Young of an article on the "Height of the Gas Cap in the Safety Lamp." Unfortunately the experiments were made with city gas and not with the methanized mine atmosphere, in which the safety lamp is normally required to give its indications.

There followed the most interestingly discussed paper, but one, of those presented—"Engineering Features of Large Modern Coal Mines," by C. A. Herbert, (who was absent) and C. M. Young. Mr. Young, being present, gave a brief account of the contents of the paper. Carl Scholz pronounced the opinion that alternating current would supersede direct current. He was not afraid, with steel-jacketed conductors, to put high-voltage cables into the mines, knowing that not even a pick could make a hole in them. A derailment might, however, cut a cable with bad

results; consequently Mr. Scholz puts the cables on traveling ways where this contingency is eliminated. However, it is not well to run any unnecessary risk so the line is laid in a ditch and covered with a plank. Should any one be digging around the cable the presence of the plank would warn him that he was approaching the high-tension conductors.

The secondary lines are hung to the roof. They have merely protection against the moisture of the mine and are not steel-jacketed like the primary lines. Mr. Scholz said that with alternating current it was impossible to burn the motors, because the alternating-current motor would refuse to function entirely if the voltage dropped, whereas the direct-current motor would go on working, taking a greater amperage and so heating up its coils faster than the heat could be dissipated, thus burning out the machine.

In discussing the use of the skip, George S. Rice declared that, in his belief, the breakage of coal accompanying its use would not be excessive, for the large quantity of coal would cause a self-choking which would make the material pour out instead of being thrown out, as it is where the car is hoisted and discharged from a self-dumping cage.

Mr. Rice stated that he designed the third steel tipple to be erected in Illinois, and that about 1892 he installed a skip hoist in Spring Valley. Carl Scholz declared that it was his expectation that owing to the pouring quality of the coal discharge there would not be any abnormal degradation. The use of a revolving, instead of an end-gate, dump in the mine is also likely to reduce breakage, though he did not so state.

E. N. Zern criticized the few headings being driven in the Valier and other Illinois mines. He thought that the eight-entry system was needed in large operations where considerable volumes of air had to be delivered. The Valier mine has in its main entries only four airways.

Mr. Scholz said that he expected to deliver 300,000 cu. ft. of air per minute with only a 3 in. water gage when the mine reached its most remote development. With headings costing $1 per running foot it was not permissible to drive as many of them as was customary where the miners were willing to drive them without additional charge.

BLASTING IS AVOIDED

As for the Jeffrey heading machines, they were installed as much to save blasting as for any other reason. Mr. Scholz declared he had carefully considered the large charge for timbering and immense cost of its replacement, and it was mainly to avoid that charge that he introduced machines that eliminated blasting and so left the coal, roof and ribs unshattered and equal to the task of staying in place under the pressure from 605 ft. of overburden, which is the cover at the Valier mine.

James W. Paul said that the rock-dust provisions at the mines of the Old Ben Corporation were credited by the company with having saved the workings from two explosions. He thought that if the vanes by which the rock dust was upheld were placed a little further apart, all the dust would not be deposited as a result of the violence of the pioneering wave. There would then be enough dust remaining to enable the barriers to cope with the explosion wave proper that was likely to follow and might pass through the headings if all the dust that had been prepared for the purpose of extinguishing it was already deposited on the floor of the mine.

Graham Bright, in discussing the rope speed in skip hoists, declared that this speed was not merely halved by the greater load which the skip carried, making fewer hoists necessary, but was actually divided by three by reason of the fact that time was saved in both loading and unloading.

Two papers followed, one entitled "Gas-Producer Practice," by G. S. Brooks and C. C. Nitchie, both authors being present and the latter reading the paper. The other paper was entitled "Testing of Coals for Byproduct Coking and Gas Manufacture," by Horace C. Porter. Mr. Porter's paper was on the possibility of forecasting by experiments in miniature the probable outcome of the coking of coals in different types of coke ovens.

Wilbur Stout's paper on "Coals of Ohio and Their Limitations for Byproduct Coke" was not presented, the printed paper not being available and the author being absent. H. W. Young briefed his interesting article on "Outdoor Substations in Connection with Coal-Mining Installations." In discussing it Mr. Bright said that it was dangerous to meter on the high-pressure side of the transformers where the high-tension current was at 66,000 volts. The best plan was to meter on the lower-tension side, but as this would be too favorable to the consumer as against the public-service corporation it was customary to make the proper allowance for transformer losses.

The author of the paper, H. W. Young, agreed with Mr. Bright, saying that it was the practice with his associates to meter on the high-pressure side of the transformer station, only when the high-tension was 33,000 volts or lower.

The many discussions on Mine Taxation, on Non-ferrous Metallurgy and Metallography, on Geology and on Milling and Industrial Organization, interesting as they were, especially that on taxation, are here passed over in favor of the more important coal sessions.

The session on Mine Taxation was resumed on Tuesday morning and was rather dull for those who attended it. The speakers were excessively lengthy and deliberate, and everything was pitched in such a low tone that little could be heard. In the afternoon the session on Iron and Steel was held with a big attendance, and in the evening a number of members participated in the Oil session.

THE SMOKER WAS A SUCCESS

Something should be said here, however, about the smoker held in the Gold Room on Monday evening, in which the ladies participated—but did not smoke. The ladies were in the balcony and the members of the institute in the hall below. A comic skit regarding the flotation of the Jno. D. Oil Co. was the principal entertainment. Most of the leading members of the American Institute of Mining and Metallurgical Engineers were subjected to a clever discharge of wit which amused every one and troubled no one.

There was the usual glee club, the efforts of which were aided by the singing talent of both the ladies and gentlemen present. A cartoonist made comic portraitures of some of the notables at the banquet and contributed other clever sketches.

Wednesday's "Symposium on Sulphur in Coal" was one of the most interesting sessions the institute has ever held, even though no lantern could be obtained to show Rheinhardt Thiessen's slides, which were to accompany his address on "Occurrence and Origin of Finely Disseminated Sulphur Compounds in Coal."

The first paper was one by I. C. White, who was unable to be present, on "Geographic Distribution of Sulphur in the West Virginia Coal Beds." In this it was pointed out that the older coal beds geologically have the greater amount of sulphur in them. A. C. Fieldner, of the Bureau of Mines, added that the percentage of sulphur is somewhat generally high where the ash is fusible at low temperature.

R. D. Hall added that, speaking of West Virginia, the percentage of sulphur was usually high where the percentage of volatile matter in the coal was high, and thought

perhaps this was more than a coincidence, that possibly heat had removed the sulphur as well as other volatile matter before the sulphur had combined with the iron. Then it was that a discussion arose as to the stability of organic sulphur under heat and the statement that it was unsafe at the present stage of our knowledge to assume that organic sulphur, especially as it now exists in our coals, is nonstable.

Professor H. H. Stoek, who presided, pointed to the statements in Gilbert H. Cady's paper, not then presented, in regard to the low-sulphur coal in the Franklin County field, which does not appear to be an area of any great disturbance and heat.

Dr. Thiessen's paper was unusually good, perhaps the best of those presented. In the comment on it Mr. Hall called attention to the fact that sulphur did not exceed 0.1 per cent. in the whole lithosphere, but composed as much as 1.1 per cent. of the volcanic rocks according to Frank Wrigglesworth Clark. Clearly the organic bodies that contain so much sulphur must have segregated this element, for it is found in larger quantities in coal, asphalt and some petroleums than in volcanic rocks. It is found also in lesser quantities in natural gas. He pointed out how small in percentage is the sulphur found in the sedimentaries above and below the coal where pyrite might be expected to form but did not.

SULPHUR APPARENTLY HAS TWO ORIGINS

However, there were those who declared that while the finely comminuted pyrite might be organic in origin, the larger lenses and nodules of pyrite probably had another source. Seeing, however, that they can be found nowhere in the measures above and below the coal, the proposition does not seem quite tenable and the question of the source seems likely to stand or fall with the solution ultimately found for the general problem as to the organic origin of coal sulphur. It may be said that a discussion of the nature of the sulphur in coal occurred in **Coal Age**, Vol. 4, pages 273 and 274, and in the same volume, page 586. Both articles appeared in 1913, when pyritic sulphur was universally held to be extraneous and not organic in origin.

A. C. Fieldner declared that he had found the organic sulphur in coal more stable than the pyritic. At the Bruceton mine the crop coal and coal under deeper cover was analyzed for sulphur and the percentage was notably greater in the coal further in the mine than in that near the surface. In both cases the coal was ground and subjected to a float-and-sink test, the liquid being of a specific gravity of 1.35.

Taking off the float and analyzing it, it was shown to have only 1 per cent. ash. It was noticeable that this relatively ash-free coal had in both samples, the near-surface and the interior samples, the same percentage of sulphur, namely 0.6 per cent. This fact led Mr. Fieldner to regard the pyritic sulphur as less stable than the nonpyritic, which is undoubtedly true as far as the weathering that is, the oxidizing process is concerned. It may or may not hold, however, as to heating.

As far as coking is concerned, the instability of some organic sulphurs in the presence of heat is of little importance provided the unstable organic sulphur will be given off before the coking temperature is attained. It is almost certain that some organic sulphurs are given off in the coke oven, but the temperature at which this occurs is not of primary importance so long as we are sure that the necessary temperature is reached. The stability, at low temperature, of the organic sulphur may be important as regards spontaneous combustion and might have relevancy in the making of gas. As far as coking is concerned, we are apparently in more of a quandary than ever, now that we find that organic sulphur still exists in the coal.

Pyritic sulphur may surrender to washing or oxidation or even flotation, but organic sulphur which is of the very essence of coal must be subjected to a process which chemistry has up to the present not even conjectured, much less outlined.

The whole subject of the reason for the prevalence or non-prevalence of pyritic sulphur C. A. Meissner showed was not readily explained because beds vary much in their sulphur content. The middle of the seam will occasionally have less than the top or the bottom. Evidently heat has nothing to do with that variation. S. A. Taylor pointed out that seams had a varying sulphur content with location, the variation occurring markedly, not merely in a single field, but in the area subject to operation from a single mine or even in that served by a single entry. It was also shown that sulphur was found mostly in swags or small basins. There are three ways in which the dip of the measures might help to preserve the sulphur. They might localize the iron solutions and the iron acting as the jailor of the sulphur might preserve it in the swags to a greater degree than it is preserved elsewhere; or again, the presence of the water in the swags might accentuate those bacterial processes by which the sulphur is retained; or third, the presence of the water might assist in the combination of iron and sulphur.

UNSOLVED PROBLEMS

All these are difficult questions and they still await thought and elucidation. There were not a few present to argue for "secondary enrichment" (the words sound like a none too merry jest with regard to iron pyrite in coal). Even if they are constrained to admit that the pigmy dots of pyrite crystal found by Mr. Thiessen are indigenous, they argue that the lenses and nodules must have another origin.

J. R. Campbell was not present to brief his article on "Mechanical Separation of Sulphur Materials in Coal." George H. Ashley also was absent, and his "Sulphur in Coal—Geological Aspects," received little discussion. A. R. Powell briefed most admirably his article "Forms in Which Sulphur Occurs in Coal," while C. W. Parmelee's paper, "Effect of Sulphur in Coal Used in Ceramic Industries," closed the session.

In the afternoon, seven papers of the "Symposium on Sulphur in Coal" were presented, the first, "Removal of Sulphur from Illuminating Gas," by W. W. Odell and W. A. Dunkley, being discussed at length. Dr. Darlington mentioned that Ferrox, a new mixture of ferric hydrate and some binding material such as cement, was giving excellent results. It has a capacity about 50 times as large as other materials used for the desulphurizing of gas. He added that the material as prepared was mechanically strong enough to bear the weight of a man.

It was said that letting air into the gas served to an extent to revivify the purifier, as the authors of the paper said, and this could be done without bringing the gas below standard, providing the gas was enriched, but that it must not be thought that the presence of a small amount of air will prevent ultimate fouling.

The paper on "Low Sulphur in Coal," by H. M. and T. M. Chance, though printed, was not available at the meeting and neither author being present it received scant attention. It was suggested, however, that the probabilities were that the sulphur in the Greene County coals of Pennsylvania would run higher than the authors thought, as the showing in West Virginia adjacent to Greene County is not by any means favorable, whatever it may be on the Monongahela front.

Williard R. Jillson's paper, being mostly geographical in its discussion of the low sulphur coals of Kentucky, its content was not discussed. Following these came "Low Sulphur Coal in Illinois," by Gilbert H. Cady, presented by State Geologist Frank W. De Wolfe.

He stated that while the coals in the Franklin County low-sulphur area were low in moisture content, as compared with Illinois coals as a whole, they were not as low in moisture as some other coals in Illinois. He more or less punctured the notion that the low-sulphur coals of Franklin County owe that quality to early heat action. Had they been subjeced to early heating they would probably have advanced further in their mineralization.

"Sulphur in the Coking Process," by S. W. Parr; "Commercial Recovery of Pyrite from Coal," by S. H. Davis, and "Sulphur in Producer Gas," by F. Crabtree and A. R. Powell, then followed. In regard to the second paper it was pointed out that the objection to coal in pyrite was that it increased the heat too much when roasting the pyrite, involved the use of too much nitric acid in purification and generated quantities of CO_2 which delayed the formation of sulphuric acid. To keep down the heat the quantity charged had to be reduced.

On the same day, Wednesday, sessions were held on Iron and Steel, on Mining and Local Resources, Pyrometry with special reference to Iron and Steel Metallurgy, and on Nonferrous Metallurgy. In the evening President Horace V. Winchell held a reception in the Elizabethan Room, and this was followed by a banquet in the Gold Room at which Robert W. Hunt was toastmaster and Horace V. Winchell, Francis S. Peabody, Theodore W. Robinson, Bradley Stoughton and Charles M. Schwab were the speakers.

Mr. Peabody spoke on his hobby, "Coal Conservation," Mr. Robinson extolled Chicago in an extremely happy vein, ending with a few words on the steel strike, and Mr. Schwab told again some old stories in a way that never tires and praised "human engineering as the greatest of all kinds of technical skill and as the art in which every engineer should excel." Schwab's stories, unlike steel, never seem to suffer from what is known as "fatigue."

On Thursday, Sept. 25, the visitors, except those pyrometrically inclined, left for La Salle, a city 99 miles from Chicago. (The "Symposium on Pyrometry" at 10 a.m. was the only technical session of that day and was the last of the series. It was held in Chicago.)

On the arrival of the train at La Salle the 200 guests were entertained at the Hotel Kaskaskia, after which they were divided into four groups—mining, scenic, geology and industrial and went in automobiles their separate ways to points of interest.

The mining group for the most part went to the Union mine, of the La Salle County Carbon Coal Co., just outside La Salle. This mine is approched by a shaft 400 ft. deep and operates in the "Third Vein," according to Illinois parlance, or in the No. 2 bed, according to the nomenclature of the U. S. Geological Survey. The coal is transported in small vertical-sided cars of 3 ft. 5½ in. gage. The capacity per car is about 2499 lbs. net. The current used in the mine for haulage and coal cutting is carried to the transformer station at a tension of 2200 volts. It is distributed for the locomotives and the five Sullivan longwall coal-cutting machines at 240 volts, direct current. The coal is hoisted by an Ottumwa electric hoist, driven by a General Electric 225 h. p. induction motor with automatic control and air-brake connection.

Much of the mine is heavily timbered, as the roof has broken up quite high. As the mine is operated by longwall no signs of coal are to be noted in the long journey from the shaft pillar to the longwall face. The mine is perfectly dry and yet quite safe from dust explosions, for the cars are not so heavily topped as to distribute coal along the roadways while the roof and sides are continually providing a finely ground shale, dust which is the most perfect defense against a mine explosion.

As the locomotive and cars ran along the rails with their freight of visitors a continuous sand storm (or rather shale storm) beat against their faces, convincing proof of what a coal-dust cloud would meet should it try to cause trouble in this mine.

The packwalling is carried close up to the face, so that there is just enough room when cutting to pass the machine between the packwall and the face. The gathering is done by mules. All the mines in this field are operated by the longwall system, except the Matthiessen and the Hegeler mine, where room-and-pillar methods are employed. Most of the mines are comparatively level, though at the Illinois Zinc Co. No. 1 mine the coal pitches decidedly.

Some of the mining party then went to the Cedar Point plant of the La Salle County Carbon Coal Co., and others to the mills of the Mineral Point Zinc Co., where they inspected the pouring out of zinc into molds, its annealing and rolling, and also visited the roasting furnaces. The party arrived in Chicago early in the evening, and the 26 who decided to visit the Franklin County field had barely time to wash and dine before starting on the second trip.

Franklin County has some of the largest mines in the United States and some of the most up to date. It is a field having no small operations for, since the cost of shaft sinking is considerable, it does not pay to put in a plant of small dimensions.

The best of the coal land is now selling at around $250 an acre, but twenty years ago it could have been purchased for less than $25. Fortunately the surface is of little value and is not farmed extensively, and with a little care in making the deeds it should be easy to secure the right to mine without providing surface support to the wild land that surmounts the coal.

When the party arrived at Benton and had been well fed at Jedd's Cafe, it was piloted back to a special train by Carl Scholz, who personally conducted the trip. This special train took the party to mine after mine in the Franklin County field. The first two mines visited were Nos. 9 and 8, of the Old Ben Corporation, located at West Frankfort. At No. 9 the first unit of the plant visited was the rock crusher, where rock is crushed for the rock-dust barriers that are in use at all the mines of the company. A Raymond rock crusher reduces the shale to dust, so that 92 per cent. goes through a 250-mesh screen. About 30 tons are produced per shift.

Another interesting feature at this plant was the storage of the smaller sizes of coal. The coal is conveyed from the tipple and dumped on a small pile. There a Link-Belt storage shovel with a clam-shell bucket and a 90-ft. boom lifts the coal and carries it to the storage ground where it is piled to a depth of about 49 ft. When it is desired to reload the coal the same shovel picks it up and moves it back to the original dumping place, where it falls into an elevator boot and is carried back to the tipple.

The coal is not allowed to remain in storage for any length of time. The storage yard is merely an equalizer of car supply, a flywheel that has had to be provided because of the scandalous irregularity and inefficiency with which the Government railroads are being run.

At these mines 45-lb. rail is used on the main haulage and 20-lb. in the rooms, steel ties being used everywhere. Sanford-Day cars with "Whitney Wonder" roller-bearing wheels are employed.

Franklin County is finding that where the shafts are of such a depth and of such a tonnage as here obtains the ordinary unconed drum has too high a peak load and does

not afford sufficient speed. For this reason at both Nos. 9 and 8 mines special conical drums are being provided. These drums begin the hoist easily and rapidly speed it up when the load is started. They then maintain that higher speed till the steam is shut off. The new drums are of Nordberg Manufacturing Co. make, but the hoists were supplied by the Litchfield company. Thus at No. 8 mine, the second operation visited, the present hoisting limit seems to be 5500 tons per eight-hour shift, but with the new hoisting arrangements it is expected that the tonnage will be raised to 6500 tons. To secure this not only is the drum being changed, but the old 24 x 42 in., Litchfield hoist is being replaced by a 28 x 48 in. hoist of the same make. The new drum has a speed ratio between slow and fast speeds of 7 to 11.

A DIFFERENCE IN DEPTH EXISTS

At the present writing No. 9 is not so large a producer as No. 8, which is older. It has a capacity of 5000 tons a day. At No. 8 the shaft depth is 450 ft. and at No. 9, 460 ft.

Since permissible powders have been introduced the safety of the mines has been greatly increased. No longer does shotfiring ignite the coal; consequently there is only one mine of the Old Ben Corporation where firerunners are now employed to follow the shotfirers and to extinguish the fires started. The company would change the explosive used at that mine if it were not for the firm determination of the men to require its use.

Rooms are driven 24 to 28 ft. wide and are spaced on 40 to 45 ft. centers. Crosscuts are driven 60 ft. apart. To save expense these are made 18 to 20 ft. wide, thus taking away about a quarter of the strength of the 16 to 17 ft. pillar between the rooms.

The haulage system at No. 9 mine is quite unusual, especially where so large a tonnage is attained. The small six-ton electric locomotives, of which from 12 to 15 are always in use, come to the landing with their trips. They do not act as secondary haulage units but take the coal from the working headings all the way to the shaft. So many locomotives arriving at one and the same point might be expected to interfere with one another, but so excellent is the signaling system that this difficulty is entirely avoided and the use of the many small units provides a steady flow of coal. This plan might not be possible at many mines, but it works out quite well at No. 8, where the grades are light.

ORIENT ALSO HAS A STORAGE YARD

The next operation visited was the Orient mine of the Chicago, Wilmington & Franklin Coal Co. This mine has a storage yard well away from the plant, the coal stored (which is not merely of small sizes but run of mine), being transported in Western dump cars from which it is discharged in the ordinary manner and transferred to big piles by two Link-Belt Machinery Co. shovels having 2-yd. buckets and 50-ft. booms.

The Orient mine is deeper than either of those just described. The coal dips toward the north, and the Orient mine is north of West Frankfort. The depth of the shaft is 520 ft. from the top of the ground to the top of the coal. The total hoist is 600 ft. (at Valier, a mine still further north, the depth of the shaft is 605 ft., the mine floor at that point being roughly 200 ft. below the sea level). The cages at the Orient mine are of the self-dumping type manufactured by the Eagle Iron Works, of Des Moines, Iowa.

Lunch was served in one of the houses in the village of Orient, and the party then took train to Valier where the main shaft was being operated, this being its first day's run. Here is installed an electric hoist and no coned drum. With this electric hoist there is a large flywheel to meet the peak load, and perhaps it is unnecessary to cone drums in such an instance in order to keep down a peak that is already well provided for.

Provision is made at Valier for a suitable rope speed through the use of a 12-ton skip, which saves in the weight to be lifted and reduces the speed by the large capacity raised at each hoist. This skip was built by the Connellsville Machinery Co., which also supplied the 14 x 5 ft. fan which is now producing 200,000 cu. ft. of air and is capable of delivering 300,000 cu. ft. against a 3-in. water gage.

Valier is a pretty little town. The company owns only 125 of the 400 houses, but it has installed an ample supply of pure water, electric lights and sidewalks, and is now prepared to sell lots to all who desire to locate there. Other persons beside the Valier Coal Co. also have lots, and the mine officials are glad to have their men purchase either of the company or of others in the field.

Though the Valier Coal Co., being railroad-owned, is sure of a steady run and favorable conditions for the earning of substantial and steady wages, the company in its little booklets is calling attention to the fact that "six of the largest mines in southern Illinois are located within a radius of 3 miles" quite a modest distance in these days of miner-owned automobiles.

DWELLING MAY BE PURCHASED

The Valier Coal Co.'s building plot alone comprises 120 acres. Every one of the 125 houses built by the company is held for sale at cost to any employee in a single payment or in installments with 6 per cent. interest per annum on outstanding balances computed monthly. Every man should be able, says Mr. Scholz, to pay for his house in less than three months time.

The party went down into the mine to see the Jeffrey Manufacturing Co.'s heading machine, which makes two shear cuts and one undercut and then wedges the coal down by heavy horizontal blows with several picks. It takes three cuts to complete the full heading width. The machine can easily make 12 ft. per day and sometimes as much as fifteen feet.

After a long trip through the mines the party came to the surface and took train to Benton, where automobiles were taken for a distance of about 2 mi. to the mine of the United States Fuel Co., a subsidiary of the United States Steel Corporation. This mine is known as Middle Fork, and it has a washery which has many new features that cannot now be described.

There are here employed many large belt conveyors, built by the Robins Conveying Belt Co., in one of which the belt is 7 ft. wide. The jigs are built by the Pittsburgh Washery Co. Centrifugal dryers of the Elmore type and Dorr Thickeners are interesting units of the same installation. The plant was idle on the occasion of the visit, and the guests were able to make the trip without discomfort.

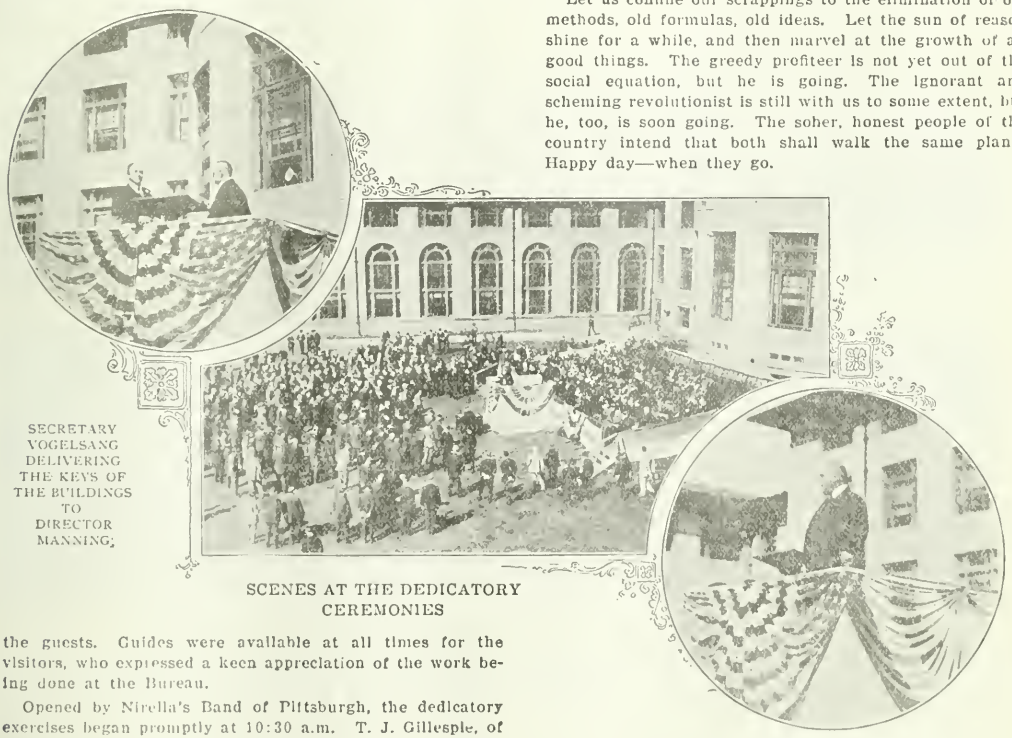
This mine has an electric hoist and a double-cone drum. Its output has so far not exceeded 3000 tons per day. After a bounteous meal at Jedd's Cafe, the party returned to the special car by which they had originally arrived at Benton, which being attached to the regular night train to Chicago landed them the next morning at the Dearborn Street Station. It was in every way a notable trip and full of interest, and many thanks are due to Mr. Scholz, the Old Ben Corporation, the Chicago, Wilmington & Franklin Coal Co. and the Valier Coal Co. for the way in which it was carried out, and the generous manner in which information was supplied.

Dedication of Bureau of Mines Buildings

A CROWD of over 200 persons, including several distinguished visitors of national reputation, witnessed the dedicatory ceremonies at the new Bureau of Mines buildings at Pittsburgh on Sept. 29. The structures, begun over three years ago and but recently completed, cost the Government $1,000,000. The dedication services were delayed by the war and the confusion resulting from the signing of the armistice.

A stand was erected within the large court in the rear of the buildings. Some of the visitors occupied seats in the stand while others grouped themselves in a wide semicircle around it. The day was ideal as far as weather conditions go, and the entire program was carried out without a hitch, although three of the men who were to have made addresses were not able to be present. They were Hon. Franklin K. Lane, Secretary of the Interior, John L. Lewis, acting president of the United Mine Workers of America, and Horace V. Winchell, president of the American Institute of Mining and Metallurgical Engineers.

Early in the morning the buildings were thrown open for inspection and souvenir booklets were distributed to the guests. Guides were available at all times for the visitors, who expressed a keen appreciation of the work being done at the Bureau.



SECRETARY VOGELSANG DELIVERING THE KEYS OF THE BUILDINGS TO DIRECTOR MANNING.

SCENES AT THE DEDICATORY CEREMONIES

Opened by Nirella's Band of Pittsburgh, the dedicatory exercises began promptly at 10:30 a.m. T. J. Gillespie, of the Pittsburgh Chamber of Commerce, presided and introduced Chancellor S. B. McCormick, of the University of Pittsburgh, who gave the invocation. Mayor E. V. Babcock delivered the address of welcome and spoke briefly of the purposes for which the buildings had been erected. He said the reclaiming and saving of human life had already been accomplished though the buildings had not been dedicated. He spoke of the scientific investigation that was part of the Bureau's program, as well as the increase of health, safety and efficiency that had already been noted. In the work being done at the Bureau, the coöperation of the city had ever been assured. In closing, Mayor Babcock extended to the visitors the hope that their visit in Pittsburgh would be pleasant, profitable and instructive. In giving them the freedom of the city, he said he offered all that any city has to offer anybody.

The response to the address of welcome was made by the Assistant Secretary of the Interior. Alexander T. Vogelsang, who said:

> The United States has had all the fighting and all the violence it wants for quite a while. It now wishes to get the war settled—to have peace proclaimed. It wants to build and produce. Four years of war and of grief have been enough—more than enough. Let us, in heaven's name, now have just one year of industrial peace. If we get it, this day twelvemonth will show us to be the happiest and most prosperous people en masse in all the world. It is not asking too much of capital to grant this brief respite, nor too much of labor. Let this country once again get the pulse beat of peace; she craves it beyond all other things.
>
> Let us confine our scrappings to the elimination of old methods, old formulas, old ideas. Let the sun of reason shine for a while, and then marvel at the growth of all good things. The greedy profiteer is not yet out of the social equation, but he is going. The ignorant and scheming revolutionist is still with us to some extent, but he, too, is soon going. The sober, honest people of the country intend that both shall walk the same plank. Happy day—when they go.

GOVERNOR SPROUL ADDRESSING THE VISITORS

In closing, Mr. Vogelsang read a message from President Wilson to Secretary Lane, as follows:

> I wish that I might be present to express my very deep interest in the work being done by such instrumentals, for the increase of production, the safeguarding of life, the raising of the standard of living and scientific endeavor. It is a very happy circumstance that with this meeting should be the ceremonies connected with the new building in Pittsburgh of the Bureau of Mines."

Hon. William C. Sproul, Governor of Pennsylvania, followed Mr. Vogelsang making an address in which he refused to discuss the steel strike. Before he began his talk he declared smilingly that he "had said his say on the strike" and stated that he had come "to express the gratification of Pennsylvania for the splendid enterprise brought into being by the American Government."

"There has been no doubt of where it should be located," he added, "yet Pittsburgh should be proud to possess it. This is the heart of the coal industry. Though it is true that as the years have passed Pennsylvania has fallen behind other commonwealths in production of iron ore, oil and gas, yet in coal she produces three times as much as any other three states combined."

Toward the success of the local institution, the Governor pledged the coöperation of the state. He called attention to the fact that men educated and trained in Pennsylvania schools were holding enviable positions in mining areas the world over. The Governor said that he was much interested in housing and welfare conditions at mining communities, and that it was impossible to make good citizens out of children who were raised in squalid localities and in unsanitary homes, no matter how safe the mines were and how farsighted the operators might be. Governor Sproul also mentioned the new Bureau of Rehabilitation, in which men crippled in industries were reëducated and prepared to once again take their place in various industries.

SOME OF THE NOTABLES PRESENT

Left to Right: Mayor Babcock, Secretary Vogelsang, Governor Sproul and Director Manning.

In the absence of Horace V. Winchell, president of the American Institute of Mining and Metallurgical Engineers, J. Parke Channing delivered an address on the labor problems of the day. He spoke of the new course in human engineering that is being included in the curricula of many technical schools, and said that a mine foreman was better equipped if he had a knowledge of his men than he was if his only ability consisted in being able to tackle the technical problems which confronted him.

It was a mistake, he said, to explain the wage system as an outgrowth of feudalism, for it was the natural developmen of the needs of our human relations. He compared the available earnings of the world to a stock of money in the interior of a pot and said that no more could be taken out than had been put in.

Stating that the income of the country was, in 1916, probably about $50,000,000,000 per year, he added that at least $40,000,000,000 of that income were turned back in wages; the rest might be divided between the profit made by capital and the reward to those who toil with their brains. He added that without the other $10,000,000,000 there would be no social progress, no improvement in railroads and other public conveniences. It was necessary that some of the earnings of the world at large should be devoted to new construction.

Were profits and awards for management annulled, Mr. Channing said, the workingman's wage would be only slightly increased. The workingman whose wage in 1916 averaged about $1000 a year would have obtained only $1250 if the brain workers had received no wages for their toil and capital had drawn no compensation for the use of the savings it had put by.

Following Mr. Channing, Van A. Bittner delivered an address in place of John L. Lewis, acting president of the United Mine Workers of America, who was at that time, busy endeavoring to obtain a new contract from the coal operators at a meeting held in Buffalo. Mr. Bittner spoke most favorably of the work and purposes of the United States Bureau of Mines and quoted figures to show how the mine-accident death rate had been decreased since the Bureau had been established. Mr. Bittner pointed to the patriotic assistance given the nation during the war by the Bureau of Mines, declaring that the buildings had, temporarily, been transformed from their death-saving purposes to one of death dealing.

He also spoke of the developments in the art of making gas and gas masks for war purposes, all of which changes in technique were the outcome of the investigations of the Bureau of Mines during the period of the war. He advocated that the United States Government undertake to regulate by Federal supervision the operation of the coal mines, so that every section of the country would be subjected to similar laws relative to the conservation of health and life in the mines.

The ceremonies were brought to a close with the handing over of the keys to the building by Secretary Vogelsang to Van H. Manning, director of the station.

E. A. Holbrook, secretary of the Pittsburgh Chamber of Commerce, then explained the program for the rest of the day, after which the crowd dispersed.

Luncheon was served at the Bureau buildings after the exercises. At two o'clock, a special train from a siding near the Bureau carried the visitors to the experimental mine near Bruceton, Penn. Arriving at the mine, the various devices for the determination of the strength, shattering effect, gaseous products, sensitiveness, liability to freezing, etc., of explosives were demonstrated. Among these different devices are included the ballistic pendulum, Bichel gages, Mettegang recorder and gas and dust galleries.

At 3:45 p.m. an explosion of coal dust was made in the mine. This was accomplished by placing pulverized coal on cross shelving overhead and on floor and side shelves. Two pounds of dust per foot of entry were applied. A cannon loaded with 3 lb. of FFF black powder was located on the floor of the entry, 225 ft. from the drift mouth, pointing outward. A solid wall of flame followed the firing of the cannon, after which the fan was put in operation and the air in the mine cleared.

Rock-dust barriers were inspected after the explosion. These were trough-shaped and illustrated the single and concentrated types. The barriers were then demonstrated. A demonstration of liquid oxygen as an explosive was given in the blowing up of a tree stump on the grounds.

The geophone was demonstrated to the visitors. The geophone is a device for locating the position of imprisoned miners and was used to considerable advantage in the war by the sapper engineers. A 25-lb. keg of black powder was exploded by passing an electric current through the metal container. In demonstrating the danger from the flame of open lamps coming in contact with kegs contalning black powder, a keg of this explosive was fired by this method. Powder was then wrapped in paper containers and placed inside a metal keg, and an open lamp placed under the keg. An explosion followed after four minutes.

An automatic switch thrower, selective or flying, manufactured by the American Mine Door Co., of Canton, Ohlo,

received more than passing notice from the visitors. A model was available as well as the actual working device.

At 6 p.m., the visitors boarded the train for Pittsburgh and were taken to the Baltimore & Ohio station. In the evening, at 8:15 p.m., a mingled program of organ music and speeches was held at the Carnegie Music Hall, Charles Heinroth, director of music at the Carnegie Institute, being the organist. Addresses were made by Samuel Harden Church, Alexander T. Vogelsang, Assistant Secretary of the Interior, and Dr. Van H. Manning, Director of the Bureau of Mines.

Mr. Church's remarks, both jocular and serious, were received with much approval. In serious mood he referred to the Plumb plan and said that even now the workmen were in charge of the railroads, referring to the humble positions from which the presidents of the four biggest railroad systems had sprung. He declared that if the Bolshevists had their day and displaced these men, they would have to take others from the ranks to fill the places of those dispossessed, and that these men, recruited from the same ranks and performing the same services, would be in no wise more truly workingmen than those now in charge, only they would be less experienced, chosen with less consideration of fitness and selected more on the spur of the moment, and therefore would be men who would inadequately fill the places of those they displaced.

He added that it was not true that the poor were growing poorer. Every day's sun set on a people who were better nurtured and more comfortably housed than the people on whom the sun arose. The progress from the ragged edge of poverty to comfort and competence was almost without a break in its continuity.

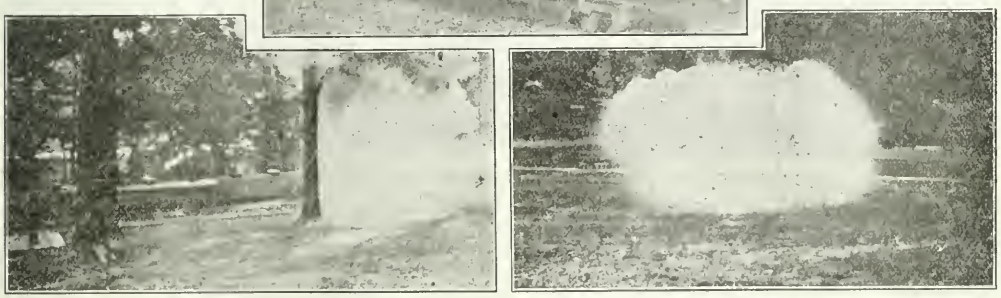
portended, but he trusted that, remembering how short was the stock of all things on which the life, health and comfort of the world depended, we would declare a six month's industrial truce which would at least carry us through the perilous period of winter.

Dr. Van H. Manning, after a word of praise of Joseph Austen Holmes, his deceased predecessor, addressed the members of the mine-rescue and first-aid teams asking them to be patient about the decisions reached by the judges in the coming meet. All could not be winners; mistakes were bound to occur, but like sportsmen we must meet all the unavoidable difficulties inherent in a contest such as that about to be staged.

Adjourning to meet in the Carnegie Lecture Hall, the audience listened to James W. Paul and inspected the slides and motion pictures taken by the Bureau of Mines in coöperation with the National Coal Association. The latter organization has provided the $25,000 necessary to prepare these screen reproductions of coal-mining scenes, which are grouped together under the title "The Story of Coal."

Many pictures of the underground have been taken before. The mining public has been in the habit of expressing itself highly pleased with these films, but now at last it can so deliver itself without any mental reservations. Daylight could hardly give better results. A little smoke from the carbon arc appears in the mine scenes and looks like steam, but that adds beauty, if not truth, to the pictures and certainly obscures nothing of importance.

The views taken on the roadways from a traveling platform will certainly be extremely illuminating to the general public. The mines chosen, if one may hazard a guess, are those which the American Insti-



SCENES FROM THE DEMONSTRATIONS AT THE EXPERIMENTAL MINE

Upper: Looking toward the drift mouth after the coal dust explosion. Lower left: A 25 lb. keg of black blasting powder exploded with unexploded keg at left in foreground. Lower right: Explosion of a 25 lb. keg of FFF black blasting powder by allowing an electric current to pass through the metal container of the keg.

Alexander T. Vogelsang dropped most of his speech into the desk in front of him. Not having the key of that desk or one of the Bureau of Mines' geophones, it is impossible to record much of what he said. In somewhat fuller voice, however, he was heard to say that he much deplored the recent strife of war with its destruction of life and its waste of material resources. He hoped that it would not be followed by a period of industrial strife where the loss to life and comfort would be equally distressing. That man would, Vogelsang added, be a rash and bold prophet who would attempt to foretell all that the next six months

tute of Mining and Metallurgical Engineers have just been visiting in Franklin County, Ill. One could recognize No. 9 mine of the Old Ben Corporation, Orient and Middle Fork. Other pictures are to be taken all over the coal fields of the United States, and the public is to be made aware of the many and expensive operations which precede and accompany the extraction of this fuel. For although coal is one of the commonest of all commodities, being probably outranked in this respect by flour and sugar only, the public at large has but small conception of just how it is produced, sized and prepared for consumption.

Mine-Rescue and First-Aid Contest in Pittsburgh

SYNOPSIS:—In spite of some inclement weather, much enthusiasm was displayed in the national meet. Many teams, both mine-rescue and first-aid, were entered and competition was keen. As a region, the West apparently showed greater proficiency than the East, although the East took first place.

ON TUESDAY, Sept. 30, from 9 to 12 a.m., the preliminary mine-rescue contests of the national first-aid and mine-rescue meet held in Pittsburgh, Penn., in conjunction with the dedication of the Bureau of Mines buildings there, were conducted at Forbes Field. Twenty-one teams, representing eight states, competed in a specially constructed wooden gallery, a portion of which was inclosed and served as a gas chamber into which formaldehyde fumes were introduced. Music by Nirella's band kept the small but appreciative crowd in a good humor.

The following problem was given each team: "Following a mine fire, crew proceeds to nearest working place. A miner is found unconscious, canary has been overcome en route—remove the miner to outside and revive by artificial respiration. Time, 19 minutes." The various teams went to work in a grim, methodical manner that was impresive and suggested the idea that real lives were at stake instead of the dummies which were used. A touch of human interest was brought out by one of the team captains who refused to take a live canary into the gas chamber. Finally a dummy bird was given him, after which he entered into the competition. Another incident of interest was the fainting of one of the team members while in the gas chamber. However, he was brought safely to the outside before any serious effects from the fumes had resulted.

The judges were William Nesbit, chief mine inspector of the Keystone Coal and Coke Co., of Greensburg, Penn.; Edward Steidle, of the mining department of the Carnegie Institute of Technology; R. Z. Virgin, of the mining department of the Carnegie Institute of Technology, and W. G. Duncan, from the mining department of Pennsylvania State College. Edward H. Cox, general manager of the Snowden Coke Co., of Braznell, Penn., acted as chief judge.

From this competition, ten teams won entry to the finals on the following day: McDonald Mine of the Carnegie Coal Co., of Pittsburgh, Penn.; Buffington Rescue Station of the H. C. Frick Coke Co., of Pittsburgh, Penn.; Leisenring No. 1 Rescue Station of the H. C. Frick Coke Co., of Pittsburgh, Penn.; Hillman Coal and Coke Co., of Brownsville, Penn.; Inland Collieries Co., of Harmarville, Penn.; Orient Central Rescue Station, Team No. 1, of Orient, Penn.; Pittsburgh Terminal Railroad and Coke Co., of Pittsburgh, Penn.; Union Coal and Coke Co., of Bentleyville, Penn.; Washington Coal and Coke Co., of Star Junction, Penn.; Madison Coal Corporation, of Carterville, Ill. These teams were selected from a field of 21 that included teams from Alabama, Indiana, Montana, Virginia, Washington and West Virginia.

In the afternoon the preliminary first-aid contests were held on the same field that saw the endeavors of the mine-rescue men. Eighty-five teams were entered, out of which 20 were selected for the world's series on the day following. Five full-team problems were given the various teams, with Major M. J. Shields, of the American Red Cross, serving as chief judge. Practically all of the judges were selected from among prominent physicians of the Pittsburgh district. A considerable number of ties for various places resulted, as was to be expected, all of which were run off after the competition proper. Five teams were tied for 20th place. A limited amount of time was allotted to each problem and the teams were penalized for failure to finish on time. A larger crowd was present than during the rescue work in the morning and saw the following teams place for the finals:

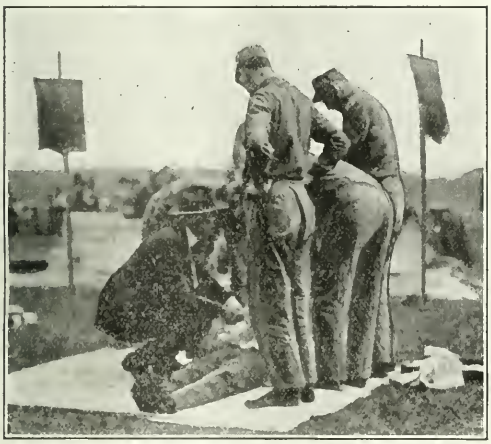
GENERAL VIEW OF FORBES FIELD DURING THE PRELIMINARY CONTEST

Superior Coal Co., of Gillespie, Ill.; Ronco Mine of the H. C. Frick Coke Co., of Ronco, Penn.; Mine No. 6 of the Pittsburgh Terminal Railroad and Coke Co., of Bruceton, Penn.; Consolidated Coal Co., of Jenkins, Ky.; Roslyn Fuel Co., of Seattle, Wash.; Butte District, of Butte, Mont.; Rachel Mine of the Bertha Coal Co., of Broomfield, W. Va.; Mine No. 6 of the J. K. Dering Coal Co., of Clinton, Ind.; Mine No. 42 of the Davis Coal and Coke Co., of Kempton, W. Va.; Standard Mine of the H. C. Frick Coke Co., of Mt. Pleasant, Penn.; Primos Chemical Co., of Vanadium, Colo.; Colliery No. 11 of the Penn Coal and Coke Corporation, of Cresson, Penn.; Sonman Shaft Coal Co., of Portage, Penn.; United States Coal and Coke Co., of Gary, W. Va.; United States Fuel Co., of Universal, Ind.; Vesta No. 7 Mine of the Vesta Coal Co., of West Brownsville, Penn.; Madison Coal

Corporation, of Carterville, Ill.; Team No. 1 of the Penn-Mary Coal Co., of Heilwood, Penn.; Berwind Mine of the Colorado Fuel and Iron Co., of Pueblo, Colo.; Team No. 2 of the Rembrandt Peale Interests, of St. Benedict, Penn.

In the evening, at 8:00 o'clock, a pageant entitled "The Hidden Treasures of the Earth" was presented by the Pittsburgh Chamber of Commerce at Forbes Field. The production was under the direction of the author, Thomas Wood Stevens, president of the American Pageant Association, who lived up to his reputation as one of the foremost producers of pageants in America. It was by far the most dramatic event of the three days and was thoroughly enjoyed by a crowd of about 5000 people. An imitation, miniature coal-dust explosion was enacted that brought the audience to its feet through its realism.

The spirits of Earth, Fire, Air and Water were represented as conspiring against the dreamer Man in the beginning of the world. The successive steps in the development of the mining industry were shown through periods that represented the ages of bronze, gold, iron and finally coal. The last episode, that of coal, portrayed events in the progress toward the safety of life in coal mining which



FIRST-AID TEAM OF THE ROSLYN FUEL CO. SEATTLE, WASH.

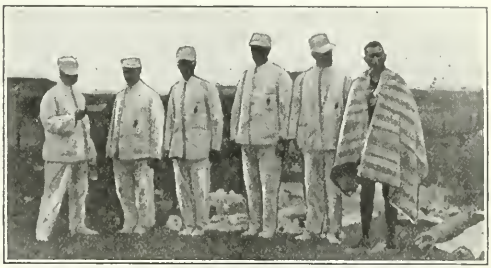
was assumed to begin with the invention of the safety lamp. Permissible explosives were introduced as part of the new methods, and lastly the methods of first-aid and mine-rescue. The final act saw the vision of the Man of Science gaining dominance over the forces of Nature.

The acting of the participants, all of whom were amateurs, was good, and the work of the dancers in particular was to be commended. The cast was drawn from students of the University of Pittsburgh, Carnegie Institute of Technology and men from the many first-aid and mine-rescue teams. Lighting effects were carefully planned and gave a pleasing impression.

THE DOINGS OF WEDNESDAY

In the face of a drizzling rain, the finals of the mine-rescue competition were run off at Forbes Field. Though the inclemency of the weather dampened the action to some extent, yet the final contest saw some of the keenest competition that has ever characterized an event of this nature. The same judges who handled the contest on the day previous were officiating at the finals. The following problem was given each of the ten teams: "Enter mine after explosion, remove stopping across roomneck, find man under fall of slate in fresh air back of barricade with severe cut on lower left leg. Treat and rescue. Time, 12 min."

The following three teams finished first, second and third in the finals, and in the order named: Acme Mine No. 2 of the Union Coal and Coke Co., of Bentleyville, Penn., captained by Mark Jones. Average 99 per cent. No. 1 Team of the Leisuring Rescue Station of the H. C. Frick



WORLD'S CHAMPION FIRST-AID TEAM

Coke Co., of Pittsburgh, Penn., captained by Patrick Bradley. Average, 98 per cent. Buffington Rescue Station of the H. C. Frick Coke Co. of Pittsburgh, Penn., captained by Frank Hyde.

Considerable trouble was experienced by some of the teams due to the wet and slippery condition of the stretchers. This, however does not mean that any credit should be taken from the winners, who performed their duties best under adverse conditions. So to the team of the Union Coal and Coke Co. goes the honor of being the champion mine-rescue team of the United States.

In the afternoon, the first-aid teams, 21 in number, assembled for the big event. The twenty-first team was represented by the Wisconsin Steel Co., of Benham, Ky. which arrived too late for the preliminary contest on the previous day. They competed merely for a place in the meet standing, though they were barred from any of the prizes.

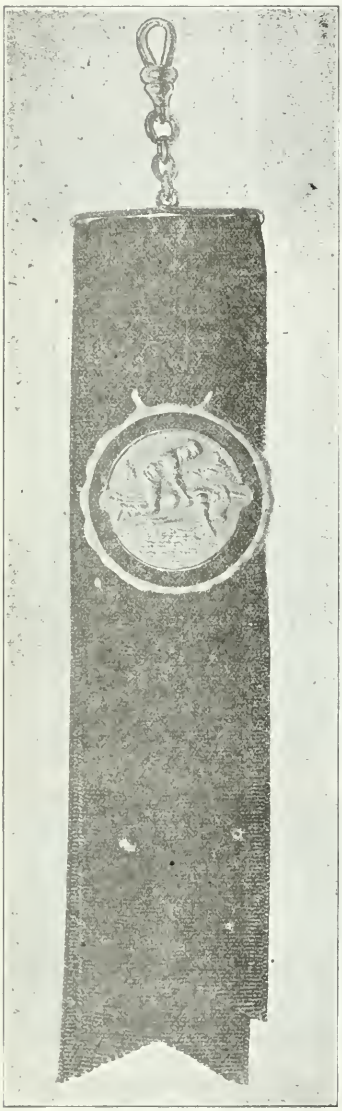
Before the contest started, Van H. Manning, director of the Bureau of Mines, read the awards of the Joseph A. Holmes Safety Association, which was established in 1916. The purpose of the association is to perpetuate the memory of the humanitarian work of Dr. Holmes, first director of the Bureau of Mines, and to further encourage organized

VIEW OF THE FIELD DURING FINAL CONTEST

efforts for greater safety in mining. The awards as made, apply to men who voluntarily risked their lives to rescue miners entombed after a mine fire or explosion. The heroes are as follows: Lewis Meredith Jones, Pittsburgh, Penn., died; Samuel Hardy, Dunbar, died; Clyde Foltz, Dunbar, died; Michael Softcheck, Frank Crum, August Klaus, Orient, Penn.; Neal Brennan, Manus Dugan, William C.

Mitchell, Butte, Mont., died, Granite J. Frowen, Thomas Cooney, Butte, Mont.; John C. Farmer, Havaco, W. Va., died; George Washington Keith, Havaco, W. Va.; Henry Clay Turner, Maitland, W. Va.; Adam B. Mitchell, Fort Gay, W. Va; Samuel Jones, Speedwell, Tenn., died. Gold medals and diplomas were awarded to the heroes. In the event of the hero himself giving up his life, the award went to his nearest relative.

The weather cleared by the time the gong sounded for the first event. Approximately 1000 persons were seated in the grandstand during the contest. Five full-team problems, as in the day previous, constituted the program, which was as follows:



TYPE OF GOLD WATCH-FOB GIVEN BY "COAL AGE" TO STATE CHAMPIONS OF THE STATE OF ALABAMA IN THE FIRST-AID CONTEST HELD AT PITTSBURGH

1. Treat a man insensible from gas and smoke. Schaefer or Sylvester method of artificial respiration must be used. Time, 5 min.

2. Punctured palm of right hand, right collar bone broken, right ear torn off, seventh and eighth ribs on right side broken. Treat and carry on improvised stretcher. Time, 10 min.

3. Dislocation of right shoulder; left knee cap broken; left eye ball injured. Treat. Time, 8 min.

4. A man is overcome by heat exhaustion and falls, fracturing skull and breaking left arm. Treat Time, 8 min.

5. Miner ignites gas with open light and receives burns on entire body above waistline. This includes head, face, neck, upper extremities, chest and back. He is conscious, but there is evidence of shock. Treat Time, 10 min.

The crowd was appreciative at all times and frequently applauded some noticeable presence of mind or speed on the part of a team or team member. The competition was spirited, but in the end the Standard Mine of the H. C. Frick Coke Co., of Mt. Pleasant, Penn., finished first with the remarkable percentage of 99.6 for the five events. Second place was won by the Butte District Team from Butte, Mont., with the splendid percentage of 99.2. The first five teams with their captains are as follows and in the order named: The Standard Mine of the H. C. Frick Coke Co., of Mt. Pleasant, Penn., Captain, J. C. Spence. Butte District Team, of Butte, Mont. Captain, Joseph E. Watson. Roslyn Fuel Co., of Seattle, Wash. Captain, William J. Evans. Berwind Mine of the Colorado Fuel and Iron Co., of Pueblo, Colo. Captain, David Aitken. Colliery No. 11 of the Pennsylvania Coal and Coke Corporation, of Cresson, Penn. Captain, Harry Davis.

When the fact is noted that Pennsylvania had over eight times as many teams entered as any other single state, or more than all of the other states put together, it must be conceeded that the teams from the visiting states did well. The Roslyn Fuel Co. team that captured third place is the same one that was given first place in the meet held in 1911. How close they came to twice carrying off the national prizes can be judged by their noteworthy percentage of 98.2, less than two points behind this year's winners. That the far west was represented in the four places by three teams is sufficient proof of the advance that has been made in first-aid treatment in that section of the country.

In the special artificial respiration contest held immediately after the first-aid finals the team of the United States Coal and Coke Co., of Gary, W. Va., received first place. The team is captained by F. S. Hoch. With it went the possession of the silver cup of the Life Saving Services Co., of Chicago.

Following the contests, a coal-dust explosion was staged in a wooden gallery on the field. This was a duplicate of a similar explosion at the same time on the day previous. Pulverized coal dust was placed in shelving throughout the gallery, much in the same manner as was done at the experimental mine near Bruceton. This event was for the benefit of those who were unable to be present at Bruceton on Monday, as well as people from the City of Pittsburgh who are not directly interested in the mining industry.

For the final meeting of the national gathering close to 1000 men crowded into the large room on the second floor of the Chamber of Commerce Building, at a smoker on Wednesday evening. Patriotic songs were sung, impromptu speeches were made and a general spirit of camaraderie that was irresistable filled the atmosphere. H. M. Wilson, of the Associated Insurance Companies of Pittsburgh, officiated. W. L. Affelder, of the Hiliman Coal and Coke Co., presented the prizes awarded to the state champions, while B. F. Tillson representing the National Safety Council, presented the prizes to the national winners.

The various prize winners are as follows:

STATE PRIZES—FIRST AID

ALABAMA—First prize, Debardeleben Coal Co., Sipsey, Ala. Second prize, Republic Iron and Steel Co., Birmingham, Ala.

ARKANSAS—First prize, United Mine Workers of America, District 1116, Paris, Ark.

COLORADO—First prize, Primos Chemical Co., Vanadium, Colo. Second prize, Berwind Mine, Colorado Fuel and Iron Co., Pueblo, Colo.

KANSAS—First prize, Kansas State Team, Pittsburg, Kan.

INDIANA—First prize, United States Fuel Co., Universal, Ind. Second prize, J. K. Dering Coal Co., Mine No. 6, Clinton, Ind. Third prize, Indiana Bituminous Coal Operators Association, Terre Haute, Ind. Fourth prize,

Miami Coal Co., Clinton, Ind. Fifth prize, Vandalia Coal Co., Terre Haute, Ind.

ILLINOIS—First prize, Superior Coal Co., Gillespie, Ill. Second prize, Madison Coal Corporation, Carterville, Ill.

NEW JERSEY—First prize, Raritan Copper Works, Perth Amboy, N. J. Second prize, New Jersey Zinc Co., Franklin, N. J.

KENTUCKY—First prize, Consolidated Coal Co., representing the Kentucky Mining Institute, Jenkins, Ky.

MONTANA—First prize, Butte District Team.

OKLAHOMA—First prize, Folsom Morris Coal Mining Co., Lehigh, Okla.

PENNSYLVANIA—First prize, Ronco Mine, H. C. Frick Coke Co., Ronco, Penn. Second prize, Pittsburgh Terminal Railroad and Coal Co., Mine No. 6, Bruceton, Penn. Third prize, H. C. Frick Coke Co., Standard Mine, Mt. Pleasant, Penn. Fourth prize, Sonman Shaft Coal Co., Portage, Penn. Fifth prize, Pennsylvania Coal and Coke Corporation, Colliery No. 11, Cresson, Penn. Sixth prize, Penn-Mary Coal Co., Team No. 1, Heilwood, Penn. Seventh prize, Vesta Coal Co., Mine No. 7, West Brownsville, Penn. Eighth prize, Rembrandt Peale Interests, St. Benedict, Penn., Team No. 2. Ninth prize, Pittsburgh Terminal Railroad and Coal Co., Team No. 3, Mollenauer, Penn. Tenth prize, W. J. Rainey Co., Revere Works, Uniontown, Penn. Eleventh prize, Oliver & Snyder Steel Co., Oliver, Penn.

TENNESSEE—First prize, American Zinc Co., Mascot, Tenn.

VIRGINIA—First prize, Clinchfield Coal Corporation, Dante, Va. Second prize, Stonega Coke and Coal Co., Stonega Colliery, Big Stone Gap, Va.

WASHINGTON—First prize, Roslyn Fuel Co., Seattle, Wash.

WEST VIRGINIA—First prize, Davis Coal and Coke Co., Mine No. 42, Kempton, W. Va. Second prize, Bertha Coal Co., Rachel Mine, Broomfield, W. Va. Third prize, United States Coal and Coke Co., Gary, W. Va.

NOTE—The winning first-aid team from each of the states mentioned above received a streamer signifying that it held the championship of its respective state.

STATE PRIZES—MINE RESCUE

ALABAMA—First prize, Republic Iron and Steel Co., Birmingham, Ala.

INDIANA—First prize, Knox County Coal Operators Association, Indianapolis, Ind.

ILLINOIS—First prize, Madison Coal Corporation, Carterville, Ill. Second prize, Herrin State Mine Rescue Team, Herrin, Ill.

WASHINGTON—First prize, Roslyn Fuel Co., Seattle, Wash.

WEST VIRGINIA—First prize, United States Coal and Coke Co., Gary, W. Va.

PENNSYLVANIA—First prize, Leisenring No. 1 Rescue Station, H. C. Frick Coke Co., Pittsburgh, Penn. Second prize, Hillman Coal and Coke Co., Brownsville, Penn. Third prize, Buffington Rescue Station, H. C. Frick Coke Co., Pittsburgh, Penn. Fourth prize, Washington Coal and Coke Co., Star Junction, Penn.

MONTANA—First prize, Butte District Team, Butte, Mont.

NATIONAL PRIZES

One silver cup, donated by the National Safety Council—First prize, first-aid team winning national championship. Won by H. C. Frick Coke Co., Standard Mine, Mt. Pleasant, Penn. Captain J. C. Spence.

One silver cup, donated by **Coal Age**—First prize, first-aid team winning national championship. Won by H. C. Frick Coke Co., Standard Mine, Mt. Pleasant, Penn. Captain J. C. Spence.

One silver cup, donated by **Coal Age**—First prize, mine-rescue team winning national championship. Won by Union Coal and Coke Co., Acme No. 2 Mine, Bentleyville, Penn. Captain Mark Jones.

One gold cup, donated by **Coal Industry**—First prize, mine-rescue team winning national championship. Won by Union Coal and Coke Co., Acme No. 2 Mine, Bentleyville, Penn. Captain Mark Jones

One silver trophy cup, donated by Life Saving Devices Co., Chicago, Ill., to first-aid team attaining best record in artificial respiration and held until next national contest. To be awarded to first-aid team attaining highest rating in resuscitation problems on final days contest. Won by United States Coal and Coke Co., Gary, W. Va. Captain F. S. Hoch.

Gold medals of National Safety Council to each member of team winning first place in national first-aid contest. Won by H. C. Frick Coke Co., Standard Mine, Mt. Pleasant, Penn. Captain J. C. Spence.

Silver medals of National Safety Council to each member of team winning second place in national first-aid contest. Won by Butte District Team, Butte, Mont. Captain J. E. Watson.

Bronze medals of National Safety Council to each member of team winning third place in national first-aid contest. Won by Roslyn Fuel Co., Seattle, Wash. Captain W. J. Evans.

Gold medals of National Safety Council to each member of team winning first place in national mine-rescue contest. Won by Union Coal and Coke Co., Acme No. 2 Mine, Bentleyville, Penn. Captain Mark Jones.

Silver medals of National Safety Council to each member of team winning second place in National mine-rescue contest. Won by H. C. Frick Coke Co., Leisenring Rescue Station, No. 1 Team, Pittsburgh, Penn. Captain Patrick Bradley.

Bronze medals of National Safety Council to each member of team winning third place in national mine-rescue contest. Won by H. C. Frick Coke Co., Buffington Rescue Station, Pittsburgh, Penn. Captain Frank Hyde.

Bronze medals of American Red Cross to each member of team winning first place in national first-aid contest. Won by H. C. Frick Coke Co., Standard Mine, Mt. Pleasant, Penn. Captain J. C. Spence.

Prize certificates of American Red Cross to each member of team winning second place in national first-aid contest. Won by Butte District Team, Butte, Mont. Captain J. E. Watson.

Prize certificates of American Red Cross to each member of team winning third place in national first-aid contest. Won by Roslyn Fuel Co., Seattle, Wash. Captain W. J. Evans.

One camera, donated by B. K. Elliott Co., Pittsburgh, Penn., to captain of team winning first place in national first-aid contest. Won by J. C. Spence of the H. C. Frick Coke Co., Standard Mine, Mt. Pleasant, Penn.

Five Koehler safety lamps, donated by Mine Safety Appliances Co., Pittsburgh, Penn., to team members winning first place in national mine-rescue contest. Won by Union Coal and Coke Co., Acme No. 2 Mine, Bentleyville, Penn. Captain Mark Jones.

Twenty M. S. A. pocket first-aid packets to 20 teams competing in final day's first-aid contest. Donated by Mine Safety Appliances Co., Pittsburgh, Penn. Won by teams in final day's contest.

Watch fobs, donated by Pittsburgh Chamber of Commerce to each competing team member in first-aid and mine-rescue contests.

Banners, donated by Pittsburgh Chamber of Commorce to each competing team in first-aid and mine-rescue contests. One banner only to combination teams.

The end of the smoker marked the conclusion of the biggest event of its kind that has ever been held in connection with the coal-mining industry. Not a single unfortunate incident marred the program of the three days, with the exception of a little rain on Wednesday morning. Everything came off according to schedule and in a manner that showed careful preparation and foresight. The officials of the Bureau of Mines are to be commended for the absolute success of the undertaking, as are also the Chamber of Commerce officials and the various men of the Pittsburgh district who served faithfully on the different committees. It is too early to hope that such a program may become a yearly event. From the amount of enthusiasm aroused in first-aid and mine-rescue, the Bureau of Mines considers the work involved well worth the effort. That safety in mining has been given a tremendous impetus there is little doubt.

Safety Men Meet at Cleveland

By R. Dawson Hall
Managing Editor, *Coal Age*

IN THE first two days of the Eighth Annual Safety Congress of the National Safety Council, held Oct. 1 to 4 at the Hotel Statler, Cleveland, Ohio, over 2100 persons registered. Probably 3000 people attended the sessions and many more witnessed the great safety show.

To the bona fide participants might be added the whole population of Cleveland, which watched the parades and read the bulletins, heard addresses in the public, high and parochial schools, listened to talks in the factories and were taught safety in sermons delivered on Sunday in the churches.

Safety bulletins took prominent places in store windows. The emblem of the Council brightened prominent points on buildings. Slogans on safety were displayed by department stores. Twenty clubs gave consideration to safety at luncheons and meetings. Street cars, municipal vehicles and all automobiles carried the story to the public. The police wore special buttons and held daily demonstrations. The fire Department was no less active.

DAVID VAN SCHAAK,
Retiring President

Every safety zone on the streets bore a safety message that was freshly painted each night. A safety section appeared in all the Sunday newspapers on Sept. 28. An accident clock was erected whereby to compare the fatalities in Cuyahoga County (the county in which Cleveland is situated) during "Safety Week" with the number of deaths that occurred in the same week a year before. Even the stoppers of the milk bottles delivered to the numerous patrons of the dairies during the week carried the story of safety conspicuously displayed.

These details are enumerated here so that the reader can take the matter to heart and try to work up a similar annual drive in his own community. It can be done everywhere, in a measure, and it will create a sentiment for safety that cannot be excelled. St. Louis and Cleveland are hardly mining centers, and the safety drives at those places will not do much good in mining communities; but the example so set can be transferred to real mining cities. Miami, Ariz., a small metal-mining city, is doing it already.

Why cannot towns like Scranton, Wilkes-Barre, Hazelton, Pottsville, Pittsburgh, Terre Haute, Springfield, Birmingham, and Jellico, to mention a few at random, do the like? They could, and they soon will. Safety is only to be attained by making it universal.

The breadwinner must not be the only one interested. He is apt to be a bit selfish. He figures that so long as he lives he will earn enough to provide for his support; when he's dead he doesn't need a living any longer, so why worry? Mother and the children don't see it that way, and they are more interested than he is. Altruism "does not go very far" with the careless man, and to get his coöperation it is necessary to bring a little pressure to bear on him through his wife and family.

We go on "bulletining" the workman at the mines, and only at the mines regardless of these facts. The store carries no message to his wife. There is no bulletin in the office. We try to get the mine worker's fleeting attention when the man-trip is waiting or he is hurrying home, and we forget to indoctrinate him when he is idle and waiting; and we overlook his family altogether.

Safety should come to him, not alone with the rattle of the tipple or the stench of the return air of the mine, but everywhere—at the store, the school, the church and the union hall, where he idles as well as where he works, wherever he congregates.

There are no engineers' meetings, apparently, as numerously attended as are the meetings of the safety engineers. Strange it is that military, civil, mining, mechanical, electrical, illuminating, railroad and all the 57 varieties of engineers are likely soon to be over-shadowed by the safety engineer.

In no place has he a more certain hold than in the mining profession, for in that work there is a specialized interest, the use of mine-rescue apparatus, and in that industry there are company-owned villages where the corporation is in a large sense responsible for the community life.

One wonders, therefore, why mine-safety engineers are not more actively interested. The metal men here, as in the American Institute of Mining and Metallurgical Engineers, take the lead. They come out in larger numbers to the meetings, talk more fluently, give more useful information, develop more discussion and are more active than the coal-mining men. Most of what they present is of value to all men who work in mines, and it is deplorable that so few coal-mining engineers are present to make use of the valuable information so generously given. In the matter of mine-rescue the metal miners are forging rapidly ahead of the coal miners, and yet the coal industry is not willing to listen to the above developments that the ready purses and active brains of the metal-mine officials are constantly initiating.

The meeting, officially dubbed "annual," took place on the morning of Oct. 1. It opened with an invocation pronounced by Ferdinand Q. Blanchard, president of the Federated Churches of Cleveland, and was followed by an address of welcome delivered by Harry L. Davis, the mayor of the convention city, to which President D. Van Schaack of the National Safety Council responded.

President Van Schaack then read his annual report. He referred to the removal of the Council to larger, and more adequate, offices, the resignation of W. H. Cameron, "that far-seeing enthusiast whose works justified his faith," the appointment of C. W. Price as general manager, "another man of vision and faith, whose administration of his new office has proved, even in a few months, that we made no mistake in advancing him to a field of wider opportunity," the addition to the staff of a new assistant secretary, a new safety engineer, a new librarian, with more assistance, a director of publicity, two regional secretaries and a public-safety field secretary.

One of the regional field secretaries is W. R. Rasmussen, formerly with the local council at Pittsburgh who did a great deal for the coal-mining communities. Mr. Van Schaack declared that one Safety Practices Bulletin was produced every month last year as against eight in the course of the whole year before and sixteen Executive Series Bulletins were issued relative to industrial relations.

Mr. Van Schaack reported that the local councils at Pittsburgh, St. Louis and Rochester are now well established with a permanent secretarial, and that they are doing excellent work. The local-council plan has been put in force at Cleveland in a local which embraces all north-

eastern Ohio. There is a local at Cincinnati, one at Kansas City and a third at Portland, Ore.

Movements are actively in progress, and some of them nearing completion, for permanent secretaries in Chicago, San Francisco, Detroit and Springfield, Mass. The Council has also assisted in organizing the Border Cities Local Council in the Canadian towns opposite Detroit and in coaching its permanent secretary.

Schools for safety supervisors have been conducted at St. Louis, Pittsburgh, Rochester and Cleveland. In these schools courses of 15 lessons have been given, and 464 men have been graduated. This work has stimulated attendance at foremen's meetings. Taking St. Louis as an illustration, the average attendance for such a meeting in 1918 was about 150. After the opening of the safety supervisor's school the attendance at foremen's meetings ranged from 1200 to 2000.

RALPH C. RICHARDS, President

Speaking about the decrease in deaths due to public-safety campaigns and the operation of local councils consequent thereon, Mr. Van Schaack said, "In St. Louis the coroner's report for the first eight months of 1919 showed 90 less inquests than in the corresponding months of 1918. Deaths from automobile accidents were 11⅛ per cent. less, notwithstanding a 25 per cent. increase in the number of automobiles in use. In Rochester the accidental deaths during the first six months of 1919 showed a reduction of 18½ per cent. from the figures for the same months of the previous year.

"Incidentally, I am sure you will be interested in knowing that the Council's public-safety propaganda have reached even beyond this continent. Last June, a safety week was conducted at Tokio, Japan, a city of 2,500,000 people, during which not even one fatal accident occurred. The idea of having such a campaign came to the Japanese from news received, through the council, of the safety week in St. Louis last year."

The National Safety Council's work in the matter of national education in safety in schools and colleges also received somewhat lengthy treatment in the address made by the Council's president. A handbook on "The Principles and Practice of Safety" has been prepared by the Council for use in technical schools and universities. Special lectures have been given by members and employees of the Council at several engineering schools, while W. D. Keefer, safety engineer of the Council, has made a successful trip to 18 eastern and mid-western colleges.

Dr. E. George Payne and his associates, said Mr. Van Schaack, have published a book on a plan for introducing safety as part of the curriculum of the common schools, or rather as a pervading element throughout the teaching. The subject is to be introduced as a part of all the branches of study.

The reports of officers and committees followed the president's address, and 25 directors were elected.

In the afternoon a general session was held at which addresses were made on Employees' Representation in Industry, the chairman being Arthur H. Young, manager of the industrial relations of the International Harvester Co. in Chicago.

On Thursday morning there was a general round-table discussion led by Dr. Lucien W. Chaney and L. A. De Blois, and an a.b.c. session in which the fundamentals of safety organization, the duties of the foreman, the promotion of safety education, workmen's inspection committees and the principles of safeguarding were considered and discussed. Concurrently with this twelve sections held meetings, including the mining section.

A large number of representative safety men from the mining industry gathered in the room appointed for the session. Metal-mining men predominated, though the subjects to be discussed held quite as much interest for one class of mining men as another. The preponderance was merely another evidence of the greater advance of the metal industry. That industry has more technical men, is more ardently desirous of learning, more willing to impart information, and is managed on a broader basis than coal mining The coal industry seems to drag along heavily behind its more agile coworker. The piecework system is paralyzing the coal business and throttling its technical development.

MEETING OF THE MINING SECTION

The meeting was called to order by B. F. Tillson, the chairman, and, after the regular annual reports of the committees had been made, A. H. Fay, the only United States Bureau of Mines man not retained to take part in the conference at Pittsburgh, read an article on "Mine Accidents of English Speaking and Non-English Speaking Employees."

In discussion N. D. Hubbell, of the W. J. Rainey Co., said that the requirement that no one could dig coal till 18 years of age would prevent native Americans from entering the coal mines. It would result in the mines being filled with foreigners. Native boys looking for a place to work and denied entrance to the coal face would enter other employment, and once there would stay there indefinitely.

Martin Flyzik, of the Safety Board, of California, expressed the opinion that no man should be allowed to mine till he had been two years engaged as a helper to an experienced miner. H. G. Davis declared that in 1889 the Gallegher bill was passed requiring of all anthracite miners two years of experience in the anthracite mines of Pennsylvania. After two years of the operation of this law the influx of English-speaking and experienced miners ceased. They did not want to come to America to labor for less experienced men, many of whom were of foreign extraction and did not speak English. Since then the British miner has stayed at home.

The anthracite mine industry can recruit from nowhere, not even from the bituminous mines of the same state. Certificates of competency in any other state or experience in any other field are valueless to the man who desires to enter the services of the anthracite companies as miner. He must start as a laborer, and in all probability only a foreign miner could be found to act as his tutor in a subject which the scholar understands much better than the man at whose feet the law compels him to study.

Mr. Davis believes that three months' experience is enough for qualification, and he would admit any man without question who could show that he was experienced either in the mines here or abroad.

T. D. Lewis declared that the education in the English language at the mines of the Lehigh Coal and Navigation Co. had been quite succesful in extending the use of the English language around the mines of the company and was in consequence doing much to increase the safety of those mines.

Joseph W. Reed, of the Consolidation Coal Co., spoke with approval of the laws of Kentucky. Each company made its own rules, which when they were compiled had to be submitted to the State Mining Inspector for approval. That official often discussed these regulations with the Attorney General to see if they comported with the laws of

the state. After a careful reading and inquiry the State Mining Inspector would approve the regulations or have them amended. As finally approved they were posted by the company and were made to all intents and purposes laws of the commonwealth, enforceable like the regular statutes enacted by the leislature of the state.

Five papers followed, one by W. W. Gidley, safety inspector of the Phelps-Dodge Corporation, Copper Queen Branch, Bisbee, Ariz., entitled "The Management and Training of Men," and one by Charles F. Willis, consulting supervisor of the industrial relations of the Phelps-Dodge Corporation, Bisbee, Ariz., on "Industrial Relations in the Mining Industry." These were followed by E. E. Bach's paper on "Labor Turnover and Its Relation to Mine Accidents" read by B. F. Tillson. Mr. Bach is chief of the Americanization Bureau of the State of Pennsylvania.

C. W. Goodale, in discussing the last-mentioned paper, said that turnover certainly did increase accident, but not altogether in proportion to the degree of turnover. The peaks of turnover and the peaks of accident frequency of the Anaconda Copper Mining Co. occurred on the same ordinates of the time curve but did not seem in any way proportional. He added that 53½ per cent. of the Anaconda Copper Mining Co's employees were from non-English-speaking countries. This doubtless exerts a powerful influence upon the rate and severity of accident occurrence.

SYDNEY J. WILLIAMS,
Secretary

B. F. Tillson remarked that it was always with wonderment that he noted that people were willing to spend large sums of money for safety prevention and yet were little willing to install a complete accounting system for accidents which would show just what was obtained from the expenditure.

It was necessary that we should inquire constantly whether the money we were spending was merely being poured into a hole without result, or yielding returns, in some measure, comparable with the effort. Only by carefully noting the facts relative to the classes of men employed and their accident frequency and the character of the accidents can we understand whether any given expenditures are being productive.

On Thursday afternoon a luncheon was held by the Employees' Publications Section and a general session dealt with Americanization, four more than ordinarily good speakers being on the latter program. They all took the view that Americanization could only travel by the route of friendly assistance, education and goodwill. Men were not to be made Americans by mechanical processes, much less by compulsion.

In the evening a "smile party" with informal dinner was held in the Hotel Winton, the spacious quarters of which were crowded with uproarious guests. The National Safety Council smokers and banquets have always been temperate affairs, no wines, whiskies or beers being served, but they never seemed to be less enjoyable from that fact; and this year, with prohibition in force and ladies present, they were as festive as ever they have been.

On Friday morning the mining section held a long and interesting meeting presided over by B. F. Tillson, the chairman of the section. The first paper presented was on "The Desirability of Standardizing Mine-Rescue Training and a Plan for Standardization," by D. J. Parker, Mine Safety Engineer of the United States Bureau of Mines Experiment Station, Pittsburgh, Penn. In the absence of the anthor the article was introduced by Dr. A. F. Knoefel, of Terre Haute, Ind., Mr. Parker being detained in Pittsburgh by the Annual Conference of the Bureau of Mines, which was planned to follow the dedication ceremonies.

In the discussion of the matters presented N. D. Hubbell, of the W. J. Rainey Co., Uniontown, Penn., declared that his company has installed the Gibbs apparatus, because in that type the rubber parts were all carried on the back of the apparatus man, and are protected by an adequate cover instead of being on the front where the air is apt to be cut off when crawling through a low place.

G. B. Southworth, of the West Virginia Coal and Coke Co., Elkins, W. Va., urged that mine-rescue certificates be renewed every six months. Any man whose information about rescue work was allowed to grow hazy was apt to be an inefficient and unsafe rescue man. J. L. Boardman, of the Anaconda Copper Mining Co., Butte, Mont., stated that in his opinion all points were against the constant-feed machines and in favor of those which regulated the oxygen flow to suit the needs of the apparatus wearer.

EFFECTS OF BREATHING NITROGEN

He related the death of a man who was wearing a half-hour Draeger. The man went about 200 ft. and worked for about 5 minutes. He then returned and fell down suddenly before he managed to reach respirable air. His nose clip was in place, but it was found that his oxygen was not turned on and there was no air in the bag. The speaker declared that the regenerator had removed the carbon dioxide from the breathing bag until it not being replenished by oxygen, became so entirely depleted that it contained nothing but nitrogen. Carbon dioxide irritates the respiratory nerves and causes rapid breathing, but here there was no irritation, and the victim failed to become aware of the fact that everything was not normal with the result that he suddenly dropped dead.

Mr. Boardman urged the importance of the doctor's examination of all applicants for mine-rescue certificates. He said that out of 300 would-be mine-rescue men at the plant of the Anaconda Copper Mining Co. only about 60 men were found physically fit for exposure to the great strain involved.

Mr. Boardman said that the weight of the men chosen should range between 130 and 180 lbs. though in some cases heavier men than the upper limit were doing rescue work. He also said that the Anaconda Copper Mining Co. examined its mine-rescue men every six months. He approved of a standardization of methods and training of the general character of that proposed, though he had not read or heard the reading of the paper.

At one disaster, of 30 men presenting themselves at the gate for mine-rescue work, many Bureau of Mines certificated men who had early received training in apparatus work were found, when they presented themselves, to have had but one day's instruction, the length of time of all the men running from one to six days. It was soon found that some of the 30 could not stand the work. The Bureau of Mines has for some time given its certificates only to those who have had six days' training.

The question being asked whether bonuses were paid to mine-rescue men, Mr. Boardman replied that the time expended in mine-rescue training was paid for by the company, and mine-rescue men worked at their regular work from 9 a.m. till 4 p.m. instead of from 8 a.m. till 4 p.m. However, from 4 to 5 p.m. the men go through the mine acting as "firebugs," seeing that no fires are left after the day's work. These men are now paid 75c. a day extra for their services, the rate having been recently advanced from 50c. a day. About 300 men are now drawing the bonus.

and about 300 others are awaiting positions on the mine-rescue staff.

When asked how many sets were a minimum for any company, he said that there should not be less than four sets because when four men go out with apparatus, one of the four is likely to be overcome and it will take at least three others to bring him out. Mr. Seip commented on this remark by saying that no isolated station should have less than two complete outfits, each of which should contain four, or preferably five, sets of breathing apparatus, and Mr. Boardman agreed that his statement that four sets constituted a minimum was valid only where, as at Butte, there were a number of other mines nearby that could supply appartus when called upon.

Mr. Boardman urged that in places of low humidity all rubber parts should be scalded in hot water once a week. Mr. Riggs, a member from Nevada, said that he had under his care 64 sets of apparatus and had constructed a dugout in which to keep his rubber parts. His hope was that the humidity of this cave would tend to keep the rubber in good condition. Every two weeks he put his rubber parts in lukewarm, not scalding, water.

Another member declared that he had installed an air-tight locker which he hoped to maintain at a constant humidity. In this way he expected to keep the rubber parts of his apparatus in perfect condition. H. G. Davis, of the Lehigh-Wilkes-Barre Coal Co., said that he had found steam heat was extremely detrimental to the rubber parts of rescue apparatus. For this reason he had taken out the steam pipes in the mine-rescue station and replaced them by stoves.

Joseph W. Reed, safety engineer, of the Consolidation Coal Co., questioned whether the deterioration was wholly chargeable to the lack of care on the part of the company maintaing rescue apparatus. It was quite likely that apparatus was six months old when purchased and so had suffered already a large degree of deterioration.

RUBBER PARTS SHOULD BE RENEWED SEMI-ANNUALLY

It would be well, he said, if the companies selling such apparatus would put a date on its rubber parts and so fix beyond question the time of manufacture. He stated that while rubber parts might have a life of two years, it was best to renew them every 12 to 15 months and place a steady order with the manufacturer so that about every six months parts of some of the apparatus on hand would be renewed.

F. F. Morris, of the Atmos Corporation, said that distributors in past years had to depend on the exigencies of transportation. The distributors kept their stocks down to the lowest level possible, but it was necessary sometimes to keep some apparatus for six months. It was always impossible to tell how long the apparatus had lain abroad. Today it is different. Apparatus can be purchased entirely of American construction. Mr. Morris considered that the stamping of apparatus with the date of its manufacture was an excellent suggestion which he purposed to follow.

When those present tended to put all the blame for accidents in rescue work on the condition of the apparatus, Dr. A. F. Knoefel declared that the condition of the rescue man was about equally important and should be carefully stressed. The myocardium or outer muscular substance of the heart is unlike other muscles. It works all the time, night and day, thus bringing excessive strain upon it.

Mr. Boardman declared that physicians too often made a cursory examination of would-be rescue men, certifying "O.K." to every detail without any test. One man whose record he had questioned, he was obliged to permit to go on with the training, fearing that otherwise he would have a strike. Neither he nor the foreman thought this applicant a fit man for rescue work, but he had nevertheless qualified physically and had to be allowed to continue the instruction.

A few days later the rescuemen who had been taking training with him declared they would go no further with it so long as he was retained, as he was known to have a disease that they had good reason to believe might be communicated through the common use of the breathing apparatus. This development simplified matters, and the man's services were dispensed with.

The second paper on "Effective Use of Rescue Apparatus in the Fighting of Mine Fires," by J. T. Ryan, of the Mine Safety Appliances Co., was read in his absence by Mr. Riggs. In the discussion that followed J. C. Roberts, of the Colorado School of Mines, Golden, Colo., described the mine recovery at Black Hawk colliery, Black Hawk, Utah, where a fire originated, apparently from the throwing of a cigarette stump onto the fringe of the canvas which was hung from the lower edge of a mine door.

USE OF THE GEOPHONE IN FIRE LOCATION

Mr. Roberts said that smoking should be forbidden in all mines, gaseous and nongaseous alike. He regretted that nothing had been said about the geophone as a means of locating mine fires. This instrument, he said, could be used for such location even if the ignited coal were covered by 250 to 300 ft. of cover. As it was impossible to close off the Black Hawk mine workings and so smother out the fire in its own incombustible gases, it was necessary to load out the incandescent coke, which stood in places in masses 17 ft. deep and 20 ft. wide. The walls of the entry have fallen in as a result of the heat.

The suggestion was offered that an attempt should be made to establish the size of openings through which it was safe to attempt rescue work. F. F. Morris quoted J. W. Paul, saying that no man should pass in mine-rescue apparatus through any hole which is so small that he could not return helping another man.

Mr. Woodburn desired to know the higher limit of temperature at which work in rescue apparatus could be performed. His teams had put in a stopping where the temperature was 116 deg. Fahr. Mr. Riggs said his men had worked in a temperature of 140 deg. Mr. Boardman remarked that where the ventilation was good and the air dry the rapid evaporation from the surface of the skin promoted the elimination of water through the epidermis. With this water he believed much carbon dioxide was also eliminated.

Mr. Woodburn then introduced the question whether mine-rescue squads should carry a stretcher. He believed that they had enough to carry without burdening themselves in that way. He instructed his men always to pick up a car, preferably a timber car, and push it forward to the nearest fall of rock. Leaving the car at that point and pushing on over the fall, they would keep their eyes open for another car, which found, they would push forward to the next fall. In that way in case of an accident it would be possible to find cars handy all along the track and save the labor of carrying the man, who might be overcome, a long distance on the stretcher.

Mr. Boardman believed that it was a small matter to carry a Windflex stretcher which only weighed 3½ lb. His squads carried an extra 2-hour apparatus.

On request he related the way he had used a bomb to blow off a globe valve at the end of a buried air line by which it was purposed to carry water to a fire at the top of a cave. The compressed air was used to lift the bomb into place. Apparently the bomb kept ahead of the compressed air. Had much air passed it, it would not, as Mr. Tillson well observed, have been driven to the end of the line. The globe valve was blown off, and a water line con-

nected with the pipe with the result that the fire was soon extinguished.

When the question arose as to the longest trip in rescue apparatus on record, there was a general protest against emphasizing any such record for it would give the public too great a confidence in the possibilities of apparatus and make people too much disposed to demand what rescue men could not supply.

The best record perhaps was attained at the Speculator disaster, which was declared, not too confidently, to be 2 miles of travel each way, or 4 miles in all. The men expected to come out another way but found an inflow of water blocked the road and so had to return. Little oxygen was left when they reached the fresh-air base, and they had been two hours on the way.

Mr. Morris said that it was not well to make much of such hazardous trips that could not be regarded as having the proper factor of safety. He said it was usual in exploration to go as far as could be reached in 20 min. and then return to the fresh-air base.

Robert H. Seip, mining engineer, New Jersey Zinc Co., Franklin, N. J., urged that as one man of the party was likely to fall at any time, the others should be ready to carry him out, and 1500 ft. was far enough for any such difficult and laborious operation.

Mr. Woodburn declared that it was commonly said that it was safe to travel 2000 ft. on the level, 200 ft. on raises and 150 ft. up stopes, but he would not permit his rescue men to go up raises without his permission. As was emphasized, how far a team should go depends on the condition of the roadway and its grade. No general rule can be given. Moreover, the work to be accomplished en route is an important consideration.

USE OF PYRENE IN FIGHTING FIRE

Mr. Woodburn stated that he had used pyrene for fighting fire with apparent success. He was not able to observe directly the work of the gas, but after the fire was over he found the timber charred halfway through. He felt sure that the pyrene had done the work of extinguishing the fire, though the fire must have been burning quite briskly to judge by the effect on the timber.

Mr. Boardman also testified to the value of pyrene from his experience in Kansas. However, judging by its effect on a mule that was exposed to the fumes, he thought pyrene if carelessly handled might affect or injure the fire-fighting crew.

Mr. Woodburn emphasized the importance of examining all working places after the shift goes off. The session ended with a few most interesting and all too short remarks from someone who had so far had nothing to say—Angus McLeod, fire chief of the Butte and Superior Co., Butte, Mont. That company had worked its way into the disaster class mainly occupied hitherto by coal mines, by a fire in which many lives were lost. It was felt that many could have been saved had there been rescue chambers in the mine. These were now being constructed, the intention being to make them gas proof.

Furthermore, arrangements were made to feed valeric acid into the compressed air lines in case a warning to the men below was necessary. The valeric acid would in a few minutes be spread through the compressed-air pipes throughout the mine and would clearly indicate the presence of danger and suggest a retreat to the "bulkheads." Another arrangement provided was a good signaling system.

Professor Sperr wanted to know the experience as to the penetration of ribs by noxious gases. He believed something more than bulkheading was needed in many mines where the natural walls were of such a character that not only gases but water would penetrate them.

Mr. McLeod said that his bulkheads resisted gas satisfactorily, but others said that in their mines it would be necessary to line the walls and floor for 100 ft. or thereabouts with gunite.

Following this discussion the chairman read an article by M. W. Price, efficiency engineer of the G. B. Markle Co., Jeddo, Penn. entitled "Fire Prevention in Anthracite Coal Mines and Necessary Equipment for Fighting Mine Fires."

H. G. Davis said that mine fires were of almost daily occurrence before permissible explosives were introduced. He said that pouring water from a big tank onto a fire had in one case that he recalled merely extended the fire area. He was not much in favor of such a fire-fighting method.

MUCH PEP AT THE BANQUET

The banquet on Friday evening was a pleasing event with speeches and songs interspersed. Sometimes the guests sung and at others a staff of vaudeville singers; however some of the numbers were of less popular order. There were renditions of old songs of the forties and Maria Condé, now Mrs. David S. Bayer, a former Metropolitan Opera House diva, recited "Safety Last" and sang the "Bird Song" in French.

The chairman was Stephen W. Tener, president of the Northeastern Ohio Division of the National Safety Council and the toastmaster, Alexander C. Brown, the vice-president of the same organization and president of the Brown Hoisting Machine Co.

James Speyer, the banker, who is treasurer of the Safety Institute of America, was the principal speaker. His address largely emphasized the steady movement toward new methods of social achievement.

He showed how we had accepted much of the platform of the Populists of 1891, unpopular as that program then was while some of the economic projects urged in that program have been rejected and are regarded with less favor now than even they were then. To show the flux of public sentiment he pointed to the advance of prohibition and woman suffrage which many years ago had few and insignificant adherents and now are accomplished facts. He urged that we must not oppose change as change, but see that it came in a quiet, orderly and constructive manner, ever proving its rights to its place in the scheme of things before it came definitely into being.

The speechmaking closed with an address by the new president R. C. Richards, one of the original founders of the National Safety Council.

On Saturday morning, at the meeting of the mining section, B. F. Tillson read for C. A. Mitke, a consulting mining engineer, for the Phelps-Dodge Corporation among others, a paper entitled "A Compilation of Chute Types for Loading Ore into Tram cars in Metal Mines." Why the subject matter was limited to metal mines is hard to determine, for the subject of chutes is quite broad and has relevancy to the anthracite regions, to the Georges Creek field and some of the Western coal mines both in the United States and Canada.

In discussing the paper Mr. Trestrail stated that he did not consider it was well to put breaks in chutes because when the chutes are allowed to fill these breaks hold the material in place so that when the chute is opened the material will not flow. Prof. Speer said that all ore would run at some angle, somewhere between 60 and 70 degrees, the latter pitch rarely being necessary. He felt that breaks so constructed as to exceed slightly the angle of flow would not interfere unduly with the flow of material whereas with vertical chutes there was a tendency of the material to pack and wedge into place. He opposed using a long chute in a shrinkage stope, for there was an assurance that

the chute would wear out before it ceased to be needed. When so worn it could not be repaired.

Mr. Boardman questioned whether the size of the material did not have a great deal to do with its packing. When the grizzely has large openings it is more than usually apt to clog the chute. He thought it would be a profitable study that would determine the proper size of grizzely for any given size of chute.

Mr. Tillson said that the New Jersey Zinc Co. standardized on a 12 x 15 in. opening. All small raises were widened so as to give an 8 x 8 ft. opening and with such an opening good results were obtained. The flattest raises were about 50 deg. in pitch. The flatter the pitch of the raise the better so long as the material will run. Too steep a slope is objectionable because the chunks will pack and arch across the opening and will then need dislodging.

When someone suggested that, when the material had packed in a chute, the loader should put in a shot and bring the material down, Mr. Gidley stated that the Phelps-Dodge Corporation would not permit a loader to shoot such a hang in a chute but would provide a miner to do such work.

DISPOSITION OF TROLLEY WIRE

Much was said as to the disposal of trolley wires around chutes, one of the engineers expressing his preference for the use of a side and bottom guard under and at the side of the wire respectively and a swiveled and ball-jointed trolley pole that would permit the trolley wheel to run above the bottom board or guard. The wire with this arrangement was kept well out of danger, and an accident could hardly take place without malicious intention on the part of the loader.

By this ingenius arrangement the trolley pole with its right angled attachment reaches up over the bottom board and engages the trolley wire. To most men however the use of a storage-battery locomotive now or eventually seems indicated, and this was suggested by one of those present. Of course these roads are often narrow, and storage-battery locomotives may therefore frequently not be suitable, but nevertheless there are many cases where a combination storage-battery and trolley locomotive should work out admirably. And here it may be remarked that the metal-mine industry is in the matter of haulage hardly as progressive as the coal industry.

As regards chutes no one present seemed to feel that Mr. Mitke had said the last word. A gate should first shut off the flow at the bottom plate of the chute and should not choke the flow at the top till later. In fine, it should lift the lumps upward not crush them downward. To bring the door down on the ore is likely to land the edge of the door on a large resistant lump and let the fines all go through.

The Oliver Iron Mining Co. makes a large room at the side of the chute above the level of the drift. This room is approachable by a ladder way. If the chute blocks, the obstruction can be loosened by a man with a bar, the man operating the bar from this room at the side of the chute. The company argues that to loosen the choked material through the chute door with the man stationed at a point in the roadway below is extremely dangerous.

The room at the side makes the work of loading much safer and might be adopted in coal mines with heavy pitches if the room could be constructed without unduly destroying the integrity of the pillars which often are unequal to resisting even the burden now laid on them.

Major Arthur S. Dwight, chairman of the Industrial Organization Committee, American Institute of Mining Engineers, read an article on "The Importance of Safety Measures to the Miner" which was followed by an interesting discussion as to the relative fatality frequency in large and small mines.

Martin Flyzik took issue with Mr. Dwight as to that frequency, declaring that in the state of Washington the hazard was the greater in the large mines as based on the record of all accidents including those which involved only 7 days of abstention from work. He also said that this could not be explained by the alleged fact that the larger mines worked the more steadily, for, at least in Washington, the reverse condition obtained. The small mines were the more regular in operation.

A. S. Fay took the opposite stand, basing his figures on the whole of the United States. J. W. Reed, at one time a mine inspector, said that there were two types of relatively safe mines, the small mine which the owner frequently visits and which can therefore be kept by him in reasonably safe condition and the large mine where the work of safety has been made such a matter of specialized concern that persons are employed to see that the safety of the mine is not neglected.

The unsafe mine is usually the medium-sized mine, too large for the perpetual supervision of the owner and too small for the oversight of specialized safety men.

ADDRESS BY THE CHAIRMAN

B. F. Tillson's address entitled "Need for a Definite Technical Service in the Mining Section of the National Safety Council" was listened to with much interest. Everyone seemed to believe that his company would be willing to pay double dues in return for better services but they doubted whether nonmemhers would be disposed to take out membership at the increased figure.

Mr. Bowman, whose friends and associates were contemplating a plan for turning a local safety oranization at Butte, into a full-fledged section of the National Safety Council suggested that it would be necessary to make a similar levy for the local council. Thus the dues would be tripled and not doubled.

He thought the locals should contribute to the section as well as to the National Safety Council, but the suggestion met with no approval (1) because the locals should not contribute to a section as the members of the local do not by any means all belong to the section (2) because the sections should be supported by all members and not by those only that belong to a local and (3) because nothing but the dues indicated as being desired from all the members in the section would be enough to finance the section and enable it to employ a technical secretary.

It was decided to take a vote as to the views of those present and to submit the matter by mail to the member companies for their decision, the balloting to take place and the result to be announced in as short a time as possible.

There was to be a discussion of the Safety Practice Pamphlet on "Mine Car Haulage" but no time remained and the matter was left to correspondence and the good judgement of R. H. Guerrant, who had done so much to formulate what has already appeared in mimeograph form. Other booklets are suggested on Mine Chutes and the Use of Explosives in Mines. The nominating committee, consisting of R. Dawson Hall, Charles W. Goodale and J. C. Roberts, reported in favor of the following officers for the ensuing year: B. F. Tillson, of Franklin Furnace, N. J. chairman; H. G. Davis, of Wilkes-Barre, Penn., first vice chairman; Dr. A. F. Knoefel, of Terre Haute, Ind., second vice-chairman; C. A. Mitke, of Bisbee, Ariz., third vice-chairman; and W. H. Shearman, of New York City, secretary. The chairman will appoint the chairmen of the various committees. After this election the sectional meeting was declared adjourned.

Berwind Canyon Is School Center

A public school system, probably as complete and modern as can be boasted by any rural community in the State of Colorado, has been built up in Berwind Canyon by the Colorado Fuel and Iron Co. With the completion in 1918 of several new buildings, the schools attended by the children of coal miners working at Berwind, Tabasco and Toller (as well as those from the Bear Canyon mine, not operated by the Colorado Fuel and Iron Co.) were made thoroughly complete and up to date. A junior high school has been provided for the accommodation of boys and girls who have completed their work in the grades. A capable staff of teachers is employed, under the supervision of of Superintendent C. A. Bent.

Before the recent building campaign was inaugurated, pupils from Berwind and Tabasco attended school in a four-room frame building which was entirely inadequate to the needs of the district. When the Colorado Fuel and Iron Co. acquired the Toller mine, the school board, with the coöperative aid of the Trinidad district Joint Committee on Recreation and Education, decided upon a building program that would provide suitable facilities for the schoo's. Two rooms were thereupon added to the old school at Berwind, and two small buildings were erected at Toller and one adjacent to the Bear Canyon Camp. These buildings accommodate the pupils up to and including the fifth grade. Between Berwind-Tabasco and Toller, as nearly as possible in the center of the district, two two-room buildings were erected for the use of the junior high school, attended by pupils from the sixth to the ninth grades inclusive. This fall tenth-grade work will be added, and, if conditions justify it, eventually a full four-year high school course.

Considerable attention has been devoted by the Colorado Fuel and Iron Co., to the question of education in its mining communities; and as a natural outcome of the study its officials have given to the subject there has come about the organization of boys' and girls' clubs, and the promotion of other activities under the direction of Superintendent Bent. A poultry and pet stock club and a garden club met regularly during the summer months, and canning societies will be busy later in the season. A junior America-First Society is in flourishing condition.

Those in charge of the many social activities are carefully selected leaders, and they are chosen not only for their educational standing, but for their efficiency and training for the subjects they are to teach, and for their ability to fit into the community life as well.

The company realizes that money spent on playgrounds and equipment is a good investment, and provision has therefore been made to promote active games and sports. Teeters, swings, slides, etc., have been installed on the school grounds, and since the welfare work has been under way a noticeable change for the better has been wrought in the conduct of the children both at school and in the camp.

The wage earners of the Colorado Fuel and Iron Co. have been under the Industrial Representation Plan for about four years, and the extension of the principle of employee's representation to salaried men and women, including foremen and office workers, was provided for recently. During the time the principle has been in effect it has been fully tested.

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SOME OF THE SCHOOL BUILDINGS IN BERWIND CANYON
1—The new high school buildings. 2—Corwin School. 3—New buildings near the Toller Mine

DISCUSSION by READERS

EDITED BY JAMES T. BEARD

Bolshevism in America

Letter No. 5—Speaking of Bolshevism, it must be admitted that its chief menace to our country is through the alluring propaganda that particularly appeals to the impressionable foreigner and to certain elements of our own people. In the light of developments, it appears that the more intolerable the social system of a nation or country has been by reason of the war, the more unsettled is its present economic problems. In such countries, Bolshevism has been able to exert a more tenacious influence, and its helpless and impoverished people have been insnared as by the tentacles of some great sea monster.

Russia is a sorry example of this condition and has proved a fertile field for the exploitation of the Bolshevik element that forms so large a proportion of its population. From the condition of an oppressed and downtrodden pepole, Russia has now passed into the hands of a torn, chaotic and disordered government. Other nations whose subjects fared better, under a more balanced, economic system of government, have not fallen victims, to the same degree, to this reign of terror.

While the condition in America is serious enough to awaken our people to the need of combating the spread of Bolshevism among us, the menace has not assumed proportions sufficient to terrorize anyone. American labor, backed by the A. F. of L., has taken a firm stand against the spread of such propaganda. But American labor, by its impatient demand for excessively high wages, shorter days, and by incessant strikes and lockouts has unwittingly opened a very promising field to the exploitation of Bolshevism.

Far better would it be for the workers in all our industries to wait patiently for the Government to apply its promised remedy for the high cost of living. Government activities along this line will prove more effectual than strikes and lockouts, which only unsettle business and furnish the opportunity desired by preachers of anarchy to further their ends.

As rapidly as possible, the A. F. of L. is weeding out from its membership the undesirable element that breathes discontent among workers. At the present time we cannot improve our economic system by a six- or seven-hour day, or by demanding increased wages. The first, by reducing production, and the second by increasing its cost, would boost the price of commodities and augment the cost of living. Strikes and lockouts have the same effect.

None of these means will prove effectual, and all are unwise. It must be remembered that the producer is hampered, like as we are, by reason of the high price he is forced to pay for crude material and must protect himself from this nightmare of high prices. In the end the worker finds that the cost of necessities has kept pace with his shorter hours and increased wage

The Government has started a war on profiteers that, it is safe to say, will bring relief if we are patient enough to wait a reasonable length of time, pending the necessary investigation and application of the promised remedy. Regarding the situation calmly, it is evident that progress is being made. The organized and systematic efforts of the Government cannot fail to produce results, in bringing the price of necessities and the cost of public utilities back to a normal pre-war basis.

We must rely on the integrity of the Government that has proclaimed its intention of throwing all its resources and energies into the effort to run down the profiteer, who will soon be an unpleasant memory of the unhappy and disastrous war. Our duty is clear; namely, to wait till the Government acts. Anything else can only aggravate a bad condition and make America a more fertile field for Bolshevik activities.

Thomas, W. Va. MINE WORKER.

Letter No. 6—That Bolshevism has, to some extent, already gained a foothold here in America is, to say the least, without a doubt. In my opinion, it will prove a very serious and troublesome question to handle, and one that should receive the careful attention of every thoughtful and patriotic citizen throughout our entire country. The pernicious propaganda has already gained a stronghold in some places and will grow rapidly and spread to other places if not checked by some effective means.

The time is not far distant when Bolshevism, in this country, will assert itself in its worst form if it is left alone. If unhindred the doctrine will soon become rooted in the minds of large numbers of our workmen, especially the foreign-born. All one has to do is to read the daily press to be convinced that Bolshevism is growing and becoming more bold and defiant in this country. The evil doctrine it promulgates is spreading and, in my opinion, will remain with us longer than will be good for the country. It is found in many places where least expected and, by reason of this fact, it is the more dangerous and harder to check.

BOLSHEVIC VIEWS ARE CHANGEABLE

As indicated by the striking analogy of the dog and the bone, in the Foreword, in the issue of *Coal Age*, July 3, when the wealth of others, which the Bolshevist is trying to destroy, falls into his own hands, he turns right-about-face; his views in regard to the possession of wealth change quickly and his brother Bolshevist sets upon him, denounces him and endeavors to despoil him of his goods.

Actuated by hatred and selfish motives, the Bolshevist would destroy the property of all who have been economical and thrifty, and have thereby accumulated enough to own their homes and are educating their children and

taking an interest in the betterment of the community in which they live.

"Justice," in his letter, *Coal Age*, July 3, p. 31, says, "We must see that no person has any cause for legitimate grievance under our flag." The greatest trouble with the Bolshevik workman is, however, his grievances are most generally imaginary, born and fostered in his own evil and selfish mind, and are far more difficult to adjust and satisfy than if they were real. While he is being apparently satisfied at one point, he is getting out of joint at another. It is a large part of his business to see to it that things are not to his liking, all along the line and at the same time. His nature is to find fault with everything progressive, and not be satisfied with anything. He hates and envies everyone who by steady work and frugal living is more thrifty than himself. He would take the wealth accumulated by others, but makes no effort to gain it by industrious means for himself.

I agree with the view expressed by Richard Bowen in his letter, Aug. 21, p. 333, namely, that by coöperation and association with their employees, operators can do much toward preventing the spread of the doctrine of Bolshevism in America. The enactment of stringent laws, unless rigidly enforced, will have but little effect in checking its spread. In my opinion, more can be done in this respect by education, earnest coöperation, friendly association and kind treatment. By making the living conditions of employees better, in and around the mines, far more will be accomplished than by the enactment of too many laws.

It does not cost anything for the mine official to be polite and friendly to employees, at all times. This can be done even in the giving of orders. The successful official knows his men by name and greets them kindly and pleasantly wherever he meets them. By this means he gains their friendship and loyalty to an extent that can be gained in no other way. Some one has said, "The best and surest way to kill an enemy is to make him a friend."

From the standpoint of the Bolshevik element of labor, in the operation of coal mines, the bad and unfair treatment is all on the part of the operator or mine official. He alone is inhuman, selfish and unreasonable, and the one who makes all the mistakes. Experience has convinced the intelligent worker that this is not always true. It cannot be charged that the employer is always in the wrong and the employee always in the right when there is a difference of opinion in regard to treatment or wages. This would be the case, were we to listen quietly to certain elements of labor.

It is unfortunate that, for their own selfish purposes, many politicians and others manifest such a readiness to take the side of discontented workmen in their controversies with their employer, at the present time, without investigating the matter to find who is in the right and who in the wrong. The exhibition of such sympathy and encouragement has a strong tendency to assist the growth of anarchy among certain classes of laboring men. There is a class of workmen who are never satisfied and contented, even when they are doing well. They are continually looking for something with which to find fault. Such only need the encouragement they get from this selfish political element to develop into dangerous Bolshevists.

High wages and the scarcity of labor during the war seem to have unbalanced the minds of many workmen in regard to what ought to be considered reasonable wages and fair treatment. Many of them received three times as much as they were worth or earned, and, as a result, they have become unreasonable. For companies to grant every demand for a raise of wages, and to shorten the hours constituting a working day, would have no effect to check the growth and spread of Bolshevism. With the extremely radical and irresponsible element now in control, in many labor unions, the granting of these demands on the part of companies would have the effect only to increase discontent among many employees.

The best men, in all labor unions, should see to it that the men who are put at the head of their organizations are not tainted with anarchy and are men of broad and liberal views, whose judgment of the differences that arise between labor and capital is only formed after a thorough investigation of the points involved in the controversy. It is the patriotic duty of all good citizens who have a sound regard for the best interest of the country, to use their influence wherever possible to check and eradicate every noxious taint of Bolshevism as soon as it is discovered.

In conclusion, let me say that, in my opinion, the enforced government control of the railroads, in the country, during the past nearly two years, by reason of the conditions imposed by the war, has developed a disposition among railroad employees that leads them to make unreasonable demands. This would seem to be the starting point of our labor troubles and makes the country ripe for Bolshevism. JOHN ROSE.

Dayton, Tenn.

Finding a Mine Door Set Open

Letter No. 1—In discussing the interesting point raised by Richard Bowen, in his inquiry, *Coal Age*, Sept. 11, p. 462, regarding the matter of starting the examination of a mine at the intake end of the section and following the air current, or beginning at the return end and proceeding against the air, it seems to me that we cannot do better than to assume the situation and conditions described and illustrated in the plan he has presented and shown below.

It is my desire to consider this question wholly from a practical standpoint, guided by an experience of a number of years as fireboss, safety and mine inspector, mine foreman and superintendent, in different fields. Some of the mines in my charge have been what would be classed as gassy mines, two of these having formerly suffered serious explosions of gas resulting in loss of lives.

Like Mr. Bowen, I would not close a door that was found standing open and not knowing the conditions existing in that section or how long the door had been open. Instead, I would leave the door as it was found and proceed to examine the section and ascertain its condition before returning and closing the door. But, further than this, my plan of examining a mine differs from that outlined by our friend.

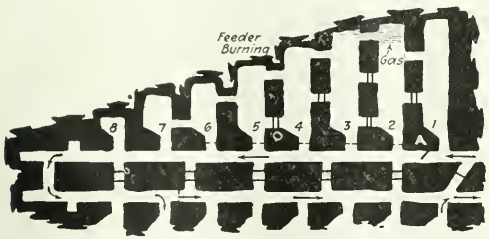
When making an examination of a mine, my experience as fireboss would never permit me to start at the return end of the section. To my mind, the dangers of such a plan are too apparent to take any chances by exposing one's self to the return air of a section when

the condition of that section is unknown and may prove highly dangerous from the presence of poisonous gas that is not indicated on the safety lamp.

It is not to be supposed that Mr. Bowen would carry mice or birds with him when making the examination, and there is every chance that he might easily walk into a poisonous atmosphere without warning of its presence. I recall an instance where a fireboss ran into a place filled with poisonous gas that gave no indication on his lamp and was only rescued by the foreman, who tied a wet handkerchief over his own mouth and ran in and dragged the man out to fresh air.

Another instance of a similar escape, but not in a mine, is that of a young dentist of Winnipeg, a member of the Canadian volunteers, who when caught in German gas, as he was carrying an important message, dipped his Glengarry cap in water and, holding it in his teeth, continued his race with death and delivered his message, after which he was confined in a hospital for several months before he recovered.

Referring now to the figure, let us suppose that we start the examination of this section by entering Chamber No. 1 and find no air passing. Returning at once to the entry and finding the door open, I would let it



remain in that position and return to Chamber 1 and proceed to examine that place up to the face, using every possible precaution in so doing. Then, passing through the crosscut and finding gas accumulated at the face of Chamber 2, I would return through that chamber to the entry and proceed to examine Chamber 3 to ascertain how much gas may have accumulated there.

Returning now to the entry, I would throw back the canvas or curtain hanging in the mouth of Chamber 3 and close the door on the entry between Chambers 1 and 2, which would restore the circulation in these three chambers and drain the gas from the face of Chamber 2, carrying it out directly into the entry in the shortest possible time.

This done, I would continue my examination following the direction in which the miner travels under normal conditions. On reaching Chamber 5 and finding a gas feeder burning at the face, I would try to put it out; but failing in this, I would close the crosscut leading to Chamber 4 with a temporary stopping so as to cut off the air and then fence off the mouth of this chamber and of each of the remaining chambers inby on the entry.

In dealing with the burning feeder, only experienced would be allowed in the fenced portion. Before proceeding with that work, however, I would again examine Chambers 2 and 3 and if these are found to be clear of gas I would open the canvas or curtain in the neck of Chamber 4 and close that in the mouth of Chamber 3.

In my judgment, the only safe and proper way for a fireboss to examine any mine, whether generating gas or not, is to begin at the intake end and proceed with the air. He is then in a position to detect at once whatever may be wrong in the circulation, by reason of the short-circuiting of the current or other possible cause.

ANDREW O. BAIN.

McKeesport, Penn.

Letter No. 2—Referring to the inquiry of Richard Bowen, *Coal Age*, Sept. 11, p. 462, asking for a general discussion on two important features involved in the answer given, in a certain textbook, to a question regarding the proper and safe method to pursue in examining a mine, after finding a door set open, when starting to make the regular inspection of the mine: (1) Whether to proceed with the intake air after the usual manner or custom in making the regular examinations, or (2) to begin at the return and proceed against the air.

Regarding the first point, it has been my custom when acting as a fireboss, if I found a door standing open on the gangway and short-circuiting the air current, I would first examine the places where gas might be expected to accumulate, before shutting the door. Then I would make a second examination if it was found necessary to remove a standing body of gas.

OPEN DOORS ARE UNPLEASANT

It is not a very cheering prospect to find a door open in the morning, which you are quite certain has been open several hours, as it is not safe to close it immediately and begin your inspection. Neither is it pleasant to make an examination of the section in which you know no air has been passing for several hours; because you fear that you may enter a standing body of gas unexpectedly, unless you proceed with more than usual caution and care. Therefore, the safest and most logical plan to follow, in the event of finding a door open, is to leave it open until you have examined the places in that section, unless you can be absolutely certain that there are no burning feeders, lights or fires, on the return; but how would a fireboss know this to a certainty?

However, unlike Mr. Bowen, even where the geological formation and local conditions have favored starting the examination at the return end, I have always followed the intake, instead of traveling against the air. In other words, I have "Followed the Formula," as I believe seventy per cent. of the firebosses of the country are doing, in following the intake, to which custom Mr. Bowen seems inclined to take exception.

In my opinion, there are no special advantages to be had in starting the examination of a mine at the return end of the airway; and there are some disadvantages in such a plan if the mine liberates much gas, unless the inspection is made with extreme caution and there is no possibility of the air being short-circuited.

In traveling against the air, in a mine generating gas freely, it must be remembered that the return air contains a certain percentage of gas which your lamp and close observation will not detect. This may happen when there is present, say two per cent. If you should detect as much as two per cent. of gas in the return airway, you conclude that a very unusual and dangerous condition existed ahead of you. You could not tell where, but you would know that it was up to you to grope your way very carefully till you had found the trouble.

A fireboss is ever confronted with the danger of unexpectedly walking into a large body of standing gas and igniting it. Brattices may be found down, in passing from one working place to another through a breakthrough, where a feeder would be responsible for a dangerous condition. It is true that the return air could be tested every few yards or so, thus determining whether the percentage of gas shows an increase, but this method of security entails extreme care and time, which can be avoided by traveling with the intake.

On the other hand, in proceeding with the intake air, in making an inspection of a mine, one is always traveling in fresh air, which a fireboss needs as much as anybody else; and, if there is any standing body of gas, he is going to find it quicker and with more security to himself and to the mine than when proceeding against the air.

The accumulation of gas shown in the sketch submitted is best removed by hanging a brattice in the crosscut beyond and then deflecting the air in the room by slowly closing the door at "*A*," after opening the curtain at the mouth of Room 3, thereby eliminating the possibility of the gas reaching the burning feeder in Room 5. It must not be thought that a small body of gas with a sufficient volume of air will diffuse very rapidly, and that no disastrous consequences will attend its coming in contact with a light on the airway.

Of course, all experienced firebosses should recognize that unusual conditions such as a large standing body of gas has got to be met with unusual remedies. One must not attempt to remove this gas till he is absolutely certain that everything is clear in the airway, that all men are safe and that no lights or possible sources of ignition are on the return.

If one encountered the condition described when making the examination as prescribed by Mr. Bowen, starting at the return end, he would likely think twice before removing the gas, and be certain that nobody or no lights were on the return airway, which he has just traveled and found safe. FIREBOSS.

———, W. Va.

Promotion of Ambitious Workers

Letter No. 2—Referring to the excellent letter of "Fairplay" on this subject, *Coal Age*, Aug. 28, p. 375, allow me to say that it is not always an easy matter to choose, from among a large number of employees, those who are most deserving of promotion and give satisfaction all around when a vacancy is to be filled.

Although a good manager or superintendent will not willingly set aside the just claims of a good worker for recognition when a place is to be filled, he is often compelled to yield to the wishes or demands of a higher officer and advance one less worthly of promotion. Instances of this are frequent and show that the man in charge cannot always be blamed for the favoritism.

However, success in operation depends on the satisfaction of the workers, and to accomplish that every man must be given a square deal. While I believe thoroughly that length of service in the employ of a company is an important factor and should have weight in the selection of a man to fill a higher position, I do not think it should be assumed that one who has been longer on the job is necessarily the more proficient.

Too often we find men holding one position for a number of years, because they are better fitted for that particular work than for anything else. If promoted to a higher and more responsible place they would fail to show the same proficiency. It is here that a good executive shows his ability to discern the kind of work each man is fitted to perform. Promotion based on length of service would establish a routine that would take away the incentive to effort and exertion to qualify for something higher. For that reason, if for no other, men should be selected to fill vacancies in accordance with their fitness for the work, which should be the controlling factor, and not length of service or political or friendly relations and influence.

In Fairplay's letter, mention is made of a man whose ambition had led him to qualify for a higher position and was much disappointed when an outsider was chosen to fill the place, though he himself had worked successfully for the company for 15 years. I cannot feel the same sympathy for this man as expressed by Fairplay, since it would appear, from the fact that the superintendent is said to have remarked that he "did not know the man desired promotion," that the man himself was to blame and not the superintendent.

THE KEYNOTE IS ACTION

It has always been my plan to get action. My motto is, If you want a thing, go after it, and I believe it is the way every ambitious worker gains success. When a man sits down and waits for promotion to come to him he will almost invariably see it go to someone else. No truly ambitious worker can serve a company successfully for 15 years without his ability and fitness being known and recognized by his superiors.

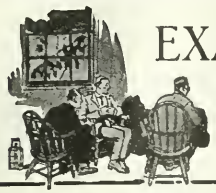
Some men work with their hands alone, unaided with their brains, and depend on their length of service to win for them the desired promotion. Such cannot hope to be awarded. These are days when men whose knowledge and skill enable them to cope successfully with industrial problems are in constant demand. The man who studies to prepare himself to meet these conditions will not be discouraged by seeing another promoted; but the circumstance will make him more active than ever.

The plan described as adopted a few years ago by a great railroad system, in this country, for the purpose of establishing a more equable basis of promoting and maintaining the loyalty of their employees is an excellent one. If our coal companies would adopt a similar plan the effect would be to increase the efficiency of mining.

Let me ask, here, how many of our mine foremen and firebosses who hold certificates could pass a satisfactory examination given by the general superintendent or manager of their company? If coal companies would hold such examinations yearly many of us would have to study, which would keep all in line with what is most up to date in mining.

A first-class foreman's certificate, I regret to say, is no longer evidence of the holder's knowledge and ability. A certificate obtained a few years ago has lost its meaning when the man has not continued to read and study. Too many are depending on their years of service, rather than on their knowledge of principles of mining. The time is fast coming when the most successful in securing production will be those who study and read to keep themselves abreast of the times, as we need more than practical experience. RICHARD BOWEN.

West Pittston, Penn.



EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Miscellaneous Questions

(Answered by Request.)

Ques.—What weight will a double-cylinder engine of the following dimensions lift, allowing one cylinder to overcome friction? The diameter of the cylinder is 10 in., length of stroke, 15 in., steam pressure on piston, 40 lb. per sq.in. The pinion shaft is geared to the [illegible] shaft, the ratio of gearing being 5 : 1, and the diameter of the drum is 5 ft.

Ans.—The total steam pressure acting on the piston in one cylinder is $40(0.7854 \times 10^2) = 3141.6$ lb. The length of stroke being 15 in. (1¼ ft.), the turning moment of the total pressure in one cylinder, acting at the center of the pinion shaft, is $3141.6 \times \frac{1}{2}(1\frac{1}{4}) = 1963.5$ lb.-ft. But, since the ratio of gearing is 5 : 1, the turning moment exerted at the center of the drum shaft is $5 \times 1963.5 = 9817.5$ lb.-ft. But the diameter of the winding drum being 5 ft., its radius is 2.5 ft. and the lifting force of the engine exerted at the circumference of the drum is $9817.5 \div 2.5 = 3927$ lb.

Ques.—Name and describe briefly the different systems of haulage used in the bituminous mines of Pennsylvania, and state to what conditions each is best adapted.

Ans.—In the smaller mines, mule haulage is mostly employed, while some form of mechanical haulage is used in the larger mines. Mechanical haulage includes both rope and motor haulage. There are four types of rope haulage; namely, gravity-plane and engine-plane haulage, tail-rope and endless-rope haulage.

In gravity-plane haulage, a rope that passes over a headsheave at the top of the incline connects the loaded car with the empty, and the descent of the former pulls the latter up the incline. The movement of the cars is regulated by a brake on the headsheave. Sometimes it is necessary to install a "barney," which is a truck having a weight between that of the loaded and empty cars. The descending loaded car pulls the barney to the top of the incline. The ropes are then changed and the descent of the barney pulls up the empty.

In engine-plane haulage, an engine is located either at the head of the incline or at its foot and used to haul the loads up the incline and lower the empties. Where the grade is not too steep the empty cars are permitted to gravitate to the bottom of the plane, their speed being controlled by a brake on the drum. When the engine is located at the foot of the incline, a headsheave is required at the top and the rope passes over the headsheave and reaches back to the bottom. The arrangement then requires twice the length of rope necessary when the engine is at the top of the plane.

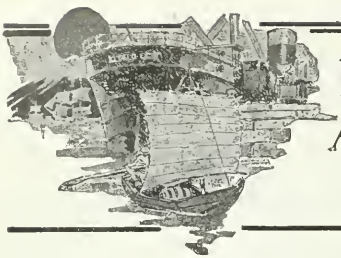
In tail-rope haulage, there are two separate ropes, a main and a tail rope. The main rope reaches from the drum of the haulage engine back to the inby parting where it is attached to the loaded trip standing on the plan an entirely new outfit for next year's installation, parting, ready to be hauled out of the mine. The tail rope reaches from the drum of the engine back to the parting, where it passes over a tails heave and is attached to the rear end of the loaded trip. The tail rope is practically twice the length of the main rope, and unwinds from the drum as the the loaded trip is hauled out of the mine. The tail rope is then attached to the empty trip, which it pulls back into the mine, dragging the main rope behind it.

In endless-rope haulage, there is but one rope, which always moves in the same direction. The rope passes from the tandem winding drums of the engine into the mine to the tail sheave and returns along the haulage road or other passage to the surface, where it is carried over a sheave on a balance truck, which keeps the entire system taut, and returns to the winding drums. In this system two winding drums or sheaves are set tandem to each other, which enables the rope to pass from one drum or sheave to the other and avoids the fleeting or side travel of the rope, by taking only a half-turn over each drum. The loaded cars are attached, at intervals, to the branch of the rope running out of the mine, while the empty cars are attached to the other branch running into the mine.

Motor haulage is performed by either electric or compressed-air mine locomotives. Steam locomotives are not adapted to underground service and are not used to any extent in mines. Electric mine locomotives are operated either on the trolley or the storage-battery system. The use of either of these systems depends largely on conditions in the mine, with respect to gas and the equipment employed for mining the coal.

Mule haulage is adapted to small mines where the main haul does not exceed, say, a half-mile; also to the work of gathering cars in larger mines. Gravity-plane haulage is adapted to conditions where the material mined must be lowered from the face to the gangway, or from the mine entrance to the loading tipple. On the other hand, engine-plane haulage is adapted to conditions where the material must be hauled up an incline or slope. The tail-rope system of haulage is more convenient than endless-rope haulage wherever the roads are crooked and there are sharp turns to be made or considerable grades against the load. On the other hand, endless-rope haulage is adapted to straight roads and where light variable grades balance each other in their effect on the engine.

The use of electric or compressed-air locomotives depends largely on the equipment of the mine and whether or not gas is generated in the workings. Where the mine is electrically equipped and lighted, electricity is generally preferred for haulage; but where compressed-air machines are used for drilling and mining the coal, or where the presence of gas in the mine debars the general installation of electrical machines, the compressed-air system is safer to employ.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Europe Facing Coal Famine

Analysis of Situation Shows European Nations Are Using Own Tonnage to Carry High-Priced Cargoes, Leaving to America the Job of Freighting the Less Profitable Coal

With the approach of winter the greatest menace to life in Europe draws on apace. The greatest stress and danger lies in the lack of coal. America has a moundless quantity, but incredible as it may seem America cannot supply the need of Europe. Nor can Great Britain, whose annual production of 287,412,000 tons has shrunk to 214,000,000. Germany's decline is even greater. And while Great Britain's pre-war export of coal ran to 76,689,000 tons her estimated post-war exports are only 23,000,000 tons or less.

To avert a world shortage America must export upward of 81,000,000 tons. The nation's pre-war export of coal was less than 20,000,000 tons. The excess over pre-war exports which must be supplied by this country, if the world shortage is to be made up, is 62,463,000 tons.

This shortage cannot be met. To make up the deficiency America would have to export within the next few months more than four times as much as it ever exported during an entire year. There is not enough tonnage available. With the trebling food exports even an extra million tons a month would tax shipping beyond its utmost limit. And even that extra million would be of no avail in relieving the distress that threatens Europe.

No phase of world conditions has more closely occupied the United States Shipping Board than this matter of coal for Europe. Keenly alive to it, J. H. Rosseter, Director of the Division of Operations, had H. Y. Saint, head of the Export Coal Department of his division, compile the report which is presented here. It portrays the abnormal demand that is being made upon the United States to take care of Europe from a coal standpoint, shows that the demand that is being made upon the Shipping Board for tonnage to be placed in the coal trade is many times greater than can be supplied, and what is more significant, shows that European nations are doing little or nothing to relieve the situation by using their own tonnage; moreover, that the nations which are doing the least are the ones that are able to do the most.

The outstanding fact, brought out by this analysis, is that European nations are using their own tonnage in trades best suited to their maritime interests and in competition with Shipping Board vessels, leaving the United States to carry the less profitable coal cargoes for the relief of suffering peoples.

"It would seem," said Mr. Saint in the report to his chief, "cognizance must be taken by the Shipping Board of this situation and something should be done to bring European tonnage into this work of distributing coal to European ports.

"The statistics compiled by this department show that Italy is practically the only European government which is extensively using its own vessels in carrying coal from the United States for Italian relief. In the month of July, 20 Italian vessels sailed from American ports with coal. You will notice that Norwegian, British and Greek ships were plying in the Italian trade, which today is considered a profitable one. At the same time the Shipping Board was having demands made upon it to carry coal to Greece, Switzerland and the Scandinavian countries as well as to South America.

"Very heavy demands are being made upon the Shipping Board to carry coal to Denmark. Our tabulation shows that no Danish vessels are carrying coal to Denmark, but a number of Danish ships are carrying coal from American ports to South America, which is a profitable trade when the return cargo situation is taken into account.

"It will be noted that Norwegian and Italian vessels are under charter to carry coal to Gibralter, when the needs in their own countries are great.

"Large demands have been made upon American tonnage to carry coal to the Netherlands, and during July, 17 American vessels sailed from American ports to that country. During the same period only three Dutch ships carried coal to their home ports while two Swedish and one Norwegian ship were in the Dutch coal trade.

"Insistent requests have been made on the Shipping Board to carry coal to Sweden, and as many as 11 steamships have sailed in one month for that country. Yet Swedish steamships in that trade have not exceeded one a month.

"With the increasing demand upon America to supply coal for Europe and to carry it in American bottoms, and with all the demands predicated upon the increasing distress in various European countries, it would seem that immediate steps must be taken to bring about an effort on the part of the various countries to help themselves in this matter of coal distribution.

"In view of the fact that the Shipping Board cannot meet the demands that are being made upon it, in view also of the fact that our vessels are now being used to relieve distress in Europe where the distress is greatest and relief most urgent, it seems imperative that the European nations which are facing a coal famine should do something to relieve the situation by placing some of their own tonnage in the American coal trade, even though that trade is less profitable than the ones on which these vessels have been placed to compete with the new fleet of the U. S. Shipping Board."

From the analysis made by Mr. Saint it appears certain that the people of France, Belgium, Holland, Italy, Denmark, Norway, Sweden, Spain and Switzerland will be among the ones that must suffer most and that the shortage will fall with no less weight upon Germany, Austria-Hungary, including Czechs-Slovakia and Jugo-Slovakia. The total coal requirements of the world next winter have been placed by this authority at 179,511,000 tons, of which 97,723,000 tons can be supplied by countries other than the United States.

This would leave 81,788,000 tons to be furnished by this country. Mr. Saint estimates that there will be furnished 19,325,000 tons, leaving a shortage in the world's coal bin of 62,463,000 tons, a tonnage sufficient to supply the New England States for nearly three years.

Translated into other terms, it would require 1,249,000 cars of fifty tons capacity each to meet the shortage, or 25,000 trains of fifty cars each. Twelve thousand, five hundred vessels of 5000 tons capacity each would be necessary to carry the cargo across the ocean in one trip. More than 60,000 men would have to dig coal at top speed for a year to produce the tonnage.

During the ten-day period from Aug. 29 to Sept. 9 inclusive, the total allocations of vessels to the coal trade numbered thirty-five.

Most of the coal to be carried in these bottoms goes to European destination, with a large portion going to Italy. One coal-laden ship is destined for Buenos Ayres, one to Chile, one to Rio de Janeiro and three are to carry coal to the Pacific Coast for the American Navy.

Allies Look to United States for Relief in Fuel Shortage

The coal situation in Europe was brought prominently before the public during the month, by a meeting of the Supreme Economic Council in London, at which a warning was given by Mr. Hoover that Europe's coal production was 35 per cent. below normal, and according to the press dispatch, Mr. Hoover stated, "That England's annual coal production has fallen from 292,000,000 tons in 1913 to 183,000,000 tons, and Germany's decline is slightly greater. "Europe," he added, "at the present rate will produce 443,000,000 tons next year, while the amount needed is estimated at 614,369,000 tons." Following this meeting, shipping and fuel representatives of France, Belgium and Italy conferred with Mr. Hoover at Paris on Aug. 4 and decided to urge the Supreme Economic Council to appoint a European coal Commission to coördinate the distribution of European coal, in order to avoid what threatens to be a disaster. Mr. Hoover declined to accept the permanent directorship of the commission, stating that, "He believed the problem to be strictly European, and that the situation cannot be relieved materially by the slight help which the United States can give." It is thought that Mr. Hoover wished to spur the Europeans to put forth their utmost endeavors to meet the dangerous situation.

Without fuel, the railroads cannot transport food and produce; factories are closed both because of inability to get fuel and inability to ship their product. The United States is vitally concerned in helping its principal allies, both from an economic and humanitarian standpoint, and whatever coal can be sent will be of the greatest benefit, and perhaps ward off disastrous conditions. Many persons in the United States, on account of the impending shortage of fuel next winter, feel it is unwise to encourage export business, but winter shortage in the United States usually is very temporary in times of peace, and except from November to February, there is ordinarily no difficulty in supplying home needs. From March to September, the bituminous mines usually work only part time. If during the slackest periods in the Appalachian fields, coal could be loaded for shipment abroad, it would both improve the financial status of these mines and also help in the shortage abroad, which is going to continue for a long time.

The principal causes for this shortage abroad are: (1) Strikes to improve conditions; (2) individual absenteeism from the mines; (3) shortening the hours of labor; (4) lowered individual effort; (5) shortage of mine supplies on the continent; (6) insufficient railroad trucks and poor train service on the continent.

The first four of these causes are due to the world-wide labor unrest which affects even the native labor in South Africa, according to a recent address of the retiring president of The South African Institution of Engineers, in which he states that in his group of mines the output per native has fallen 30 per cent since 1914. In Europe Mr. Rice, chief of the Mining Division of the U. S. Bureau of Mines, observed during his recent visit that there is a very general feeling among the miners that they are not willing to go back to the old order of things in the matter of low salaries, housing and other conditions. This feeling is particularly acute in Great Britain.

In Great Britain, on July 16, 1919, there went into effect the so-called Sankey award which shortened the hours of labor from 8 to 7, not including the average time of lowering and raising the workmen, but including the time he takes in traveling to and from the working place, the mine owners contending that with the seven-hour workday there was less than six hours effective work performed. While to some extent this might be taken care of in the future,

by increasing the number of employees, there are no unemployed miners at the present time, and moreover the workings, which are laid out for the longwall system, would not provide places at the working faces. This with the other causes has led to a tremendous slump in the production in Great Britain, and it is now a question of how long England will be able to supply its former export trade markets. In 1913, the exports were 77,000,000 tons (2240 lb.) Unless there is serious restriction of home industries and consumption of coal, there will be little or no coal available for export.

In France, the fuel conditions continue serious. There is a loss of 20,000,000 tons output of the mines wrecked by the Germans, which has not been made up by imports from Germany or the Saar fields, where the normal output of 17,000,000 tons per annum has been reduced to about 35 per cent. by reason of lessened efficiency of the miners, claimed in part due to poor feeding.

It was expected that Westphalia, when peace had been made, would at once respond and resume its former large production, but strikes and labor troubles have continued, and there is a most serious shortage of coal so that the remarkable situation is found of coal being imported from the United States to Switzerland and now going up the Rhine on barges through the great Westphalian fields. Sweden, Denmark and The Netherlands continue to receive coal from the United States, though normally all the Baltic ports should be supplied by English coal. France and Italy are also importing from the United States.

Great interest is now being manifested in the export business, the leading companies have their own facilities for handling the business, while many of the smaller operators are desirous of getting into this lucrative business; but the greatest difficulty arises first, in getting the allocation of ships, second, in arranging the matter of payment by the foreign consignees, and third, in agreement as to grade and quality of coal.

It would appear that one very important thing must be done—the establishing of standardized methods of taking samples and making analyses. At the present time the U. S. Bureau of Mines is sampling and analyzing American coal purchased by the Swiss and Holland governments. It would seem desirable that similar standardized methods should be followed in shipments to commercial foreign buyers to guarantee the quality of what they recieve, owing to the very great differences in the kinds and quality of coals heretofore used abroad, as compared with those obtainable from this country, and also because of the varying methods of sampling, analyzing and the interpretation of results.

Prices of Bunker Coal at American and Canadian Ports

Under date of Sept. 27, Willard, Sutherland & Co., of New York, state that the following prices prevail for bunker coal at the American and Canadian ports listed:

AMERICAN PORTS—CURRENT PRICES AS OF SEPTEMBER 27, 1919

New York, N. Y.	$6.35	Pool 9 and 71, f.a.s. ex-lighters.
Philadelphia, Penn.	6.50	Pools 9 and 71, trimmed, ex-lighters.
Baltimore, Md.	6.50	Pools 9 and 71, trimmed, ex-lighters.
Newport News Sewalls' Point, Va. Lamberts point	6.50	F.o.b. under chutes at coal piers—trimming extra.
Boston, Mass.	10.25	T.i.b. ex-lighters.
Charleston, S. C.	6.25	F.o.b. and trimmed, under chutes at coal piers.
Portland, Maine	11.50	Trimmed ex-lighters.
Wilmington, Del.	7.90	F.o.b. ex-lighters.
Savannah, Ga	6.80	T.i.b. alongside supplier's wharves.
Jacksonville, Fla	9.95	New River-Pocahontas — T.i.b. alongside supplier's wharf.
	8.75	Stonega — T.i.b. alongside supplier's wharf.
	7.50	Sipsey — T.i.b. alongside supplier's wharf.
Mobile, Ala.	6.50	Pratt run-of-mine — T.i.b. alongside supplier's wharf.
Pensacola, Fla.	6.26	Cahaba or Black Creek washed — F.o.b. under chutes at coal piers.
	5.25	Pratt run-of-mine — F.o.b. under chutes at coal piers.
	5.85	Cahaba or Black Creek R/M — F.o.b. under chutes at coal piers.
New Orleans, La.	7.40	Sipsey — T.i.b. ex-lighters.
	6.50	Pratt run-of-mine — T.i.b. ex-lighters.
Galveston, Tex.	10.50	Oklahoma steam coal—f.o.b. at supplier's wharf.
Seattle, Wash.	9.15	Comox steam coal, f.a.s. ex-lighters.
San Francisco, Calif.	13.05	Utah and/or British Columbia, f.o.b. ex-lighters, trimming extra.
San Pedro, Calif.	8.50	Utah black — F.o.b. alongside supplier's wharf.
	9.65	Run-of-mine — F.o.b. alongside supplier's wharf.

CANADIAN PORTS

Union Bay, Vancouver	7.65	Comox steam coal — F.o.b. under chutes at coal piers, trimming extra.
St. John, N. B.	10.50	T.i.b. ex-lighters.
North Sydney, N. S.	7.25	T.i.b. at piers.
Halifax, N. S.	10.50	T.i.b. ex-lighters.

Coal Trade of Trieste

Prior to the war the annual importation of coal into Trieste was approximately 108,000 tons, of which about 15,000 tons were from other parts of Austria and about 72,500 tons from England. The annual importation of American coal was only about 3500 tons. The yearly exports of coal from Trieste amounted to some 8800 tons, of which 5600 tons went to Austria and the remainder to Italy, Hungary, Turkey and Greece.

Before the war the total yearly consumption of coal in Trieste and Istria was approximately 400,000 tons. The most important coal consumers of Trieste are the industrial works and the steamship companies. Of the former the principal consumers are the municipal gas works, the electric light and power stations, the Stabilimento Tecnico, and the Alti Forni di Servola. Of the various steamship companies the most important are the Lloyd Triestino (formerly Austrian Lloyd), operating lines to Italy, Dalmatia, the Levant, India and the Far East, and the "Cosulich" Societa Triestina di Navigazione (formerly Austro-Americana), operating lines to North and South America via the Mediterranean ports.

From the outbreak of the European war until November, 1918, the Trieste market was supplied with Austrian coal from the mines of Ostrau in Moravia and Arsa in Istria. In 1917 the Austro-Hungarian Government established in Vienna a Coal Central, which undertook the supplying of coal to all the industrial works, steamship companies and steam and electric railways of the dual monarchy. The Arsa coal mines are located in the southeastern part of Istria. The port of shipment is at the northern end of the Arsa Canal, at the entrance of which the water has a depth of about 75 ft. This entrance is between Punta Ubas and Punta Socciajo near Punta Nera. An Austrian company has been operating these mines, but at present negotiations are under way for the purchase of the shares of that company by Italian capitalists.

The Sebenico coal mines are located in the southern part of Dalmatia, in the district of Knin. The Sebenico coal is a lignite and cannot be used for fuel without the admixture of other coal. Only Arsa and Sebenico coals are at present on the Trieste market, and the local industries use a mixture of one-third Arsa and two-thirds Sebenico, as the coal from these mines is of inferior quality, the uses to which it can be put are limited, and as the supply is inadequate to meet the growing demand, the coal situation in Trieste is critical. On July 1 last the prices of the above-mentioned coal were increased 100 per cent. At present the Arsa coal is quoted at 180 lire (700 crowns) and Sebenico coal at 150 lire (600 crowns) per ton. [At normal exchange the lire is worth 19.3 cents.]

The British coal imported into Trieste for the steamship companies and the local gas and electric works since the signing of the armistice has been under the control of the Commissariato Generale dei Carboni, which has fixed the prices from time to time. It is reported that this Government control of supplies to private firms is about to be discontinued. Local coal dealers say that the recent increase of 6 shilling ($1.46) in the price of British coal will not have much influence on the local market: First, because up to the present time the prices of British coal imported into Trieste have been controlled by the Italian Government, so that such coal has not yet entered into competition; and, second, because the increase makes practically no difference in relation to the high price of coal here today. Cardiff coal, which was the industrial coal most used in Trieste before the war, is now quoted at 123 shilling ($29.93) c. i. f. Trieste.

As the result of an investigation just completed by the Trieste consulate, the following suggestions are made to American coal exporters wishing to establish themselves in that region:

1. The steamship companies and local industrial works require lump hard coal. The people are accustomed to use domestic coal, wood and charcoal for heating and cooking, and the available supplies would be sufficient for household purposes if the steamers and industries were supplied from abroad.

2. American exporters should be represented in trade by trustworthy agents interested only in American coal.

3. Through their local agents American exporters must be constantly informed as to market conditions in order to quote competitive prices c. i. f. Trieste.

4. Trial shipments would facilitate the introduction of American coal and get the industrial consumers accustomed to its use.

When local coal consumers are convinced that American coal will be as good as, if not better for their purpose than the coal to which they are accustomed, American exporters can look forward to a permanent market in this territory.

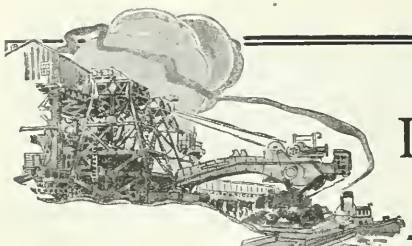
Regarding trade conditions and the prospect of marketing American coal in the countries of the former Austrian Empire, it is believed that the manufacturing industries of German Austria, Jugoslavia, Czechoslovakia and Poland will be in regular operation long before the coal mines in these countries will be able to meet the demand. Mining operations will be hampered by deterioration in machinery and organization, by the necessity of repairing or replacing machinery, and by the lack of skilled miners.

Owing to the enhanced cost of production, due to wage increases, the Austrian companies were obliged to increase the price of coal and coke on Apr. 1, 1919. It appears that the prices then fixed are to continue until Jan. 1, 1920. Thus steam coal cost 200 crowns per ton f. o. b. and coke 340 crowns. Th prices of coal in Upper Silesia have also been increased. Owing to the loss under the peace treaty of Bohemia, Silesia and Moravia, the new state of German Austria will have to import most of the coal required by its industries. In order to facilitate the importation of coal and other commodities from overseas agreements by the countries concerned will have to be made for the stablishment of special freight rates for the railway carriage from Trieste.

The harbor of Trieste has several breakwaters, so that ships can enter the old Free Port, where the depth is about 60 ft., or at the port of San Andrea, where the depth is about 50 ft. The old Free Port is connected with the Central Railway Station, from which trains leave for Udine, Venice, Fiume and Vienna. The port of San Andrea is connected with the San Andrea Railway Station, from which the trains leave for Northern Austria and Bavaria. Both ports are equipped with modern cranes and elevators for the loading and discharging of vessels. This work is conducted by the Administration of the General Warehouses, which has fixed the charge for loading and unloading coal by cranes at 0.15 lire per ton, and for the use of elevators at:

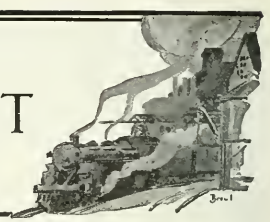
Using crane of—	Per Day Lire	Per Half Day Lire	Per Hour Lire
15 tons	40	25	[illegible] 8
30 tons	50	30	[illegible] 10

drsulic power and the 30-ton by electric power. At present the discharge of coal from vessel to wharf or railway car, including stevedore charges, cost about 6.50 lire per ton. In general, the unloading and transportation of coal to the local industries is undertaken by the industries themselves.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

No Misgivings as to Situation this Winter if Car Supply is Adequate and Labor Stays on the Job.

Not only is there plenty of soft coal to be had, but increased production due to a better supply of empty cars to the mines precludes any possibility of a coal scarcity this winter if mine workers stay on the job and settle their new wage demands by conciliation and arbitration instead of going on strike Nov. 1, as they now threaten to do.

The past week has disclosed no new developments affecting the market for steam grades of bituminous coal. There is almost no buying interest shown throughout the New England States, a section of the country wherein are located a great number of plants that consume a large tonnage of coal annually. So unsettled is the industrial situation that important consumers are more interested in stopping shipments than in making further purchases.

The iron and steel strike has greatly decreased the demand for coal in the Pittsburgh district. Steel plants would doubtless continue to take coal for stocking purposes if they could, but the strike is of such a nature that coal cannot be unloaded. The entire Mahoning Valley was closed within the first two days of the strike and has remained closed. More than half of the Lake front plants are closed. The Shenango Valley, which was about one-half closed at the beginning of the strike, is now running moderately well. The Monongahela and Allegheny Valleys are running nearly full, as is Pittsburgh proper. On the whole the coal demand of the steel industry that is supplied by mines in the Pittsburgh district is approximately cut in half.

In the Middle West, there has been a marked improvement in the steam coal market so far as demand is concerned, and prices in practically all of the fields have stiffened. Mines throughout this territory cannot keep up with the demands for domestic fuel, which continue as strong as ever.

There is practically no break in prices, in spite of the many adverse conditions under which the soft coal industry is operating, and in spite of the steel strike. In fact, the efforts of the Railroad Administration to furnish cars to the mines carried the rate of bituminous coal production to a new high record for the year during the week ended Sept. 27, the output for the week totaling 11,667,000 net tons.

The export market continues to show strength. The situation in Italy and in Holland is in many ways acute, and there is every indication that coal exports will continue to show increases from week to week.

Anthracite mine workers have agreed to stand by their war schedule and will not seek to change their wage scales or working hours until Mar. 31, 1920, when the present agreement expires. In the anthracite steam trade there continues to be a large surplus of all sizes. Buckwheat coal is being bought moderately, and there seems to be some increase in the demand from week to week. In the domestic sizes, egg, stove and chestnut continue to be called for. There cannot be said to be a scarcity of hard coal, for though some consumers may not have received all the coal they wanted, practically everybody has some.

If production keeps up to the new high level for the year set during the week ended Sept. 27, no fears need be entertained of a shortage. During that week the hard coal mines produced 1,964,000 net tons, a 6 per cent increase over the previous week's output and 18,000 net tons higher than the output of the last week in August, which up to the present had been the record for the year.

WEEKLY COAL PRODUCTION

The efforts of the railroads to increase the supply of cars carried the rate of bituminous coal production to a new high record for the year. The total output for the week ended Sept. 27 (including lignite and coal made into coke) is estimated at 11,667,000 net tons. The railroads provided empties sufficient for the loading of nearly 212,000 cars, an increase of 5.6 per cent. over the preceding week.

The first week of the steel strike has thus not reacted adversely upon the production of coal. The general industrial demand seems to have been active enough to absorb any capacity released by reduction in the customary demand of the steel mills.

Anthracite, like bituminous, set a new high record for the year, during the week ended Sept. 27. Production is estimated at 1,964,000 net tons, 6 per cent higher than that of the preceding week, and 18,000 tons higher than during the last week of August, which up to the present had been the greatest attained this year. The week's output was still materially less than for the corresponding week of 1918, and the total production since the beginning of the coal year is 7,000,000 tons below the extraordinary record of last year.

A general improvement in operating conditions marked the week ended Sept. 20. The mines of the country, as a whole, realized in actual output 71.4 per cent of their full-time capacity. For the preceding week the percentage of operation had been 69.4, and during the week of Labor Day 70.3. The increase was due to a widespread improvement in car supply.

Labor conditions during the week underwent little change. The percentage of losses due to labor in Illinois continued to grow smaller. A slight increasse in absenteeism was reported from Somerset, Cumberland, Piedmont, and the West Virginia fields. Losses due to strikes were significant only in the New River and Winding Gulf field, where they reached 8 per cent of capacity. Of the total capacity for the country, only 3.9 per cent was reported by the operators as shut down because of labor.

Mine disability was unusually prevalent in central Illinois, where losses attributed to that factor amounted to one-eighth of the full-time capacity of the district. This raised the per cent lost because of mine disability to the figure of 3.5 for the country as a whole.

The factor of no market continued to grow less important. In the northern and central Appalachian region it has virtually ceased to operate. In the Central, Southern and Southwestern States the market improved. Only in the Rocky Mountain region did the week record a slackening in demand.

Car supply, although remaining the dominant factor limiting production, improved materially. As good or better supply was reported from all districts except Kansas and Missouri, eastern Kentucky, and the southern West Virginia high volatile fields. In the two last mentioned regions the car situation was unsatisfactory.

Losses were attributed by the operators to car shortage as follows:

Hazard	54.2
Northeastern Kentucky	43.3
Harlan County	35.5
High volatile of southern West Virginia	42.4

For the country, as a whole, however, losses due to transportation were only 19.8 per cent of capacity, as compared with 22.4 per cent during the preceding week.

The production of beehive coke fell off nearly a third during the first week of the steel strike. For the country, as a whole, the decrease, when compared with the week ended Sept. 20, was 105,000 tons or 30.6 per cent. Over 100,000 tons of this was in Pennsylvania and Ohio alone. The output of beehive coke in West Virginia and the Southern States has so far been little affected by the steel strike. A slight decrease was reported from the Rocky Mountain region.

In spite of the strike it is to be noted that the demand for beehive coke as indicated by production, was greater than during any week from mid-April to mid-July of this year.

Increased activity at lower Lake Erie ports marked the week of Sept. 21. The tonnage dumped was 607,896, an increase of 54,517 tons over the preceding week. Total dumpings since the beginning of the year are now two and a half million tons below those of the last season.

PITTSBURGH AND CHICAGO MARKETS

The iron and steel strike has greatly decreased the demand for coal and the market is now decidedly easy. The steel works would doubtless take coal for stocking purposes if they could, but the strike is of such a nature that coal cannot be unloaded. The entire Mahoning Valley was closed within the first two days of the strike and has remained closed, while more than half of the lake front plants are closed. The Shenango Valley was about one-half closed at the beginning of the strike, but is now running moderately well. The Monongahela and Allegheny Valleys are running nearly full, as is Pittsburgh proper. On the whole, the coal demand of the steel industry that is supplied by the Pittsburgh district is approximately cut in half.

Demand from retail dealers has not opened up to any extent, and with continued summery weather this demand may be postponed. Railroad coal requirements are up to normal. Not much interest is displayed by coal consumers in the wage scale issue of the coal industry.

While the coal market is softer, offerings at lower prices are made by only a few of the operators. Large operators are adhering to former quotations and will curtail production rather than cut. We quote: Slack, $1.80@2; steam mine-run, $2.10@2.40; gas mine-run, $2.20@2.50; prepared gas, $2.60@2.80, per net ton at mine, Pittsburgh district.

High-grade domestic coals from the Illinois and Indiana fields advanced 10c per ton on Oct. 1. For instance, Franklin County lump, furnace, small egg and cook stove are all selling at $3.25 f. o. b. mines. In view of the fact that high-grade Eastern coals are selling at figures far above these, the general opinion is that the Illinois and Indiana operaters are perhaps a little too modest. For example, a Chicago wholesaler was able to buy a large tonnage of Pocohontas lump put on the market because of the steel strike. This distributer had no difficulty at all in selling this coal at $5.75 per ton f. o. b. mines. We understand that it was very high-grade coal, being Pocahontas third vein, and was very carefully prepared.

COAL AGE

Volume 16 New York, October 16, 1919 *Number* 16

Combinations in Restraint of Trade.

By R. DAWSON HALL

SINCE the fourteenth year of the reign of Edward VI little doubt has existed in Anglo-Saxon communities that combinations in unjust restraint of trade are illegal. In fact under the act of that year large combinations to conduct trade, "engrossers" the legislation termed them, were in their very nature illegal. The Sherman Act merely made more specific, what was generally a part of the legal heritage of all Anglo-Saxon peoples. The courts have, however, in a degree interpreted the Sherman law "by the light of reason." The public is beginning to feel that the purpose of combination is more important than the combination itself.

In no matter has the public been more tolerant of combinations in restraint of trade than in the matter of labor. The present Federal Administration has not only recognized such combinations but has openly sponsored their formation and called for the "coöperative bargain." It has required of corporations that they meet such combinations though they have been created in restraint of trade and has excused its action by declaring labor not to be a commodity, though labor is bought and sold and enters everything bought and sold.

It is as useless to deny that labor is a commodity as to question any of Newton's Laws of Nature. Its quality is inherent and denying it will not change its character. A new name, if it will not properly define it, will not be a name at all. A new attitude to it will be like a new attitude toward water. We may hold that water will flow up hill, but with persistence it will show us that the new attitude has not changed the character of that fluid. It will still flow down hill whenever it is released from restraint.

It is considered a heresy today, to declare labor a commodity, but seeing that it is a commodity and nothing else, the denial will be as hopeless as was the censure pronounced on Galileo, when he averred that the earth revolved around the sun and not the sun around the earth.

What then? If combinations of laboring men, and the strikes which follow them, are indeed combinations in restraint of trade, shall we make laws to suppress them? Not at all, if the combinations are for proper purposes, and the strikes are for fully justified ends.

But the public is beginning to see that justice is not the end, though it may be the cause of such combinations, and the tendency now is to condemn all combinations and all strikes however caused, however much justified and however conducted. The pendulum is swinging against unions because they have gone over far and are making modern life impracticable.

The mechanism of production and distribution is being ruptured. A few men by breaking a link in the chain can make the whole concatenation useless. By breaking the links in turn or altogether they can remove the girdle by which civilization has been kept intact.

The public is not a most discerning body. During the war men of German birth, name and ancestry were all more or less suspected. A ban went forth against them all whether well affected or disaffected, and it was only with difficulty that the public exercised its power of discernment and kept that poise which is a nation's most prized possession.

The same result may be expected in our relations to unions and strikes. We may easily travel too far in our opposition to them. Workingmen of union affiliations may well beware. The word "trust" has had an ugly sound for years, and the word "union" may have no better treatment.

The law if clearly against public opinion makes martyrs, which prisons later canonize, but public opinion often transforms men of blameless character into criminals, so much stronger is popular conviction than the mere processes of law. One stigmatizes the individual and the other merely sequestrates his person.

Strong Background for Community Work Is Formed by Bathhouses and Laundries

Keystone Coal and Coke Co., Greensburg, Penn., has completed installation of bathhouses and laundries with excellent results. Forty per cent. of the work at the miners' homes has been done away with and a general improvement of health conditions noted

By Donald J. Baker
Pittsburgh, Penn.

AFTER the influenza epidemic of 1918 had taken its heavy toll of lives from the mining communities, a coal company in western Pennsylvania that was among the first to realize that another such visitation would result in an even greater catastrophe, unless precautions were taken beforehand, was the Keystone Coal and Coke Co., of Greensburg. That cleanliness is next to godliness was the principle upon which this company started the work of safeguarding the health of the populace in its mining towns. This theory, by being applied in the form of community bathhouses and laundries, has already worked out far beyond the original hopes and expectations of those men in the company who were at the head of the movement.

The motive at the start was purely an unselfish one, having for its chief concern the foreign-born miner who either had not the opportunity to practice the simple laws of self-sanitation or was unfamiliar with them; so that when the germ of influenza was attracted to the miner's home, perhaps by overcrowded conditions, it was aided in its conquest by the general atmosphere of uncleanliness that prevails at the houses in nearly all small coal towns.

When the pall had finally been lifted and conditions returned to normal, a plan was started to install combination bathhouses and laundries at every one of the 30 operations of the Keystone companies, of which 15 lie in the Greensburg district.

It was no easy task that was outlined, since there was no background for starting. No design for such a type of building was at hand, for the idea was new. That four such installations have already been made and are in operation at the different Keystone plants is really remarkable when the short space of time that has elapsed since the epidemic is considered.

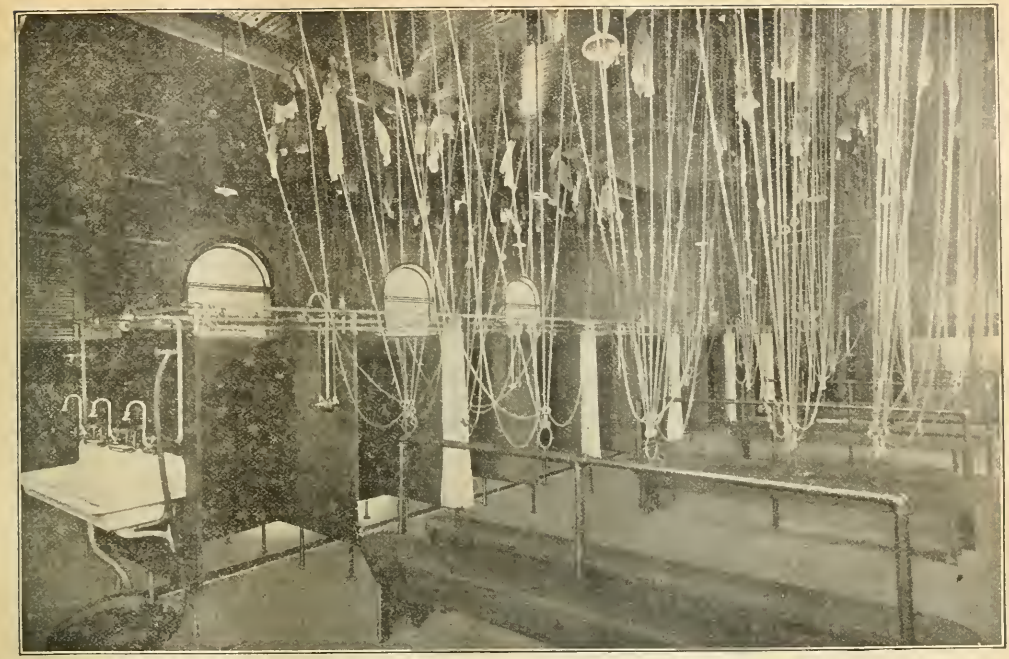
The illustrations used in this article are made from photographs of the original installation, completed some time ago, at the Keystone shaft, 8 miles southwest of Greensburg. Operation has been going on for some time, with splendid results.

It would be of interest to study the original installation as brought out in the pictures, and which with small changes will serve as a model for all future installations to be made by the Keystone Coal and Coke Co. It was of course impractical at the start to design a building with dimensions that would be standard for all of the communities, owing to the extent and variance in size of the different operations. An old brick compressor room at the Keystone shaft was utilized for the first experiment. Five concrete stalls were constructed, as can be noticed in the background of the illustrations showing the shower room. However, the idea of this sort of construction was abandoned, as it was thought that this type would leave much to be desired in the way of keeping the completed installation clean. One-inch slate slabs were then placed in the position shown, on a 42-in. square spacing, and the overhead piping installed. Connection was made to a boiler heater in the adjoining room for the hot-water supply. The cantonment type of shower head was used, which is adjustable and fitted with a ball joint connection. These fixtures were furnished by the Bailey Farrell Manufacturing Co., Pittsburgh, Penn.

The shower heads permit a maximum passage of 1 gal. of water per minute. The temperature of the water is regulated by a handle controlling both hot- and cold-water valves, the arrangement giving any desired temperature from cold to hot. A thermostat on the hot-water pipe, at a point where it enters the building, regulates the temperature of the water so that the hottest water that can be passed through the shower heads is but 110 deg. This temperature is believed to be as hot as can be withstood, and prevents any accidents that might occur through horseplay among the men if the water were allowed to come direct from the heater. The thermostats installed are manufactured by the Robertshaw Manufacturing Co., Youngwood, Penn., and are adopted as a standard. They can be adjusted to any desired temperature and are extremely simple and reliable.

The slate slabs were raised 10 in. from the floor and supported by cast-brass piping. The distance from the floor has been decreased in later installations to 4 in., so as to prevent an undue amount of splashing from adjacent stalls. Duck curtains are available for each compartment, to give privacy if desired, but these are scarcely ever used. . Brown curtains have been substituted at the later installations, and these give the compartments a far neater appearance. The floor is of cement, and each compartment drains into a gutter running longitudinally through the entire system of stalls. Toilets, urinals, lavatories and drinking fountains are a part of the equipment in each bathhouse.

The overhead system used for holding clothes is unique and has given greater satisfaction than a locker arrangement. No. 2 sash chain is run through pulleys on a 27-in. spacing on the ceiling and connected by a hook to a ring on the piping that is used for a back support with benches. A wire basket is connected to the chain, which is raised or lowered by running through the pulley. The baskets, as can be seen, afford ample



Two views of the interior of the Keystone company's bathhouse at Keystone Shaft, Greensburg, Penn., showing the general scheme of installation

room for towel and soap, while directly under them are hooks for suspending the garments. This allows of a better circulation of air through the clothing, which therefore dries much more quickly than if hung away in lockers. The baskets as well as most of the fixtures were made at the Keystone shaft shops.

The spacing of the pulleys is such that no clothes from adjoining hooks can touch, no matter how crowded. A man acting as janitor is stationed in the building, and his duty is to keep the room scrupulously clean as well as guard the suspended clothing. It is possible, however, for any individual to lock his chain to the ring in the piping; but this is scarcely ever necessary because of the vigilance of the janitor, who is acquainted with all of the men at the mine.

What has proved to be an even greater success than the bathhouse is the community laundry which is located in the same building. Three washing machines, manufactured by the Lutes Sinclair Co., of Benton Harbor, Mich., have been installed in one end of the compressor room at the Keystone shaft, and adjoin the bathhouse. Two washing machines have 36-in. cylinders, with six compartments each. The other is a "baby washer" 30 x 30 in. They are operated by belt drive from a shaft driven by a 5-hp. Westinghouse motor.

LUTES SINCLAIR WASHING MACHINES, WITH CENTRIFUGAL DRIER IN REAR

A stamped laundry bag made of duck material is given each family, as well as a box of pins stamped with a number to correspond with that on the bag. On each article to be washed a pin is placed, and the bag of clothes is then taken to the laundry. The girl in charge of the laundry is able to take care of 25 family washings a day. She assorts the clothes according to whether they are white, colored or woolen, each lot being washed separately. The allotment of soap used in the washing process has been scientifically determined by expert chemists. After washing, the clothes are rinsed and passed through a bluing solution, thence to a centrifugal drier, which can be seen in the background of the view of the laundry. The drier revolves at 1500 r.p.m., and ten minutes' operation suffices to practically dry the clothes. Just enough moisture remains in them to permit of easy ironing.

The entire process from the time the clothes are assorted and placed in the washing machine to when they are removed from the drier consumes but one hour. As the clothes are removed from the drier they are assorted by the numbers on the pins and placed on hooks bearing the corresponding number. Here they are allowed to hang until the different pieces of goods have likewise been washed and dried, when all are gathered together and placed in the laundry bag.

The laundry room has a cement floor. The proper mixtures of hot and cold water are controlled by valves at the head of each washing machine. Special periods have been arranged for washing the mine clothes of the men. The laundry is self-supporting, a small nominal fee being charged each family to cover the cost of soap, bluing and general maintenance. Hand in hand with the bathhouse and laundry installations of the Keystone Coal and Coke Co. has been another innovation in safeguarding the health of the community. A professional nurse is stationed at each operation. The work of the nurses is varied and of considerable importance. Cases of sickness are watched over and recommendations made. Community visiting is done by the nurse, in which talks and helpful hints are given the women of the families in regard to better housekeeping, self-sanitation and the prevention of disease. Lessons are also given in domestic science.

Each nurse is required to furnish a weekly report, showing the number of houses visited, and a periodical visit is made to each home. All cases of sickness are reported. In this manner the company officials know at all times the exact health condition of each community. The nurses also assist the mothers in bathing the children at the bathhouses, for which special morning periods are allotted. The younger element of the town also have their bathing periods. The miners and their families have taken kindly to the new health work, and a much better morale has resulted.

The entire scheme of community bathhouses, laundries and professional nursing has reduced sickness at the Keystone company's mining towns to the lowest degree that has ever been recorded. The miner, as he comes to the surface at the end of the day, goes to the bathhouse, where he bathes and changes his clothes. The mine clothes are left at the bathhouse and never see the home. The men go home clean and in a happy frame of mind. The heating of water for bathing at home has been done away with, as well as the hard labor incident to washing the clothes for the usually large families in miners' homes. It is estimated that 40 per cent. of the work that used to occupy the time of the wife at home has been removed. Consequently, this leaves time for the improvement of the household and permits of more attention being given to the children. The time that used to be taken up by the men in laborious washing after the day's work is used in improving the appearance of the home.

It is really surprising to note the number of attractive lawns and gardens that have suddenly sprung into existence during the short time that the community work has been in operation. No part of the scheme is compulsory, although it is advised. It is taken by the people as an opportunity, as they realize the desire of the company to help them.

Of the four completed installations, all are at mines in the Greensburg district. The operation at the Keystone shaft employs 300 men and has a daily output of 2000 tons through a 300-ft. shaft. Another installation is at the Crow's Nest mine, where 400 men are employed; 2500 tons daily is the output here from a 9000-

ft. slope. A special brick building has been constructed here, which contains a bathhouse, laundry, boiler room and first-aid and mine-rescue station. The general scheme carried out is the same as that at the Keystone shaft, except that instead of using slate slabs for making the stalls in the bathhouse, 2 x 4's form a framework over which sheet zinc has been placed. This type of construction is considerably cheaper than the other and is just as easy to keep clean. As a result it is planned to use the zinc sheeting construction in the other installations that are now under way. The laundry equipment at this plant is direct-motor drive. Another installation is at the Sewickley mine, where 150 men are employed. The output of this plant is 1000 tons daily through a slope. The fourth installation has recently been completed at the Salem mine, and the installation at Huron is now under way. All of the plants mentioned above are within ten miles of Greensburg.

First-aid and mine-rescue teams are maintained at all of the operations, and these are directed by William Nesbit, who has been an employee of the company for 35 years. Mr. Nesbit inspects the mines and makes suggestions and recommendations for improving the general safety methods in use. He also has charge of the training of the personnel of the first-aid and mine-rescue teams. Company meets are held frequently. The National Bureau of Mines meet in Pittsburgh during September will be represented by strong teams from the Keystone Coal and Coke Co. operations. Ten oxygen helments and two lungmotors, manufactured by the Life Saving Devices Co., of Chicago, Ill., are kept in the main office at Greensburg. These are tested at regular periods and kept in condition for immediate service.

H. F. Bovard, general manager of all the Keystone interests, has been at the head of the community work movement, and it is mainly through his untiring efforts that the bathhouse and laundry installations have been so successful.

Loose Roof Is Dangerous

That some of our employees do not pay sufficient attention to the fact that loose roof is dangerous is shown by the following accidents which happened during the first half of this year. All of these mishaps could have been prevented by the exercise of greater care.

One man was killed, nine injured, sustaining disabilities of over five weeks, and four were off duty for shorter periods of time, involving an absence from work ranging from one to five weeks, because they neglected to timber or take down dangerous material such as bone coal, drawslate and loose rock.

A miner, while lying down to mine coal, had a piece of drawslate 3 x 4 x 8 ft. fall on him, breaking his back. He is totally disabled for life because he took a chance. A number of other men in the same way received broken arms and legs. A few got off with bad bruises. Loose roof is always dangerous, and we who work in the mines must pay the strictest attention to it. While taking down loose roof three men received injuries causing disabilities of from one to five weeks. These accidents occurred from three types of oversight: (1) Not expecting so much rock to fall as was actually brought down; (2) using a pick instead of a bar, and (3) not providing enough room to permit stepping back safely when the material fell.

Returning under dangerous roof killed two men and injured two others, causing them to lay off for two months. These accidents occurred because men went back into pillar workings after the coal track and timbers had been pulled. It is not known why one of the men (who, by the way, was killed) went back, but in the other case the man entered the abandoned place with the foreman, to show him the condition of the place, and while there struck a crushed stump with his pick and immediately the entire place fell in.

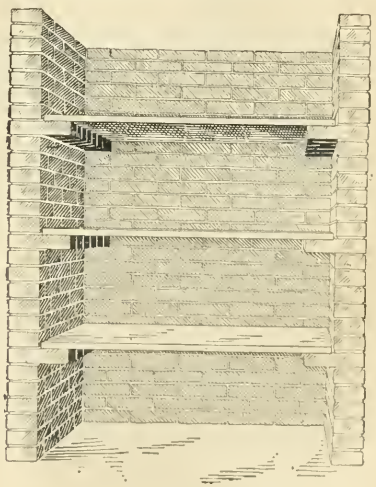
In another instance a man needed a block to put over a post. He saw one back in the gob and went to get it, but just then some of the roof fell and he got a broken leg. One man went back to get a shovel, and though he heard the roof begin to crack he continued on his way and lost 58 days from being crushed through the hips by a fall of slate.

These occurrences show that there is only one safe method to pursue, and that is to keep out from under dangerous roof. And the roof in pillar work is always dangerous after the coal has been taken out and the place made ready to fall.—*Mutual Monthly Magazine of Consolidated Coal Company.*

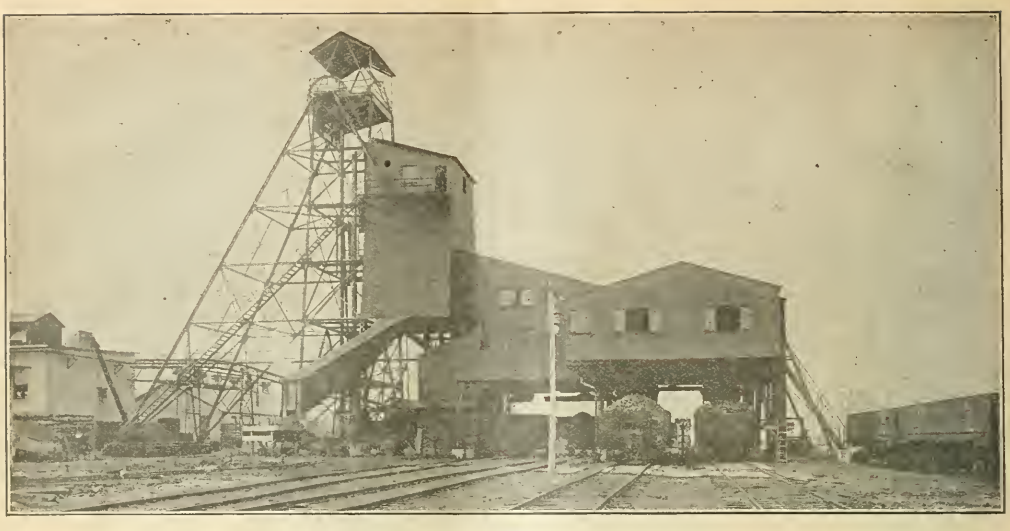
Shelf Supports for Mine Foreman's Office

By Ralph W. Mayer
California, Penn.

When an underground office for a mine foreman is being built, rectangular holes are often dug in the coal at the sides for closets, in which to keep supplies or records. These holes, or closets, have to be lined with brick, and when building these the masons can easily



make supports for shelving, with no extra work or expense. Every 18 in. or 2 ft., according to the distance it is desired to have the shelves apart, one of the courses of brick, preferably a header course, may be set with half the width of the brick exposed beyond the face of the wall. The course of brick in the opposite wall at the same height is also allowed to project. These projecting bricks make substantial supports for boards cut the proper length for shelving.



GENERAL VIEW OF THE SURFACE PLANT

A Model Illinois Coal Mine*

The Nokomis Mine is one of the few operations in Illinois or elsewhere using direct current for haulage and alternating current for cutting and other purposes. Underground shops and substations are also unique, although not altogether new features of this mine.

THE Nokomis Coal Co.'s mine at Nokomis, Ill., 72 mi. northeast of St. Louis, in Montgomery County presents an example of mining practice that is in many respects, a model for conditions in the central field. In 1912, the Nokomis Coal Co. was organized and acquired mining rights about a mile southwest of Nokomis. The company now owns or controls more than 12,000 acres. The bed worked is the No. 6, which lies 650 ft. below the surface, and ranges from 7½ to 9 ft. in thickness, averaging 8 ft. 4 inches.

The company selected Joseph P. Hebenstreit, a mining man of many years' experience, as its superintendent, and early in 1913 the main hoisting and air shafts were sunk. These are 17½ x 11½ ft. in size inside the timbers, and are 500 ft. apart, the air shaft being due west of the two-compartment hoisting shaft. The material encountered in sinking varied from hard limestone to layers of shale and even indurated clay, sand and gravel. Immediately above the coal lie 6 to 9 ft. of slate and shale, with two 5-ft. beds of lime rock, permitting the rooms to be opened 28 ft. wide.

The shafts were sunk in rapid time, facilitated by a systematic organization and careful planning. Sullivan air-jet, sinker, hand-feed, hammer drills were employed, using hollow steel with six-point rose bits. Three 8-hr. shifts were worked, each crew consisting of four drillers, four muckers and a shift boss.

The use of hammer drills accomplished a large economy of time and labor cost as compared with hand drilling. A Sullivan straight-line, steam-driven compressor supplied air for the machines.

Holes 4½ ft. deep were drilled, and a round of 8 to 10 holes were frequently drilled in 45 to 75 minutes in the soft shale. In the hard limestone, 28 to 32 holes per round were required. The labor cost was $93 for both shafts. As the average footage per 24 hours was 4.5 ft. advance as compared with 3.5 ft. for hand-sinking, the saving by using hammer drills amounted to twice $26.50, or $53 per day on the two shafts.

The Nokomis mine is developed on a modified room-and-pillar system, which practically amounts to the panel method. Instead of running the main entries north, east, south and west from the bottom, these are driven at an angle of 45 deg. so that the mine is divided into four main territories, northwest, northeast, southeast and southwest. This arrangement gives certain advantages in ventilation, which will be referred to later. The barrier pillars on the main entries are 150 ft. thick. All entries are 12 ft. wide and air courses are driven 22 ft. in width with an entry pillar of 30 ft. of coal. The air courses are made permanent by dropping the slate. Cross entries are carried at right angles to the main entries, approximately 600 ft. from center to center, and on the cross entries the rooms are opened on 60-ft. centers with 12-ft. room necks and 28-ft. rooms, leaving a pillar of 32 ft., of coal between each two rooms. The rooms are carried 250 to 270 ft. in depth with cross-cuts at intervals of 60 ft. and 12 ft. wide. Cross-cuts on the entries, however, are 10 ft. wide.

On the accompanying mine map, the rooms sketched in outline around the main bottom have all been worked out; and as each area is completed, the entries leading to it are walled off by concrete stoppings, so as to close off the inactive portions of the mine altogether.

The mine is at present working the areas indicated

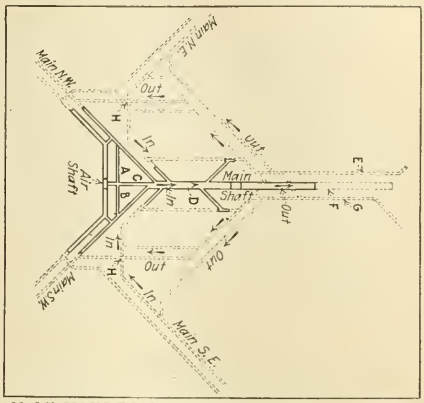
*Abstracted from *Mine and Quarry*.

by solid black oblongs, showing the depth to which the different rooms have been carried.

The main bottom, the heart of the underground workings of the mine, is an interesting place and naturally the busiest locality in the mine at all times. As stated, the hoisting and air shafts are 500 ft. apart, the latter due west of the former. This distance is more than abundant for perfect safety. The main bottom itself is 950 ft. long with over 450 ft. of space west of the hoisting shaft. The bottom is lined with concrete throughout. All coal comes into it from the west and all empties leave the shaft and proceed to the east before being returned to the outer workings.

The main bottom is 22 ft. wide, giving ample space for handling the cars, locomotives and other equipment. In stations driven from it are found an underground concrete-walled power house where the electric motor-generators, motors and switchboards are situated; a concrete repair shop with electrically driven grinders, drill press, a small lathe, etc., where mining machines, tools and locomotives may be completely dismantled if necessary, and major repairs made; a stockroom also lined with concrete, systematically arranged with bins and storage trays for practically all repair parts and supplies needed in the operation of the mine; a recharging station with double tracks and pits under each with sufficient accommodation for 20 electric storage-battery locomotives to be recharged at the same time; a blacksmith and forge shop and toilet facilities for the men. The entire bottom is fully electric lighted and all work rooms are concreted. The accompanying illustration shows the arrangement of run-arounds for bringing the loaded trips into the bottom and for returning the empties to the proper quarter of the mine.

The track gage is 42 in. In the main entry and in the bottom, 40-lb. steel rails are used, while 30-lb. rails



PLAN OF MAIN BOTTOM, SHOWING ARRANGEMENT OF ENTRIES, RUN AROUNDS, ETC.

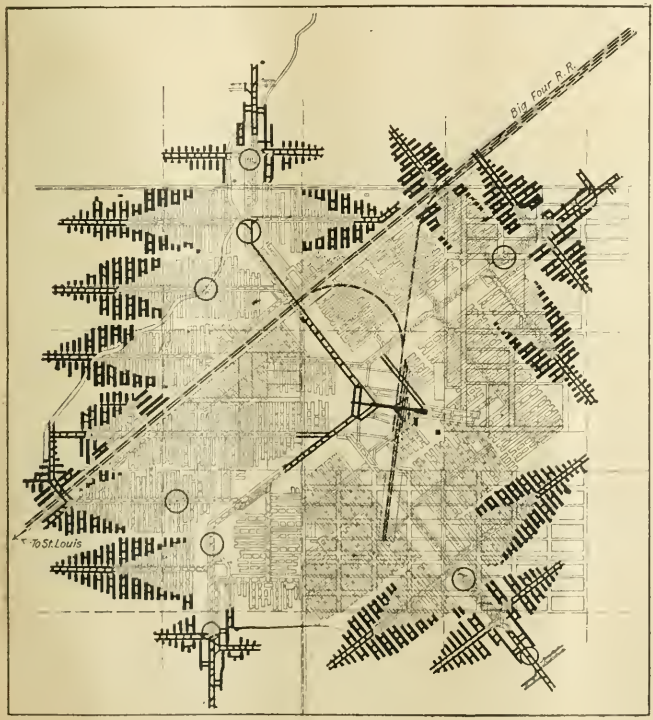
A—Power house. B—Locomotive charging station. C—Repair shop. D—Main bottom. E, F and G—Empty car storage tracks. H—Underpasses for empty cars. Arrows indicate direction of cars

are employed on the cross and stub-entries and in the rooms. All curves and turns are laid out at as flat an angle as possible in order to eliminate the danger of derailing cars. The track is carried down the center of the room for convenience in handling the mining machines, as well as in loading. Standard mine cars of 5-ton capacity are employed, built of wood with roller bearing trucks and draw bar springs.

Animal haulage has been entirely done away with in this mine. The cars are gathered from the rooms and entries and returned to the working places by means of electric "mine mules," or storage-battery locomotives, of which 17 are at present employed, 7 of these being Mancha and 10 Whitcomb locomotives. Six sets of Edison cell batteries have been installed recently. These motors pull the loaded cars out of the rooms, gather them in trips of from 6 to 10 and haul them to the partings, where storage tracks are provided for the loaded cars and for empties. The process is reversed in distributing the empties to the rooms.

At the partings where the inside workings connect with the main entries, the trolley locomotives, of which there are four, two of six, and one each of 10 and 15 tons capacity, haul the trips to the main bottom and return the empties to the partings.

At the shaft bottom, two tracks are provided, one for each of the



MINE MAP OF THE NOKOMIS COAL COMPANY

Black portions show operations in 1918-19. Light portions are worked out areas. Circles indicate transformer substations. Outer circle of two on same entry shows the site to which the inner substation will be moved as mine is developed.

COAL CUTTING MACHINE AT WORK IN A ROOM

two hoisting cages, and there is a slight down grade to the cages, equipped with the usual trips and safety catches for rapid handling of the cars. When it is noted that the full working capacity of this mine is 5000 tons per day, meaning 1000 hoists, it will be seen that rapid and accurate work must be provided for, and the equipment at hand is calculated to do the work safely and continuously. The storage-battery locomotives will operate under full load for from 8 to 10 hours without recharging. Four locomotives are operated at night for distribution of timbers, concrete, powder and other material.

Loaded coal cars enter the bottom over four separate lines from the four quarters of the mine. Large storage space east of the shaft in the main bottom and on adjacent side tracks permits prompt and ready handling

LOADER AND CAR OF COAL, SHOWING LARGE PERCENTAGE OF LUMP AFTER MACHINE MINING

of empties, and enables the trolley locomotives to pick up full trips at all times for distribution to the partings.

The uninterrupted and safe passage of loads and empties is provided for by under-passes at the points *H* indicated on the bottom diagram. These have been constructed under the main haulage lines, coming from northeast and southeast, so that empties bound to the southwest and northwest pass under at these intersections. This makes all territories independent, and avoids conflicts of locomotives arriving at and leaving the bottom.

All roadways in the entries are maintained in the best condition, the track being laid on substantial oak ties, carefully leveled, making a smooth-running road bed.

The east side of the shaft is double-tracked for 600-ft. in order to handle empty cars. The slate and shale is shot down and the walls are concreted. This gives overhead room for a second floor for the miners as they come out, go up stairs and wait until quitting time. This space is arranged with benches to accommodate 700 to 800 men. This avoids the presence of men on either full or empty tracks, and also prevents them from going across tracks. When ready to go out a man at the foot of the steps controls them by allowing not over 20 persons on a cage.

As previously stated, the air shaft is 11½x17½ ft. in size, and is situated 500 ft. from the hoisting shaft, so that in case of accident in the latter, the lives of the men underground would not be imperiled by a resulting accident at the same time to the air shaft. The mine is ventilated by a Sullivan steel-plate, high-speed reversible fan 10 ft. in diameter by 6 ft. in width, of the double-wheel type with conical steel-plate deflectors and multiple vanes or blades. It is operated as a blower, taking air down the shaft and forcing it through the mine workings and up the hoisting shaft. If desired, the fan may be reversed in less than two minutes, so as to exhaust, without changing any doors. The fan is well housed in a permanent brick building. It is operated by direct connection to a Brownell high-speed steam engine, the entire installation being a substantial one and kept in the best possible condition at all times.

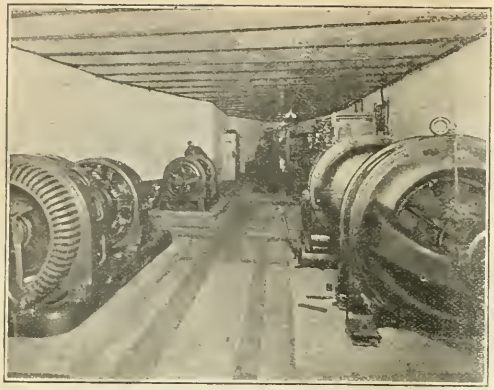
This fan supplies 200,000 cu.ft. of air per minute against a water gage of one inch. and has a large reserve capacity hitherto not called upon, although the mine workings have been greatly extended since the fan was installed.

As previously stated, the method of laying out the mine with main entries at 45 deg. from the bottom possesses distinct advantages in securing adequate ventilation. From the mine bottom plan, it will be noted that right angles are avoided wherever possible, so as to decrease the frictional resistance encountered by the air.

The current is split into eight separate parts, giving each quarter of the mine two splits of 25,000 cu.ft. per minute each. The overcasts are carefully constructed and maintained and are of concrete throughout. All doors in the mine are of the two-leaf, center-opening swing type and are opened by the locomotives without stopping, closing automatically after the motor or trip has passed, so that ventilation is interfered with as little as possible by opening and closing the doors. The doors are substantially made, close so as to make a tight joint and have iron reinforcements to protect them from the shock of the locomotives or cars in opening. It is particularly noticeable in this mine that the air is pure and sweet throughout all of the workings and that there is a good current of air passing at all times. As previously stated, the cross-cuts are driven between rooms at intervals of 60 ft., so that the miners at the face are well supplied with air.

All the coal is undercut before shooting by means of continuous cutting mining machines of the Sullivan alternating-current ironclad pattern. These machines

VIEW OF THE COAL PICKING PROCESS



VIEW IN AN UNDERGROUND SUBSTATION

are equipped with 30-hp. motors and cutter bars 7½ ft. in length. Pick-point bits are employed entirely, these being set in blocks, having a range of nine positions in the chains. This arrangement gives excellent satisfaction in cutting this firm, hard coal.

The kerf or undercut made by these machines is 5¾ to 6 in. high and is made in the coal itself, some three or four inches of bottom being left purposely. The machine is sumped at the right hand rib. The take-up rig or rear jack is then set at the right rib and the front jack or anchor is set at the other side of the room. The machine cuts the entire face without being withdrawn from under the coal until the left-hand rib is reached, when it is backed out, remounted on the pan and power car and is ready for moving under its own power to the next working place.

Each mining machine has a certain territory consisting of from 10 to 15 rooms, and a certain number of loaders, from 15 to 20, assigned to it. This arrangement makes it possible to avoid long moves and to have plenty of clean working places ready for the machine to cut, at all times. As high as eight and nine working places have been cut by these machines in a shift's time, under favorable cutting and moving conditions.

These machines develop about 20 hp. while cutting; and when loading, unloading and moving about the mine 4 to 8 hp. is necessary. They take current at around 250 volts, the armatures being wound for 220 volts. The truck is equipped with a reel on which the trailing cable is paid out or wound up, as the machine advances into the room or is withdrawn from it. The mining machine cable is attached to the feed wires in the entries by means of clips as in the case of the direct-current mining machine, except that three wires and three clips are needed.

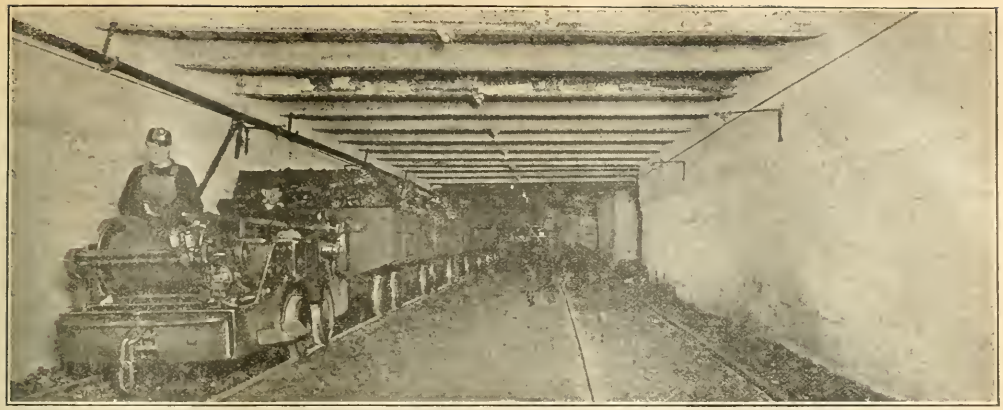
The particular advantage of alternating current mining machines lies in: (1) The greater convenience and economy of employing alternating current; (2) the ability of the alternating-current motors to keep in operation when obstructions are encountered, rather than to stop or stall as sometimes occurs with direct-current machines under difficult cutting conditions.

The motors on these machines are of the squirrel-cage, induction pattern and are quite substantial. No regulating appliances are required on the motor itself and the magnetic leakage of this type is exceedingly low. A high pulling-out torque is secured.

The company has 27 of these machines, and has employed them from the beginning of its operation, not only for work in wide places but also for developing the mine, cutting all entries, cross-cuts and breakthroughs. Another advantage secured by the use of alternating current for the mining machine in this mine is that the voltage is always up to the full tension, securing maximum effectiveness in cutting, and handling at all times. The haulage motors are all operated by direct current, so that there is no interference or other demand on the alternating-current line to hamper the proper action of the machines.

In planning the Nokomis mine, the company's engineers considered with the greatest care the question of the character of the power supply and the method and cost of distribution. After securing advice from some of the best known commercial electrical engineers in the country, it was decided to use alternating current as the main basis of supply and, as stated above, to cut

THE UNDERGROUND MACHINE SHOP SHOWING ARRANGEMENT AND MACHINERY



STEEL AND CONCRETE CONSTRUCTION NEAR THE SHAFT BOTTOM

the coal with alternating current and to haul it with direct current.

Power is carried to the mine from the transmission lines of the Central Illinois Public Service Corporation at Kincaid, 27 mi. away, at 33,000 volts. The transformer station, adjacent to the fanhouse and built substantially of concrete and corrugated iron, contains the high-tension transformers which reduce the current for the mine, to 2300 volts, three-phase, 60 cycle. At that tension, the current is carried underground, down the air shaft in lead-covered cables. In the power house at the bottom, already described, a large switchboard is provided for handling the power.

The main supply of current is sent down the air shaft at 2300 volts alternating current to the main panel of the 28-ft. switchboard. Four oil switches on the board divide the 2300-volt line into four districts. Each district is fed by a No. 1 armored cable to a bank of transformers where the voltage is stepped down to 270 volts alternating current for the mining machines.

The main feed cables from the outside transformer station to the mine bottom have a capacity of 100,000 circ. mils on each wire. The low tension, alternating-current wiring is 00 and 0000. The transformers for supplying the mining machines consist of two banks of three 25-kva. and four banks of two 50-kva. transformers, each substation being sufficient to handle five to seven machines.

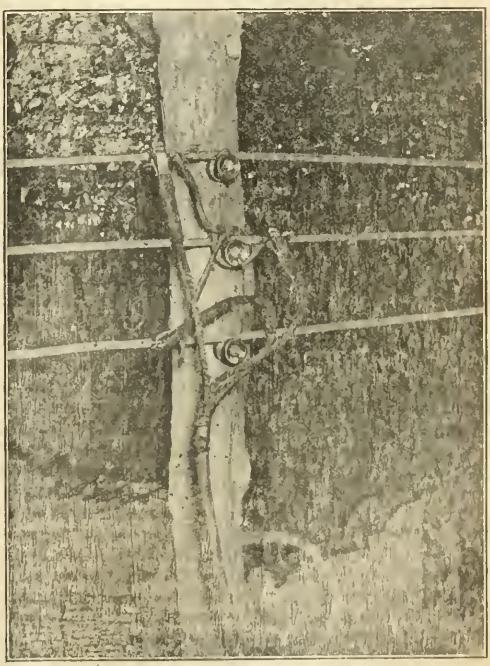
Part of the supply is conducted to motor generators, which convert it to direct current at 250 to 275 volts for the operation of the trolley locomotives.

The switchboard, motor generators and transformers are of the latest type and construction, built by the General Electric Co. The switchboard is equipped with seven watthour meters, giving the monthly consumption per ton of coal hauled to the bottom, gathered by the storage-battery locomotives and cut by the mining machines.

The 0000, fig.-8 trolley wires are carried on steel cross bars along the main entries, close to the roof, where there is no danger that men will come in contact with them. The trolley system is divided into five districts, being controlled at the switchboard by means of automatic reclosing circuit breakers with a direct-current ammeter in connection with each circuit, thus giving the substation attendant control over hi[illegible]d motors.

A motor-generator set is also provided for converting the alternating-current power into direct current for charging the storage-battery locomotives.

At the present time, with the mine developed to a considerable distance from the main bottom, it has become undesirable to carry long lines of low-tension alternating-current wiring to the outer workings for the machines. The 2300-volt current is therefore carried underground along the sides of the entries to points fairly central with the different working sections of the mine and there stepped down by means of transformers



THREE-WIRE ALTERNATING-CURRENT FEED LINES FOR MINING MACHINES, AND METHOD OF CONNECTING TRAILING MACHINE CABLES

to the 270 volts at which it is carried to the machines.

There are, at the present time, six banks of transformers located in crosscuts on the inside entries. As the mine advances, it is merely necessary to move the transformers to a new location and continue the armored cables carrying the 2300-volt current up to them. Twenty-four hundred feet is considered the maximum distance over which the secondary current can be economically carried.

The essential safety and economy of this method of distribution is obvious. During the six years of its operation the company has never had any serious accidents chargeable to the use of alternating current—or direct current either for that matter.

All rock removal, such as taking down roof, lifting bottom, trimming side walls, cutting overcasts or breakthroughs in rock, drilling bolt holes for hangers, and similar work is done by means of Sullivan hand-feed hammer drills, operated by compressed air. Air is supplied by a Sullivan Class WK-2 motor-driven, portable type air compressor mounted on a mine car, complete with receiver, starting panel, etc. This outfit is shown, connected to one of the company's storage-battery locomotives, by which it is hauled about the mine, in one of the accompanying illustrations.

As shown in one of the photographs, the surface buildings of the Nokomis Coal Co. are modern in type and of first-class construction. The tipple is built of steel throughout and loads coal on four railroad tracks. It contains self-dumping cages and shaker screens, also the first pair of raising and lowering booms installed in the State of Illinois for handling coal into cars with the minimum of breakage. These are a valuable aid in picking and sizing the coal. Four scales, 80 ft. long and of 100 tons capacity, are installed, enabling the empty cars to be weighed as they come beneath the tipple and the loads to be weighed on the same scales as they pass out.

The power and hoisting plant is housed in a single brick building, adjacent to the tipple. Steam for the hoists is provided by six 175-hp. Brownell self-contained boilers. The tipple is electrically operated from a transformer substation on the surface. The hoisting engines are direct-connected, having cylinders 28 in. in diameter by 42 in. stroke and operating two 9-ft. steel drums. The engines were manufactured by the Danville Foundry and Machine Co., and the drums by the Litchfield Foundry Company.

The blacksmith shop is one portion of the repair building, which also includes a carpenter and machine shop. There are a separate powder house, oil house and a modern miners' wash and change-house.

A modern and attractive looking brick office building is a recent addition. The mine is supplied with water from eight deep wells, having a capacity of 140,000 gal. per day, discharging into a surface basin or reservoir near the power house.

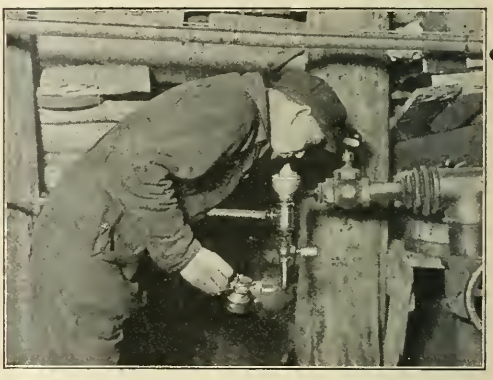
Shipping facilities are afforded by side tracks, connecting with the main line of the C. & E. I. and Big Four railroads and providing for a storage of 140 empty cars and 140 loaded cars. At full capacity, the mine employs from 625 to 725 men, and hoists from 4000 to 5000 tons of coal in 8 hours.

The coal is carefully prepared by removing impurities, by picking and by sizing, into the following sizes—6-in. lump, 1½-in. lump, 6x3-in. egg, 6x1½-in. egg, 3x1½-in. nut, 1½ or 2-in. screenings and mine run. Coal from the Nokomis mine is marketed under the trademark of Reliance Coal by the Nason Coal Co. of Chicago, with offices in the Old Colony Building. Sales agencies are also maintained in Minneapolis and Omaha. Reliance Coal is widely used for both steam and domestic purposes to the extent of 750,000 to 1,000,000 tons per year.

In securing photographs, and in preparing the foregoing account, the assistance of Albert J. Nason, president; Joseph P. Hebenstreit. superintendent at Nokomis; Edward H. Hebenstreit, mine manager, and Harry C. Hebenstreit, chief electrician is acknowledged.

Drinking Fountain in Mine

To provide good drinking water for men working underground is most desirable. Formerly it was seldom that the men were able to obtain a drink of pure, uncontaminated water underground. In a number of instances in several districts the practice was to catch a small stream of mine water which was trickling over the wall rock, at a convenient place, in some sort of an improvised vessel. Another method was to catch the water in a depression in a rock, from which the men would quench



UNDERGROUND DRINKING FOUNTAIN

their thirst. The accompanying illustration shows an installation of a drinking fountain in one of the underground workings of the Oliver Iron Mining Co., a subsidiary of the United States Steel Corporation. This illustration has been reproduced from the bulletin of the Bureau of Safety, Sanitation and Welfare of that corporation.

The advantages of installing such a simple device at numerous places underground over the old system of making no adequate provision for the comfort of the miners is obvious.

The production percentage of each size of anthracite coal during the years 1913 to 1916 was fairly constant. The percentages of the sizes of fresh-mined anthracite produced by the twelve leading producers in 1916 are given in the following table:

	Per Cent.		Per Cent
Lump	00.3	Pea	12.1
Broken	07.4	Buckwheat	13.7
Egg	12.4	Rice	04.3
Stove	20.8	Barley	02.6
Chestnut	22.7	Boiler	03.4
		Screenings	00.3
Total	63.6	Total	36.4

Need for a Definite Technical Service in the Mining Section of the National Safety Council

Address by Chairman, Mining Section, National Safety Council

By Benjamin F. Tillson
Franklin, N. J.

TO ATTAIN real efficiency in safety work we must *keep our men interested.* This requires persistent effort and ingenuity, for only in this way can we gain their support and maintain their enthusiasm. No single safety engineer can think up enough "stunts" to last 365 days in the year, and the realization of this has drawn those engaged in many different industries into one central coöperative organization—the National Safety Council. Those whose interests lie within the field of one of the most important industrial groups of this country—namely, mining—were desirous of concentrating attention upon their specific problems and at the same time profiting by the broadening influence of the experience of other industries. They therefore formed the mining section as a part of the National Safety Council.

What has this profited us? What are our future needs and how may they best be met?

Good Work of the Safety Council

A résumé of the service rendered in the past by the National Safety Council at large and the mining section in particular should indicate the lines along which an analysis of advance in safety work would show a profit from this association of interests.

The National Safety Council as a whole has provided a weekly service of bulletins suitable for plant bulletin boards, of which about 840 have been devoted to the general topics of safety, welfare and health. In addition there have been issued about 160 mining bulletins dealing with both coal- and metal-mining practices. Even the largest firm represented would not have felt that it could devote the time, money and attention necessary to have produced this bulletin service for direct appeal to its workmen. Only one other section —the electric railway section—can compare in specific sectional bulletin service. It has issued about 20 bulletins more, but the rest of the sections have only from 15 to 75 per cent. of the number which has been received by members of the mining section. However, if interests are so ramified as to make the activities of other particular sections of service, we have at our disposal some 700 additional bulletins issued by nine other sections.

As executives and safety engineers we have further profited by having our attention called each week to the experiences and successes of others in safety work; and this stimulation to our interest and enthusiasm is not only vital but incalculable. It has been accomplished by some 300 "weekly letters" and 15 executive series bulletins, which have come to us without the asking or through any effort on our part. These have also kept us in touch with the times in regard to labor relations, employment problems and welfare work. How else could we have obtained this service?

Some 27 different pamphlets have already been printed to give authoritative information in regard to the safe construction and operation of different elements common to most plants, such as ladders, stairs, boiler rooms, cranes, belts, shafting, engine guarding, oiling devices, knots and slings, floors, scaffolds, grinding wheels, goggles, etc.; while two pamphlets have been produced as being highly pertinent to mining—namely, "Ropes," and "Mine Car Haulage." Only one other section has had a "safe practices" pamphlet prepared for it. In the work of preparing these pamphlets we have had the collaboration of some of the best engineers of the country who are thinking along safety lines. Nowhere else is similar information available.

Finally, we have had the privilege of associating with each other at the annual congress, and we have thus rubbed shoulders, compared notes and argued our mutual problems in safety, health and welfare with men in whose veins flows the virile blood of the present day—men whose duties have brought them in contact with problems similar to ours and whose viewpoints vary from that of the workman to that of the foreman, safety engineer, executive, insurance agent, doctor, teacher, lawyer or other professional man. Not only have we been able to concentrate our discussions upon our peculiar problems by reason of our grouping together as the mining section, but our programs have also been arranged so that we might join in more general discussions with representatives of other industries. Furthermore, we could attend the sessions of other sections (such as the health section) whose interests supplement our own.

Clarifying Discussion of Safety

He who has never attended one of these congresses may wrongly think of it in terms of the occasional engineering or business convention, where there is but little tendency among those present to speak freely and fully of their experiences, and where are read formal, innocuous, boresome papers written in so historical a style as to produce no discussion and questions from the floor elicit no satisfactory replies. If such an impression exists, it may readily be refuted to the satisfaction of even a stranger to the meeting of the mining section, for the extensive printed transactions record that over one-third of the information presented during the last three congresses was developed in discussion.

Perhaps the "Round Table" is a new idea to some of us. If so, it must be experienced to be appreciated, unless we think in terms of those exciting conferences we have held with our confréres, at which we have participated in informal discussions of ways and means for accomplishing some object of mutual interest and have defended our views and "hobbies." A round-table session in similar, "only more so," for the chairman with watch in hand is forced to limit an individual's remarks to three minutes in order to give an equal opportunity to all—and his gavel may fall in the midst of our "one last thought."

Such a session is provocative of clear, concise thinking and produces that nervous tension so necessary to stimulate the enthusiasm that makes us cling tenaciously to our ideal plans and smooths the rough drudgery necessary for their consummation. These round-table sessions are held not only as a part of the mining section meetings, but also of the general meetings of the National Safety Council. And we all enjoy the privilege of profiting by the experience of others and gratifying our own modesty by proclaiming our successes or seeking solutions for our unsolved problems.

However, if business or other conditions prevent our attendance at the annual congress we still may profit by its *Proceedings*. Nowhere else is there so encyclopedic a source of authoritative information regarding the problems of safety, health and welfare as is presented in the published proceedings of the National Safety Council since its inception in 1912. These comprise over 5800 pages, 6 x 9 in. in size, of which about 680 pages are devoted particularly to the mining industry.

Perhaps the summation of the last three years' proceedings is most indicative of the amount of information now annually being made available for reference. The total for these years was about 4200 pages, of which 550 pages were the proceedings of the mining section. It should furthermore be borne in mind that this literature is the coöperative effort of individuals, as well as of those who represent both large and small industrial organizations, Federal and state agencies and engineering and other societies.

This is an Age of Specialists

Perhaps it has not been amiss to thus enumerate the activities of the National Safety Council and its mining section, for its benefits are dispensed so continuously that we may have come to receive them thoughtlessly and so have lost the perspective which is given us when we ponder upon the subject as a whole; and we should not fail to add as a benefit the opportunity which exists at all times to present our special problem to the competent engineering and executive staff of safety specialists at National Safety Council headquarters, which has at its convenience an exhaustive library and file of information and which stands ready to share it with us. So much for what we have (or should have) received if we had sought it.

Our work and our life is yearly becoming more technical, and general information must be supplemented with specific knowledge in order that it may be applied *practically*. We are living in an era when specialists are a necessity, and we all require the services of a mining safety engineer if we intend to make any considerable progress in the reduction of accidents. Compensation laws, insurance ratings and general safety propaganda have made it plain to us that safety pays, both for employer and employee. Both, however, are prone to forgetfulness in this matter and require continual reminders.

With some concerns the size of their operations makes an extensive safety organization feasible, and they may therefore feel that they can "go it alone," since circumstances would compel them to give more to such an organization as the National Safety Council than they would receive in return. It would be wise for them, however, before deciding on such a course, to consider several things: Are not their safety engineers so tied down to plant details that they find it difficult to get away and obtain entry to other plants for the observation of problems and solutions of others?

Need for Proper Coördination

And would not many of these other plants be so remote that these engineers could not spare sufficient time or money to visit them? Does not the continual educational campaign which it is necessary to prosecute for the workmen's benefit whether by bulletins, lectures, courses of study or moving pictures, require resources outside of those available in the operations of any one company, in order that the reiteration of advised safe practices may be made attractive by their novelty of presentation? Does not the giving out of information devoid of trade secrets pay both by reason of our analysis and more thorough understanding of that which we desire to make clear to others, and also because our generosity begets a similar attitude in others and we receive much value from the coöperative effort produced? If so, no company is too large to receive adequate benefit from the coöperative support of a skilled technical man who could put at their disposal, in proper shape for use, the information, bulletins, etc., which he has gleaned from others, and who also makes it possible for them to reciprocate with the least effort.

Let the "doubting Thomas" try but one experiment—namely, to plan a program for 100 meetings of his safety committees which will so hold the interest of his men as to induce them to attend without pay and which will also show value in accident reduction. Such an attempt will destroy any feeling of self-sufficiency and indicate that his safety engineer (who may be responsible for many more such meetings) deserves all of the outside aid that he can obtain, and that the efficiency of his plants is well worthy of such help. Remember, we are considering definite technical services, for general information might here be an entirely different story.

On the other hand, there are thousands of small plants that cannot see how their operations could stand the expenses of a man who would devote all his time to safety work. With some the safety spirit may be present and with others lacking. The former may not require the general information, but they both will need specific help not only in regard to the proper practices in design and operation to overcome their hazards, but also with respect to prepared educational matter for inaugurating and maintaining a safety campaign.

Even more for these small companies than the larger and wealthier ones is it imperative that they receive the intensive technical service which will show immediate marked results in accident abatement and correspondingly lower costs in production and insurance ratings; for they cannot afford to make a "long swing" investment in safety with faith in the ultimate profit,

since their resources might be dissipated before the time came for reaping the benefits.

Most of us desire to respond generously to appeals from others as to how they can better conserve human life and effort, but the urgency of our duties and pleasures almightily interferes with our preparation of complete and technical descriptions and illustrations of the methods we have used and the results we have produced. No, it is not because of a lack of willingness that we have not helped each other more in the safety movement; it is because of the lack of a suitable agency. Writing or dictation is laborious because it requires the logical correlation of our ideas with much data which are not carried in the memory, and because it is performed in an office or home environment where we cannot reap the benefit of contact with physical conditions that stimulate our recollections through the association of ideas.

What a Trained Safety Engineer Will See

For example, if a trained safety engineer should visit us, look around the plant and consult our records and drawings, he would acquire a vastly greater fund of information from our casual and disconnected conversation as elicited by his inquiries, or our observations (if we should happen to personally show him about), than we would probably ever attempt to write down even though we did take time from our other activities with the intent of presenting the subject in the form of a letter or address. Why? Because he would make it his business to do this one thing and this only, while we could not avoid the distractions of other duties. Also, we would have become so familiar with many of our old practices that we would not appreciate the novelty and interest they might be to others. Thus we would neglect to mention them unless they were called to our attention by a stranger.

Is it not clear that if no other purpose were accomplished than the sending around of a capable man to various mining properties, to dig out information for its managers and for others as to what is being done to enhance safety conditions, it would warrant a considerable expenditure by each of us?

When can we expect the greatest potential returns from our membership in the mining section? Is it not when we have every mine in the country as an ardent supporter? Then let us increase the value of membership through the service we render to such a degree that no company will fail to realize that it cannot afford to neglect the opportunity to join our ranks.

Will not a keen and technical executive secretary, through visits to various mining camps and his personal contact with representatives of various mining companies, give us greater and more valuable publicity than could be effected in any other way? Should not his conversation and presence be more effective than any solicitation by correspondence? If so, then the benefits accruing from increased and more representative membership would warrant our making an additional investment for such a worthy object.

We are in an era of diverse and profuse legislation. It seems as if almost everyone else knows more about how we should conduct our affairs than we do ourselves; and they desire to make us follow their beliefs and fancies. Foolish as this may sound, it seems to be a reality; and if by chance we do not know how to conduct our business with the greatest economy in material and human factors, we should make haste to learn if we would hope to survive industrially. If we do know these things, we should so formulate our practices as to plainly demonstrate that fact. Otherwise we may suffer from ignorant or mischievous legislation.

The principal ingredient for a cure of either dilemma is a complete code of safety standards in respect to mining. The apparent object of most of the mine laws and regulations upon the statute books of various states is the protection of the lives and unimpaired health of the workmen as well as the interests of the public at large. The mining section has the same objects in view, but what are we accomplishing in that direction? True, we are originating and assembling much valuable information and recommendations, but are we doing it in a systematic, painstaking and final manner—let us be honest and properly say technical manner? No, we are not doing this as we should. Then what is wrong?

It seems astonishing that a chairman of a section should so flaunt his incompetency if he truly is responsible for this state of affairs. Generously grant that the chairman and his executive associates have not failed in the duties imposed upon them. Rather consider the organization as a whole in order to see whether anything else might be responsible for this deficiency. Examination will disclose a section more highly organized than any other of the National Safety Council. Its officers and committeemen well represent the different phases of the mining industry, both geographically and industrially. An extensive organization of committees will be noted—executive, membership and publicity, standardization, accident statistics, ropes and safety devices in hoisting and haulage, mine hygiene and sanitation, mine fire prevention and fighting; mine rescue and first aid contests, program and publication. It will also be found that the functions and activities of these committees have been thoroughly outlined and correlated. Then what is lacking?

Need for Something More Than Committees

Naturally and properly the members of these committees are widely separated geographically and are men of affairs with absorbing business interests. If their time were not of considerable value to their industries, their opinions would not be worth much to the mining section or to any participating member. Such time as they can devote to the interest of the mining section should be utilized with the greatest economy, and this would be accomplished by relieving them of all routine labor.

This is no more than your company's practice toward its executives. Would you not feel more tempted to serve in their places if you knew that your knowledge and ability would be drawn upon in an advisory capacity without your being expected to steal extra time for petty details and drudgery? That situation can be met only by the employment of an executive secretary for the mining section, who will make it his business to reduce the amount of correspondence between officers and committeemen and prepare inquiries in such a form as to permit each man's knowledge and experience to be available with the least expenditure of time and effort on his part.

Such an official would outline the general features of "safe practices" pamphlets, which would ultimately become a code of standards. He would utilize the various committees in an advisory capacity to fill in the essential details which could be obtained in no other way

than from the store of their varied experiences; and the seal of approval of such advisory committeemen would be a respected guarantee of the recommendations made.

This is the reason why we have not achieved more in these essentials—because we had no funds with which to pay for the services of such a technical executive secretary.

Other expenses would also naturally be involved in the production of such safe practices pamphlets or standards. From time to time the settlement of a question will involve research work, and while this probably could be "farmed out" to some industry whose interests would parallel our own, yet we should be in a position to assume any contingent expenses or, in some cases, all of the expenses. A technical man as secretary would also be required in the follow-up of such work.

The profession of mining is an extremely broad one, since it requires knowledge not only in the specific field of mining engineering but also in other similar or allied fields such as mechanical, electrical, civil and sanitary engineering. The problems of safety, health and welfare in mining require coördination with the activities in these other branches of the engineering field. In the national engineering societies representing all of these branches considerable attention is naturally devoted to the same or kindred subjects which come before us in the mining section of the National Safety Council, and standards committees in these other societies will consider standards to meet the needs that we also will strive to meet. It is therefore highly important that there should be close coöperation between all of these agencies; and to be efficient, this service should be performed by one who is devoting all his time to the activities of the mining section. Again we find need for a technical executive secretary.

Our present foremen and miners, as well as the present and coming generation of mining engineers, need definite and concrete courses of instruction in the "hows" and "whys" of safe mining practices. But how are they going to get this information? There are no schools and colleges prepared to teach it, nor are there books in which they can find a thorough and able presentation of the subject. Must they all learn in the rough and expensive school of experience, or will we aid them by preparing courses of instruction which may be used in the schools and by the classes formed at our plants?

If we pursue this latter course, we will be engaging in a task which we can never hope to complete properly through the sole agency of volunteered services. We must be prepared to pay for the outlining, editing, writing and publication of such a work and wait for our returns from its sale and use. Again we find a need for definite paid technical service.

To me the reasons for this need seem legion, and if the few I have presented do not demonstrate the fact incontrovertibly it would be useless to attempt further to demonstrate a theorem that seems axiomatic. I will therefore rest my case with the observation that no engineering society of prominence, including the National Safety Council, attempts to operate without a paid, technical executive secretary. When we consider that the wealth involved in the mining industry runs well into billions of dollars, and that the men engaged in that industry number millions, it appears that the mining section of the National Safety Council has been given heavy responsibilities in assuming a prominent position in the promotion of safety, health and welfare measures. Are we going to meet our obligations? If so, we must render more and more service. And in order to be true service it must be technical.

How can we finance the demands made by a more technical service? The answer is extremely simple—by increasing the dues of mining members. We might well call the increase a surtax, if that term has not achieved unpopularity because of its association with our income taxes.

For the conservative growth represented by the engagement of an experienced mining and safety engineer as our technical and executive secretary, in the mining section, and for his traveling, and other expenses incidental to his work and that of the volunteering officers and committeemen, we will need an additional yearly income of about $10,000. The necessary office and clerical assistance might properly be expected from the National Safety Council headquarters, with the same bulletin, printing and other service that we have been receiving in return for the regular dues which we are now paying. Although the mining and the metals sections stand on a par as the two largest sections of the National Safety Council, yet the membership and dues for each amounts to only 7 or 8 per cent. of the whole. The membership of these two on Aug. 1, 1919, was 253, of which 165 were coal-mining and 88 metal-mining companies. They paid, in dues, respectively $6,532.50 and $3,877.50, or a total of $10,410. The highest amount paid by any one company was $157.50 per year; the average was $41. Of course, more than half of the membership pays less than this average.

In view of the fact that the maximum amount involved for any one company seems slight compared with the benefits which should accrue, and that the average amount involved for each company is small, I strongly urge the members of the mining section to increase their dues to double those they are now paying, with the understanding that the excess above their present dues be devoted to the specific activities of the mining section.

I trust that there will be a free expression of opinion as to the need and advisability of this step, and an authoritative communication from the various individuals and companies who are members as to whether they would approve and support such an action.

In case of fire or an explosion at a mine a messenger should be sent or a telephone should be used to call the assistance of persons at points distant from the mine. The character of the aid needed is of much importance; men who are experienced in mining and who have had training or experience in mine-rescue or mine-recovery work being most needed. The following persons should always be notified promptly; State mine inspectors and the coroner of the county in which the mine is situated; the local mine-rescue station, and any trained crews of rescue men; the United States Bureau of Mines rescue car or station nearest the mine; and the surgeons and doctors in the vicinity of the mine. To facilitate calling assistance, there should be kept posted near the telephone stations at the mine and office the names and addresses of all of the officials mentioned, so that they may be reached without delay.—*Rescue and Recovery Operations in Mines.*

Recent Development in Mine-Rescue Apparatus in the United States

By F. F. Morris
Wilkinsburg, Penn.

THE first equipments of self-contained mine-rescue apparatus were introduced into the United States late in 1907 and were used by the Anaconda Copper Mining Co. in fighting a mine fire. The apparatus installed was of the Draeger model, with metal helmet and twin oxygen cylinders, also twin air regenerators and double breathing bag directly connected to the helmet. Up to the time that the great European War broke out in August, 1914, or within a period of about seven years, the use of self-contained breathing apparatus for fighting mine fires and accomplishing rescue work after explosions had become so general that no less than 8000 units of such apparatus of different types had been installed in the United States for mining work, to say nothing of a large number being used for industrial purposes, in chemical plants, around blast furnaces, in ammonia plants and in numerous other industries.

Self-contained breathing apparatus was introduced into the United States in the year 1907. Up until the breaking out of the European War all such equipment was imported from foreign countries. Fostered by a strong demand and cut off from outside supply by the war, the growth of American apparatus has been rapid. The use of breathing equipment is certain to increase as mines grow older and deeper.

It has been through the instrumentality of the U. S. Bureau of Mines that interest has developed in the use of self-contained breathing apparatus. This organization today has been perfected to a point where its mine-rescue stations and mine-rescue cars located at various important mining centers throughout the country are not only themselves doing great work in actually assisting in mine-rescue operations, but are creating a sentiment in favor of the use of such equipments by the producing companies themselves and encouraging the installation of mine-rescue apparatus by private enterprises.

One of the most important considerations in the use of breathing apparatus of this kind is that it is highly essential that apparatus be put into service promptly at the time of a mine explosion, or in the event of a mine fire, if lives are to be saved and property adequately protected.

In January, 1917, the Bureau of Mines issued Technical Paper No. 82, the subject of which was "Oxygen Mine Rescue Apparatus and Physiological Effects on Users." The authors were Dr. Yandell Henderson and James W. Paul.

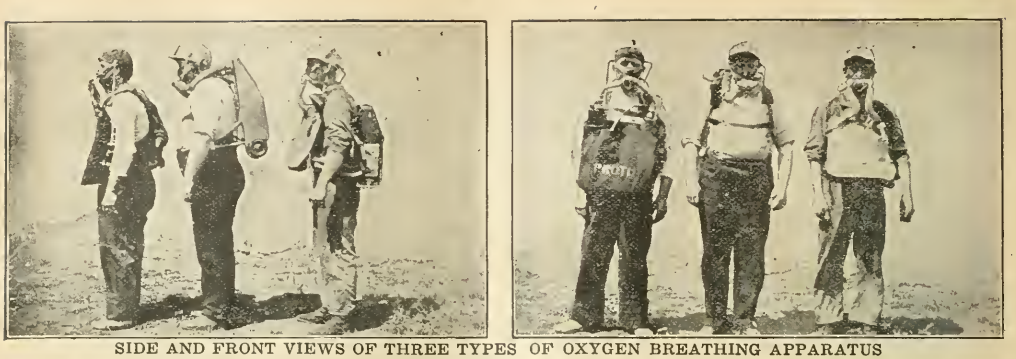
Quoting from the preface by Mr. Manning, "the report had three purposes, first among which was to show the inherent limitations of present types of oxygen breathing apparatus and to indicate improvements in design that will more nearly meet the requirements of use in poisonous or irrespirable gases." Mr. Manning further states in his preface that "during seven years, until January, 1916, Mr. Paul was in charge of the mine-rescue operations, the testing of the various types of apparatus and the selection, for the equipment of the rescue operations of the Bureau of Mines, of those types shown to be best suited for rescue work. His experience has included the supervision of many mine-rescue contests in which the apparatus was worn, as well as the personal direction of many actual rescue operations following mine disasters. Thus he has been enabled to discover in actual practice the defects as well as the merits of the various types of apparatus."

Quoting further from Mr. Manning's preface, "During the past two years W. E. Gibbs, an experienced mechanical engineer, has been at work for the Bureau on this problem. Mr. Gibbs, aided by the advice and coöperation of the authors of this report, has produced an apparatus which, in experimental tests, has shown itself superior to the older types, but which has still to be subjected to further tests in service."

After completing his work with the Bureau and assisting in the development of the Gibbs apparatus, Mr. Paul, with his unusual fund of experience and knowledge of the subject gained through the advantageous circumstances which had surrounded his connection with the Bureau of Mines, undertook the task of introducing features into rescue apparatus which have to do with the efficiency and safety of the machines in operation, and which had not before been incorporated in any form of apparatus. The problem, however, was to develop such an apparatus with the additional features of efficiency and safety, without, at the same time, complicating the mechanism.

Chief among the recommendations for improvements in rescue apparatus was one for a self-adjusting oxygen feed valve to replace the fixed feed valve then used. Mr. Paul has developed the self-adjusting feed valve, which as designed by the manufacturers has a much more simple and safe construction than was provided in the former fixed-feed valves.

It was further recommended by the autnors of Technical Paper No. 82 that an artificial form of circulation should be replaced by a natural circulation, that the absorption of the carbon dioxide should be so nearly complete that the air in the circulation system during moderate exercise will not contain more than ½ per cent. of carbon dioxide, and at no time, even during the most vigorous exercise, more than 1 per cent.; that a bypass valve should be made a part of the apparatus, this to be used in case of failure of the reducing valve; that the inhalation and exhalation bag should have a combined capacity of at least 8 liters; that the air within the circulating system should at all points be under a positive pressure; that all tubes and valves should be sufficiently large to permit the breathing of 100 liters of air per minute; that an efficient radiating and cooling device be provided. All of these features have been in their entirety incorporated in the Paul breathing apparatus.



SIDE AND FRONT VIEWS OF THREE TYPES OF OXYGEN BREATHING APPARATUS

A number of state mining departments and a large number of the private mine operators throughout the country have thoroughly investigated the Paul apparatus and adopted its use, in many instances replacing older forms of equipment with this latest development.

The deeper the mine entries extend into the earth, the more dangerous become the operations. Mines in the United States are, as compared with those in Europe and Great Britain, very young. The need for rescue apparatus has for this reason been felt years prior to its adoption in the United States by those operating mines in European countries. The use, however, of such equipments is certain to increase as the mine entries are extended farther away from the surface of the earth, and the development of the industry in the United States through the excellent coöperation of the Bureau of Mines has taken such strides during the past 5 years that it is on an established footing now, whereas prior to the war it was necessary to import all such equipment from factories in Europe.

State mining laws are being made more rigid with a view to conserving life and property, and among other provisions in many of the statistics now in existence is one to the effect that insurance premiums are reduced if rescue apparatus is installed and kept ready for service. Most of the mining companies, however, do not require this incentive to interest them in the installation of such equipments, as they readily realize the great advantage to them in protecting the lives of their employees and assuring prompt and efficient action in saving property in the event of a mine fire starting.

The industry which has thus been developed through the period of the war is destined to be one of the important branches of the safety movement in the United States.

Some Savings Possible at Mine Power Plants

Little thought is ordinarily given to the consumption of coal at the mines, and unless this subject is frequently brought to the attention of the company officials no attempt on the part of the men who have charge of the equipment will be made to improve the boilers, methods of firing, distribution of steam, or the use of steam in either pumps or engines.

A great saving can usually be effected by a close examination of the boilers. This may be conducted somewhat as follows: The brickwork should be tight—that is, should have no air leaks. If return tabular boilers are employed, there should be ample distance between the shell of the boiler and the grate. The fire-doors should fit tight and be provided with liners to keep them from warping. The conbustion door (entrance to combustion chamber) should also fit tight, as well as the smoke-box doors. When blowing back, the safety valves may waste steam; this should be rectified. As high a steam pressure as the equipment will permit should be used. Most important of all, the boilers should be thoroughly cleaned.

Where the life of the plant will justify it, it will usually effect a saving of 25 per cent. in fuel if the boiler settings are rebuilt from the foundation up; In some instances a saving of 50 per cent. will be realized in addition to rebuilding the settings the firemen be systematically instructed as to the reason for this thing and that, and of the advantages of a maximum steam pressure, high furnace temperature, etc.

A few instances where a great saving of fuel has been effected; might be given. In one plant where there were seven large boilers, and six of them were on the line at all times, the firemen cleaned their own boilers. They were relieved of this work, which usually had to be done on Sunday, four of the boilers were rebuilt, their blow-off valves ground and fitted tight, safety valves ground and the blow-back adjusted, columns repiped and other boiler details set right. This plant then operated on two boilers, and even after considerable equipment had been added it was able to operate during the war on four boilers.

Another plant was using four boilers. After about the same procedure as detailed above, it was able to operate on two boilers. And to this day it would take some strong talk to induce the firemen to put on more than two boilers, since they know that in that case there would be more coal to shovel and more ashes to wheel, resulting, of course, in more work for them.

Along with the boiler improvement goes proper construction of the feed line, proper adjustment of the feed pump, adequate deadmen for the stack guys, care of the boiler house and the proper kind of wash room, as well as other improvements and facilities making for the efficient consumption of fuel and good conditions for the workmen.

Mining of coal at the Eska mine of the Alaskan Engineering Commission is beginning to assume proportions which make it very helpful to the Commission. During March, which is the last month for which a report has been received by the Secretary of the Interior, the production was 3690 tons. Ninety men are employed, but a number of them are on non-productive development work.

Fire Prevention in Anthracite Coal Mines*

Necessary Equipment for the Extinguishment of Mine Fires

By M. W. Price
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PREVENTION of fires, the necessary fire-fighting equipment and the extinguishing of mine fires is a subject which has, on account of the various conditions under which they occur and the hazardous work connected with them, together with the possible loss of life and destruction to property involved, furnished a topic for discussion among mining men that is not surpassed by any other subject related to mining.

The prevention of mine fires necessitates a careful and frequent examination of some sections in anthracite mines because of physical conditions over which no control can be had. The elimination of wooden structures in the mines has been the means of preventing numerous fires and permits of more time and thought being expended in trying to prevent fires in sections necessarily heavily timbered, and in portions of the mine where the "robbing of pillars" is being done. Workmen engaged in timbering should not be permitted to use the common oil lamp on account of sparks and the careless manner in which old wick (cotton) is thrown around when it becomes necessary to put a new wick in the lamp. The careless manner in which oil is used in lamps in many cases causes timber to become saturated and is the means of causing disastrous fires. Again, I have seen night patrolmen making their examinations and using the common oil lamp. This seems a grave mistake. Such a watchman should be furnished with an improved electric lamp and also have a safety lamp of modern type. Thus equipped, he will be prepared to perform his duties in a proper manner.

The robbing of pillars, especially in the Mammoth bed, on account of its great thickness and by its continuous crushing, generates a heat that causes everything to become so dry that a disastrous fire may develop in a short time. Added to this risk is the possibility of encountering methane while driving up chutes in the pillars. I have seen careless workmen engaged in timbering in sections where the fire risk is great add to that risk by permitting a trolley wire to touch the timber instead of making the wire hangers properly support it. In sections of this nature a water line on the gangway with branch connections arranged about 200 ft. apart with a 50-ft. section of fire hose placed at each branch will enable a person discovering a fire to apply water to it in an extremely short time. This system of "fire lines," as it is called, will be of vital importance to the patrolman by night who, without it, upon discovering a fire, is forced by lack of system to travel a considerable distance for equipment and help.

Various methods have been advocated for extinguishing mine fires, because of the good results that each has obtained. These include flooding or smothering the sections affected, depending upon conditions. Numerous discussions also have taken place describing in detail the methods used at various fires, while the results have been carefully noted. Little has been mentioned concerning having men properly organized for this particular kind of work. The results of poor organization have been demonstrated where the work at small mine fires, improperly directed in the beginning, has been the cause of a large disaster eventually.

In fighting mine fires much depends upon speed of action and proficiency of organization. No two mine fires are alike and nothing even approximating set rules of procedure can therefore be laid down. It is always well to keep on hand sufficient supplies of pipe fittings and other equipment so that a mine fire may be extinguished before it reaches sizable proportions.

The importance of the mine foreman in some instances is not properly realized or appreciated. His thorough knowledge of the mine, for instance, the circulation of air and the quickest way and most convenient place in which a current can be changed so as to bring about desired results, together with the exact conditions of each working place, whether or not it happens to be one which is giving off gas or a place with a dangerous roof, makes him the most valuable man available. The delay which will be caused by an accident happening to the foreman at a time of this kind does not seem to be realized.

Notwithstanding all of this, invariably the foreman is the one man who can always be found in the most dangerous place. Then, again, it is no uncommon sight to see the superintendent in the most dangerous place. I fully realize the anxiety which is caused by a mine fire, but nevertheless I maintain that the proper place for the directing head is back from the scene of the fire a safe distance where he can properly think and direct the work, for there is nothing which spells disaster at a time of this kind like the loss of proper control.

The extinguishing of a mine fire today in the older mines of the anthracite region requires keen thought and especially prompt action. The virgin mining being finished and the reclaim or pillar robbing being done rapidly, prevents the most efficient of mining men from having complete control of the air currents. Air is a predominating factor in performing work at a mine fire. It can therefore be readily understood that the conditions in a mine govern the method that can be used to the best advantage.

I have had the opportunity of assisting in the work of extinguishing quite a number of mine fires (some of which were of an exceptionally serious nature), and have seen various methods used with good results. Owing to pillar robbing, causing in some places the strata to be crushed and broken, it becomes a difficult proposition to flood or smother a fire in some sections without seriously affecting several others. This is quite different from what was to be expected in former years, in the anthracite region.

In beds where the coal is of a soft and shelly nature and fire occurs, which causes caves to develop, thus preventing direct work, good results have been obtained by taking a piece of 2 or 2½-in. wrought iron pipe and clos-

*Paper presented before the eighth annual safety congress of the National Safety Council, Cleveland, Ohio, Oct. 1 to 4, 11

ing one end in the form of a pick point after which the pipe is drilled with ⅜-in. holes in a spiral manner throughout its entire length, the holes being spaced reasonably close together. The pipe is then forced through the caved or loose ground, after which a hose is attached to the open end. In this manner water may be forced onto the fire, thereby extinguishing considerable of it and making the caved material cool enough not to interfere with the process of loading it into cars. This spray method can also be used in some instances in and around burning timber to good advantage.

Boreholes are sometimes drilled for the purpose of running water down onto fires, and while this will be the means of extinguishing some fires, still it does not accomplish any remarkable results because of the fact that the water takes a natural course, and since it is not possible to increase the original supply through the hole the results are not what is expected.

Good results were obtained at one large fire, which had burned up into a caved section where pillar robbing had been done, by placing on the surface a large tank which had a capacity of about 60,000 gal. Two large mine pumps discharged into this tank, and when this was filled the gate was opened by a mine locomotive pulling on a tackle which had been properly arranged. This large quantity of water was run into the caves and the measures being all thoroughly broken permitted the water to pass down over the fire. In this manner a large portion of the fire was extinguished which, on account of the caved conditions, would have been extremely difficult to reach from the inside.

Mechanical devices, such as mine-rescue apparatus, permit men now to penetrate fire zones and accomplish such work as the laying of water lines from which hose can be used and the using of fire extinguishers direct on the fire, also the building of air brattice to establish necessary ventilation as well as doing various other kinds of work. Thus direct fire fighting may now be performed, which seems to be the right procedure in that the official in charge is in a position to note the progress and changes that are constantly taking place at a mine fire.

This brings out the importance of mine-rescue equipment and the vital necessity for the proper training of men in its use in that the work performed by a corps of men well trained in the use of the apparatus at the beginning of a fire will prevent both possible loss of life and great destruction of property.

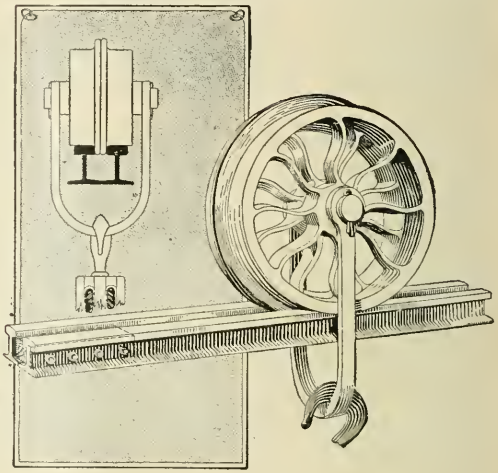
The establishment of a fire-fighting equipment to consist of fittings, pipe, hose, nails, brattice cloth, boards, tools, telephone and a fire pump, which should be kept intact at all times, is a valuable asset to any mining property. Again quite often steam and air lines, coming from the surface into the mine, can be converted into water lines in a short time. Conditions of this kind may be taken advantage of and by their aid a supply of water quickly secured. This more than once has been the means of preventing what might have developed into disastrous fires. Available lines of this description are sometimes overlooked in the excitement caused by a fire and through lack of a proper organization.

In conclusion, I would say that the fire-fighting organization should be such that when a mine fire does occur each man will fully understand his duties. This prevents dangerous delays at the beginning of a fire in making up an organization.

Monorail for a Chain Block

Where chain blocks are used for various purposes in and about the mines it is sometimes advantageous to ssupend them from some kind of a track or traveler so that the weight handled may not only be lifted but moved a certain distance. The Pittsburgh Coal Co., at its Crescent mine, has in use a homemade traveler that although simple in construction well answers the purpose for which it was built.

Two track rails are placed side by side with the space between the balls of the rails just wide enough to permit the flanges of two car wheels placed back to back to fit the roll easily between them. A piece of strap iron bent in a U-shape passes around the bottom of the



rails and extends upward far enough so that a shaft or axle passing through the wheels also passes through the extremities of the U. Spacers between the wheels and the sides of the U-shaped yoke and lynch pins or cotters through the axle at either end complete the outfit.

If ordinary lengths of rail are too short to serve the purpose in hand two lengths may be joined with fish plates. If the strength of the traveler track thus formed is deficient the track may be reinforced either by one or two other rails placed bottom up under the first two, or a wooden or steel beam may be similarly placed. Several variations of this general plan may be worked out as occasion or expedient may dictate. In any case the device will be simple and if properly constructed it will be fairly efficient.

THE CONSERVATION OF FUEL is a vital problem the world over, and among the pertinent suggestions looking to this end are the development of water-power and the electric transmission of such energy. The problems of water-power development are the same in all countries with varying local conditions, says Past-president Main of the American Society of Mechanical Engineers. As the requirements of business grow more exacting, it becomes absolutely necessary to have constant power assured. A specific instance of this necessity could be cited in connection with the wonderful electrical development in southern West Virginia to supply the rapidly expanding coal-mining industry of this section.

COAL AGE

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The Radical Foreigner.

MUCH of the blame for the present industrial unrest in the United States is laid at the door of foreigners—alien labor—men who have never accepted Americanism in its entirety. Prosecuted in the country of their origin, kept in subjugation and ignorance by despotic governments, permitted no religious or political independence, the men who in past years came to our shores did so because they sought a haven, a refuge, an asylum wherein they could achieve those things the accomplishment of which had been denied them.

And when they landed, many of these immigrants harbored within them only a feeling of hatred toward the country they had left. America was a land of opportunity—the Promised Land. At home, the foreigner had heard many tales of the new country. Human nature being so constituted, those of his countrymen who had preceded him, and who had fared not so well as they expected, would write glowing accounts of a land literally flowing with milk and honey; for who would have the courage to admit that he was a failure in a country where so many others had succeeded! So immigrant followed immigrant, singly and in groups, large families and small families, all with expectant faces and hearts that were filled with new ideals. For this country was a Democracy, a great and glorious place where opportunity was written in large letters and where success depended on initiative and personal endeavor. But alas, our foreigner had no more than landed when we, who prided ourselves on our Americanism, who were only one or perhaps two generations removed from him in circumstance, began to strip him one by one of the ideals he had carefully cherished, of the radiant visions he had beheld in his day-dreamings on the voyage over. Having come from a land where intolerance and injustice had left their impression on his mind and a crimson tint on his thoughts, he found similar conditions awaiting him here. Don't let us argue about this fact, for this is but the least of the ills that we have worked on the foreigner. We have asked him to assimilate American customs and ways of doing things, and then we have ridiculed him to his face while he was trying to do so. We have told him that he was necessary to the welfare of this country, and then we have taken advantage of his ignorance to exploit him. We promised him a land of freedom and largeness of opportunity, and when he came we shunned and ostracized him.

Ignorant? Of course he was ignorant. Crude, uncouth, and even filthy? Yes, he was these too. But it was not long after he came that he discovered that learning and education were to be obtained for the asking. And it was then that we Americans, those who have the real well-being of this country at heart, missed a grand opportunity. Instead of showing him our other side, the side that he thought extended all the way around when he was forming his plans to come to us, we let him learn from those of his countrymen who had become sophisticated here, from those who were only too ready to fan into flame the embers of hate against constituted government that lay dormant within his heart, and to use this hate to their own advantage. We did not trouble to teach him and tell him the truth about ourselves. We did not trouble to show him the real America. No! It is only of recent years that we have agitated for a real Americanization program, for an educational plan that will help the foreigner realize his ideals.

We are a nation yet young, therefore we have made and will make mistakes. But the one mistake we must not continue to make is that of treating the foreigner as we have treated him in years gone by. If we would have him become one of us—in thought and in action—we must make him one of us. We must indicate to him the mistakes he makes, in a kindly way. We must educate him, and bear with him while he is learning.

If America is at the present time overrun with rampant, radical foreigners, we ourselves are in no small measure to blame. Instead of smothering the fire when we could have done so easily, we permitted it to smolder. No fire will continue to burn unless it has something to consume. Have we, wittingly or unwittingly, been furnishing the fuel?

How About Development?

OF all the radical schemes, plans, systems, etc., that have so far been propounded for the "democratization of industry," for the pacification of labor militant, for the amelioration of "social unrest," not one has made provision for industrial expansion. Not one of the multitudinous panaceas yet hatched has considered that industry may at some time be inadequate to the demands placed upon it.

Industry must needs develop, else industry will die. Freight congestion at various terminals at sundry times during the past few years was but the manifestion of the fact that the railroads of the land had been so repressed by legislative and other impediments that they had failed to keep pace in development with other industrial and commercial enterprises. The present sale of automobiles, that now exist only as steel billets or even as ore in the mines and rubber still sap in the tree, evidences the inadequacy of the motor industry to present-day demands.

How do the advocates of sovietism, syndicalism, socialism, industrial demoncratization or what not—granting that anyone of them could maintain any industry—expect that any new venture could be started? When all capital as it now exists has been confiscated, divided equally among the workers, and by them scattered to the four winds, from whence and where will the promoter of any new enterprise derive the funds necessary to start it going?

Any enterprise, regardless of its character, dimensions or usefulness, is liable to disaster from enemies either within or without. In a socialistic or sovietistic state who will secure the necessary franchises, for, we will say, a railroad extension, attend to the infinite details of construction, see to matters of special or temporary finance in times of depression, protect the enterprise from the onslaughts of manipulators and pirates as well as from the ravages of political leeches? Experience has shown that all of these duties must be performed if the rocks of financial shipwreck are to be avoided.

Even if some laborers could be found willing to risk a part of their savings in a new venture, would they be satisfied with the meager return of a few per cent. on

a meager valuation of actual construction, while any real profit goes to the men employed?

It is doubtless highly probable that such laborers would prefer to invest their savings (provided they had any) in something else and leave the inauguration of any and all new enterprise to others. And it is extremely problematical if others, foolish enough to venture investment in risky, poorlypaid new enterprises, and wise and sagacious enough to make their dreams a reality, could be found.

Sooner or later industry would thus cease to be. A lack of growth is the beginning of decay.

Fallacies in Management.

In Sardinia and Sicily it is a part of popular education to train every man to resent every injury and insult with his knife. The average peasant believes that revenge is a sacred duty and the vendetta a noble institution. Some of our mountaineers hold the same idea with regard to the feud. The rest of us, however, have shaken ourselves clear of such ideas. They went into the discard quite appropriately with the post chaise and the sedan chair. They do not fit modern civilzation.

But do not think for a moment that we are without a few fallacies of like character, and that we are not being trained even today to believe in certain false premises. Many managers, even in this year of grace, fully believe that there is something that may rightly be termed a correct managerial manner. Many superintendents and foremen are of the opinion that it is necessary every so often to assert their authority and exhibit the fact that they really are bosses, and to that end they roughly and loudly resent incivilities and rebuke follies.

In the minds of many a man there is an uncomfortable feeling that things have been going along smoothly for so long that it is time for him to assert himself, or his dignity and authority will be overlooked. An explosion comes therefore, and thereafter the manager prides himself that all the good that follows is the result of his exhibition of immoderate temper.

He is not aware apparently that there are any number of successful business men who have no managerial manner, who never worry themselves about their authority, but who go along without any preconceived theories of just how unpleasant a manager should prove himself to be and just how often he should exhibit that he is made of trinitrotoluol.

But the upshot of this friendliness, he will say, is that no one knows who is boss. Precisely; the idea goes around that all are partners in enterprise and that every man is striving together to "put the job over." There may be some few embarrassing moments when visitors come to the plant, but those moments are the test of the real democracy of the manager. If he meets the situation then, it will be met on all occasions. For in the minds of strangers there *is* a proper managerial manner, a proper relation between officials and subofficials, and between both, and what we term—save the mark—men. In passi g may we not ask:—Are not officials and subofficials also to be so classified?

In every organization there are some who do not respond to courtesy or consideration, and the only cure is to show them the gate; and there sometimes the union bars the way. Is that condition universal? Not always; sometimes the union very quietly and unostentatiously holds the gate open, for undesirable workingmen are often " more undesirable in the union.

And again, sometimes the union is no fairer than the least conscionable of the men, and there are even cases where the wrong man has to be kept for other reasons. In such cases the advice just given cannot be followed; but beware, nevertheless, of the old belief that any official needs periodically to be unpleasant if he would have an efficient organization.

After long and expensive propaganda, labor has almost convinced the world that it should be kept scot free of the Sherman Act, the injunction and taxes, and now, having sighted the Promised Land, it is about to undo all its years of indoctrination in one red hour of revelry. If it does what it threatens, the starving, shivering world will with difficulty believe in the civil rights of the labor trusts that brought it to so sad a pass.

A Great and Growing Hazard of the Mine.

NOT ONLY in the mine but on the surface is transportation the growing hazard. Above ground the dangers of the railroad, of the street car and automobile, have added greatly to the accident mortality of mankind, and the flying machine bids fair to add greatly to that death roll. The mine has suffered as has the surface. However, there is a cure for the matter in better track and equipment.

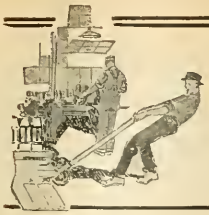
There is no reason why so many mine-car accidents should occur. We would certainly reduce their number if we would conscientiously inquire into the many ulterior causes that lead to every accident and if we would define an accident somewhat broadly as something that happens that ought not to have happened. A derailment is an accident, even if it kills or hurts no one. The etymology supports us in so regarding it, and the needs of safety demand that we should take that view of it.

In Great Britain, the Board of Trade investigates railroad accidents whether they cause a loss of life and limb or do absolutely no damage to either. It is true that if, at the mines, we investigated every pile-up, we should do little else, though it seems likely that if a single one were properly investigated, the conclusions would be so valuable, that when the lessons they taught were followed, few further accidents would be experienced.

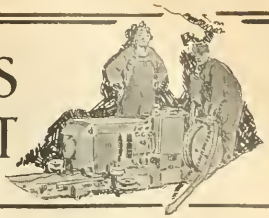
Accidents from mine cars have been given little attention. They should have been studied with the most painstaking care. Instead, few records have been kept. We cannot tell how many arose from locking bumpers, falling roof, room frogs, dirty track, low joints, broken wheels, thrown switches, broken couplings, excessive or tight gage, bent axles, sharp curves, pushing trips and other causes.

That it is a serious matter is shown by the fact that in 1916, 390 persons were killed underground by mine cars and locomotives. In 1918 the number rose to 506. In 1916 there were 59 killed by mine cars and mine locomotives on the surface while in 1918 the number had risen to 87. Every superintendent, who would reduce his accidents, must watch the mine-car and mine-locomotive hazards.

The cure rests in better tracks, stiffer cars, better lights and more careful crews. Avoid being satisfied with the official classifications of the Bureau of Mines in describing accidents. No one knows better than Albert H. Fay, of that Bureau, that they are merely valuable for tabulation. Any investigation to be good and productive of safety must be more detailed.



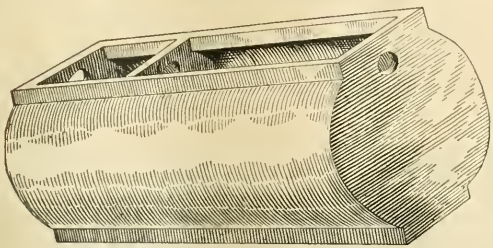
NEW APPARATUS AND EQUIPMENT



New Form of Septic Tank

A new and improved form of septic tank has been placed upon the market by the Universal Septic Tank Corporation, of Beaver Falls, Penn., with an office in the Oliver Building, Pittsburgh, Penn. This tank is designed upon no new principles and utilizes no new septic processes. However, it is claimed to be a decided improvement upon previous designs.

This tank, containing two compartments, is built integral of reinforced concrete. It thus possesses a great



REINFORCED-CONCRETE SEPTIC TANK

advantage over the double tank in that no ground movement or subsidence can stress, injure or break the connection between the two compartments. When both tanks are cast integral there is of course only one setting operation when this tank is put in place.

The principle upon which these septic tanks operate is well known. In all raw sewage two types of germs exist—harmless bacteria and disease-bearing bacteria. The harmless or friendly variety thrive in the absence of light and air, while the harmful or disease germs are most virile in the presence of light and oxygen. In the closed septic tank the harmless bacteria multiply rapidly and, attaining vast numbers, consume not only the disease germs but all vestiges of organic matter as well, leaving the overflow from the tank practically clear water that may be absorbed by the soil or turned into a stream without contamination.

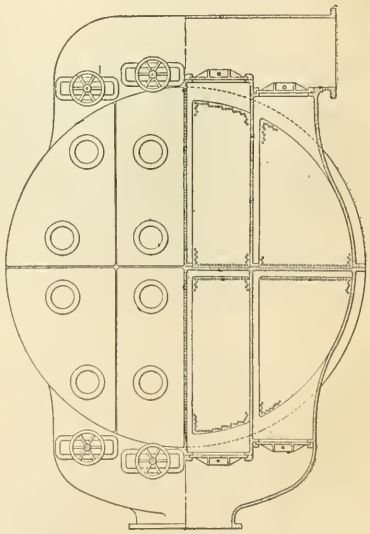
This tank is an adaptation of the L. R. S. system originated and approved by the U. S. Bureau of Public Health. The use of such a tank does away with the cesspool, provides a clean and sanitary method of sewage disposal, solves the fly and mosquito problem, prevents the possible contamination of water supply, improves living conditions and acts as a safeguard against epidemics.

A New Sectional Surface Condenser

A new development in surface condensers is announced by the Wheeler Condenser and Engineering Co., of Carteret, N. J. It is a patented "compartment condenser" that can be cleaned while in service without shutting down the turbine. Any tube or tubes may be temporarily plugged and other repairs made without taking the condenser out of service.

This condenser will enable the plant engineer to constantly maintain a clean condenser, hence a vacuum continuously high. All engineers of experience know that in addition to increasing output a high vacuum means low fuel consumption and a considerable saving in money yearly.

Upon installation of this condenser there need be no interference with the operation of the turbine. At the present time, in many power stations, even where water conditions are regarded as good, it is necessary to occasionally shut down the turbine for a period sufficiently long to give the condenser a thorough cleaning. Under such conditions, and in fact in all cases where continuous and highly efficient operation is desirable, this new type of condenser will be highly acceptable.



ARRANGEMENT FOR SECTIONAL SURFACE CONDENSER

To clean an ordinary condenser is not a difficult task, but it is time-consuming, and for that reason the man in charge is naturally tempted to put cleaning off until "tomorrow," or "next week," or "next month." During his wait for the opportune time the vacuum gradually drops, and with the drop coal consumption increases. Sometimes the loss of vacuum amounts to several inches of mercury. Hence the compartment condenser, which can be kept constantly clean regardless of load conditions, will in the long run prove to be a paying investment from the standpoints of both uninterrupted service and coal saving to say nothing of convenience.

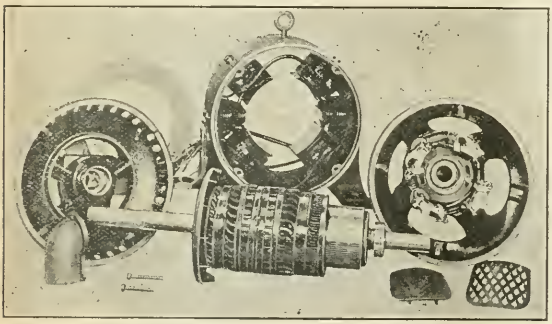
The accompanying illustration shows the arrange-

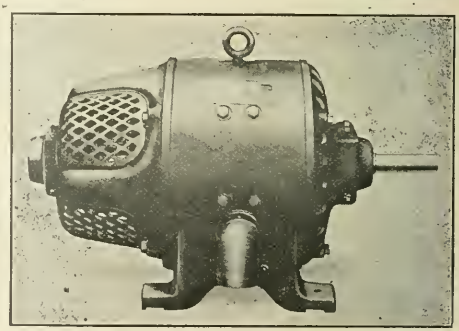
ment clearly. The condenser is divided into four comments, each being equipped with a set of valves to control the circulating water through it. To clean the condenser while the turbine is delivering full power, the operator simply shuts off the water from one compartment, removes the cover, cleans the tubes, replaces the cover, turns on the water again, and then passes on to the next compartment, continuing this operation until all compartments or the entire condenser is clean. Thus, while one compartment is being cleaned, the others are in full operation, temporarily taking over the entire load.

New Line of Direct-Current Motors

A new line of commutating-pole, direct-current motors and generators has been introduced by the Allis-Chalmers Manufacturing Co. These machines are not only rugged and compact, with excellent operating characteristics, but the many details which contribute to accessibility, reliability and safety have been given careful and thorough consideration.

This line includes the following standard ratings: (1) Continuous rated (50 deg. C rise) motors, for applications where the power requirements are definitely known; (2) normal rated (40 deg. C. rise) general purpose motors; (3) adjustable speed motors for continuous or intermittent service, and (4) generators and exciters.





DISASSEMBLED AND ASSEMBLED VIEWS OF A COMMUTATING-POLE, DIRECT-CURRENT MOTOR

For constant-speed motors the ratings and speeds are the same as those of 60-cycle induction motors, and they can thus be used interchangeably with induction motors for direct-connected applications without changing the method of drive or the ratio of gearing. Adjustable-speed motors, intended particularly for machine-tool and similar applications, are provided for 2:1, 3:1 or 4:1 speed range. Generator speeds also correspond to those of induction motors, thus permitting the direct coupling of the machines in various combinations to form motor-generator sets.

The motors are now built in capacities from ½ to 50 hp., while generators range from ½ to 40 kw. Larger sizes are under development. Cast steel yokes, combining light weight and rigid construction, are used for the larger ratings while the smaller machines, which are of the bi-polar type, have riveted frames.

The accessibility of the commutator is apparent from the illustrations. Protecting grid covers can be provided and they are readily attached and may be applied even to machines in service, without affecting the rating. Solid covers are used with completely inclosed motors, the rating of these machines being somewhat lower than open or semi-inclosed motors.

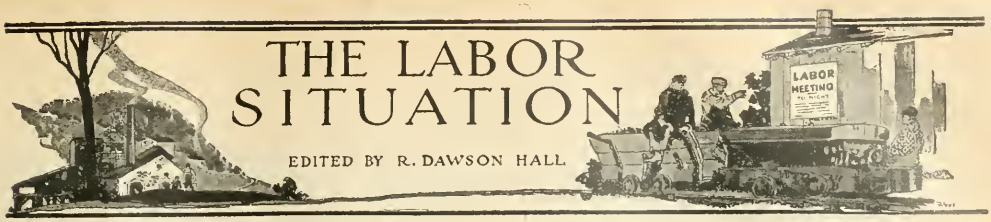
All machines have ring-oiling, dustproof bearings, while the windings are treated to resist oil and moisture. Conduit terminal boxes, regularly supplied, have removable covers, giving ready access to the terminals. The box-type brush holders are adjustable for tension and are suitable for either direction of rotation. Each holder can be removed independently with a screw driver or wrench. At least two brushes per stud are used. The field coils are wound on metal spools, which prevent their movement, and are protected by an outside layer of enameled wire.

The armature core has the laminations riveted together, permitting the removal of the shaft without dismantling the core or commutator. In ratings of 20 hp., 850 r.p.m. and larger, the core and commutator are built on a sleeve, so that the shaft can be pressed out of the finished armature without disturbing the windings.

A thorough ventilating system has been provided. The air is drawn out by the fan mounted on the rear armature head; fresh cool air flows in through the liberal ventilating ducts and takes up the heat from the iron and windings. This heated air is forced out through openings in the periphery of the rear bearing bracket. With thorough ventilation the internal temperatures are kept low, thus greatly prolonging the life of the insulation.

This new line, which is designated as Type "E," is new throughout, no attempt having been made to redesign old apparatus or to employ parts from any previous machines. The motors are designed for belted as well as direct-connected applications.

When an explosion has occurred at a mine some room or building near the entrance of the mine should be designated and used as executive headquarters and placed in charge of some local official or employee who knows where materials, tools and supplies are available in order that there may be as little delay as possible in supplying volunteers, who come from other mines. The foremen of the different gangs of workmen should keep the executive headquarters notified of the progress of their work so that officials and inspectors on arrival may know just what has been accomplished.—*Rescue*



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

After two conferences, one at Buffalo and one at Philadelphia had failed to induce either mine workers or operators to change their positions a general strike of the bituminous coal mine workers was called by the union to take place on Nov. 1. Immediately thereafter a conference was called by the Secretary of Labor.

In the anthracite region the contract miners of the Jermyn colliery of the Hudson Coal Co. obtained a favorable decision from the Hon. Charles P. Neil, the umpire for the Conciliation Board. The miners claimed that they should be paid the same rates in the gob chambers as were, and are, paid in the gob chambers of the Powderly colliery of the same company.

It was claimed by the miners that, when the work in question was started, the company paid the men the same rates paid in the Powderly colliery with the exception of the rate of 0.6473 and $1.294 per yard which was being paid in the gob chambers of the Powderly plant.

At Johnstown, in central Pennsylvania, the owners of seven mines signed the scale presented by the United Mine Workers of America and orders were issued for the men on strike to return to work. In all, 17 of the operations in that vicinity have signed the scale; 13 still refuse to do so. Including the men of the Cambria Steel Co., there are 3,000 mine workers around Johnstown who were still on strike on Oct. 7.

At Bridgeport, Ohio, sympathizers with Thomas J. Mooney to the number of several hundred, on Oct. 6, celebrated a one day's strike in protest against his imprisonment. The mines of the Wheeling & Lake Erie, Virginia, Hill and Occo coal companies at Bannock, Lafferty and Black Oak were all closed down.

At No. 10 mine of the Pittsburgh Coal Co., Athens County, Ohio, a strike, ended by the authority of the officials of the union, took place when two union mine workers joined the National Guard.

Mine Workers Wage Conference

On Oct. 9 the operators of the Central Competitive District and the officials appointed to meet them by the United Mine Workers of America failed to assemble, though Oct. 9 was the date that was named when the Buffalo conference came to an unsuccessful end. On Oct. 10, however, the meeting reassembled, the place of session being the Bellevue-Stratford Hotel, Philadelphia, Penna.

The meeting lasted only one hour, as the proceedings emphasized the hopelessness of the situation, for neither side would modify its position. It was decided eventually to submit all the proposed wage raises and working conditions to a subcommittee consisting of two operators and two mine workers from each of the four districts—Western Pennsylvania, Ohio, Indiana and Illinois.

The operators held that the war was not over and that no contract could be made to date from any other day than the day on which the war would end excepting, however, April 1, 1920, which was the date set as a limit for the termination of the contract. A statement issued by Ellis Searles, editor, United Mine Workers Journal, was to the effect that the mine workers last year worked only 198 days and yet the miners made an average earning of $1,434. In Indiana the average wage was $1,400 and in western Pennsylvania $1,200.

The following day, Oct. 11, found the subcommittee as firmly determined in its ways as the whole conference had been, and an adjournment was the only thing they could agree on. This adjournment was taken on the morning of Oct. 12. Mr. Lewis gave out a dishonest statement to the public in which he said that the United Mine Workers were ready for an agreement, and that the operators proved by their action that they were not.

Yet the United Mine Workers' officials were bound by a hard and fast—and ridiculously excessive—program, whereas the operator delegates were at liberty to make a contract.

CONFEREES IN THE MINING DISPUTE

From left to right: T. T. Brewster, Secretary Wilson and J. L. Lewis.

They were not willing to make it operative Nov. 1 because the old contract was still in force and because they questioned the justice of wage increases and unalterably voiced public sentiment by condemning shorter hours. Dr. H. A. Garfield wrote a letter to the bituminous operators saying that the miners were "incorrect in taking the stand that the agreement has expired."

Mr. Lewis declared after the meeting that he would return to Indianapolis and issue 4,000 copies of the strike order calling for a cessation of work on Nov. 1. Accordingly the order was issued on Oct. 15. It called on "the members of our organization, employed in and around the mines of the bituminous coal-producing districts within the jurisdiction of our organization in the United States to cease the production of coal at midnight on Friday, Oct. 31, 1919. The strike thus called will continue in full force and effect until terminated by official order."

On the same day, toward evening, Secretary of Labor William B. Wilson announced that he had, as mediator, assumed jurisdiction under Section 8 of the law creating the Department of Labor and had summoned John L. Lewis, acting president of the United Mine Workers of America, and Thomas T. Brewster, spokesman of the coal operators, to meet him on Friday, Oct. 17.

The Steam Jet Ash Conveyor

By T. A. Peebles
Pittsburgh, Penn.

SYNOPSIS — *Mechanical conveyors are excellent devices for moving coal or other non-abrasive material in the boiler house or elsewhere, but ash being highly abrasive soon cuts the moving parts. The steam jet ash conveyor, since it has no moving parts, is not subject to this difficulty and parts worn out may be easily and quickly replaced. They also tend to allay dust and exert a more or less pronounced ventilating action upon the rooms or tunnels where installed.*

THE development of steam-generating apparatus has not kept pace with the development of power-generating equipment. The engine room has been made clean and attractive, while the boiler room has too often been looked upon as a hot, dirty and disagreeable necessity, operated by men "strong in the shoulders and weak in the head." This condition has existed in spite of the fact that the economy of steam-consuming apparatus is determined by the design and is affected only slightly by operation, while with steam-generating apparatus operation is an important factor.

The increased price of fuel and labor has forced power producers to make a careful analysis of steam-generating costs. In every case such an analysis has shown the necessity for the installation of the most economical equipment and of attracting to the boiler room the highest possible grade of labor. As a result a new standard of boiler-plant design has been established, including the use of a mechanical stoker, coal and ash conveyors, instruments and automatic regulators, all installed in a well lighted, well ventilated building. The results obtained have justified the rebuilding of old plants along modern lines.

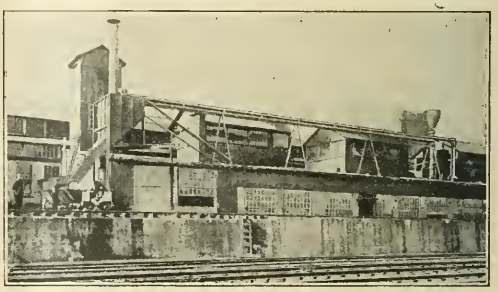
The installation of mechanical stokers, coal conveyors, instruments, etc., seldom presents construction difficulties that cannot be easily overcome, but the disposal of ash is often difficult on account of the nature of foundations, location of sewers, relation of high-ground water level to boiler-room floor, or other local limitations.

Because of the abrasive action of ash, those types of conveyors that handle coal most successfully are not always suitable for handling ash, and the manufacturers of such equipment often recommend the installation of separate ash conveyors of different design. A satisfactory ash conveyor must meet the requirements of reliability, safety, low cost of moving the material, cleanliness and ease of installation.

The following analysis of a steam jet ash conveyor will show the manner in which this particular variety meets these requirements. This type of conveyor depends for its operation on the fact that air traveling at high velocity will carry in suspension material heavier than itself. The flow of air through a steam jet ash conveyor is produced by a jet of steam introduced through a properly designed expanding nozzle, usually located in an elbow fitting, where the direction of travel is changed. Conveyors have been installed using pipe of 6, 8 or 10 in. in inside diameter. It has been found that a man can feed ash at the rate of about 5 tons per hour, and this is therefore the most economical capacity for a conveyor of this type that is to be operated by one man.

There is a critical air velocity below which the conveyor becomes sluggish in handling the heavier particles, and this establishes the minimum rate of air travel. With this velocity, the capacity of an 8-in. conveyor is from 5 to 6 tons per hour, which is about the rate at which the ash can be handled by one man; and this size is therefore the most economical for most plants. A smaller size will be wasteful of labor because its capacity is less than that of the operator and it is also wasteful of steam because the greater ratio of surface to area results in an increase in friction. A larger size is not economical, not only because a greater amount of steam is required to create the required velocity in the larger pipe, but because the increased capacity which is in excess of one man's ability to handle ash cannot be utilized.

The steam jet ash conveyor meets the requirement of reliability because of its simplicity, small number of parts requiring replacement and the ease with which



OUTSIDE INSTALLATION, SHOWING METHOD OF PLACING ASH FOR REMOVAL BY CARS TO DUMP

these replacements can be made. Since there are no moving parts, no lubrication is required and there are no adjustments to make. Breakdowns in a true sense do not occur, and the replacement of any part requires only two or three hours' time and can easily be made between periods of operation. A high degree of reliability is thus secured and it is never necessary to resort to hard labor for ash removal while conveyor repairs are being made.

A pipe running from the ash pits to the point of ash disposal presents no danger of accident. There are no moving parts in which an operator may be caught and injured. It is thus assuredly safe. The cost of handling ash is made up of fixed charges, maintenance, power and labor. The small first cost of this type of conveyor makes fixed charges and depreciation low, and maintenance which is confined principally to inexpensive renewable wearing parts is also slight.

The steam jet conveyor has frequently been criticized because of the amount of steam required for its operation, and there was a time when such criticism was justified. Careful engineering analysis of what takes place in the conveyor pipe has led to certain definite

improvements which materially reduce the steam consumption and minimize wear.

The frictional resistance within the conveyor increases rapidly with the velocity. The introduction of steam increases the volume and velocity in the conveyor beyond the jet. Excessive friction may result from the excessive velocities and incorrect proportioning of the steam jets. In fact, a point is sometimes reached where the operation can be greatly improved by using less actual steam. The old theory that a leaky joint at any point would interfere with the operation of the conveyor has been exploded, and it has been definitely proved that for best operation certain points in the system should actually be vented in order to offset the increased volume arising from the admission of steam. The velocity is thus reduced to that required to convey ashes, diminishing the abnormal friction due to high velocity together with a large decrease in steam consumption and wear.

The labor involved in the operation and maintenance of this type of conveyor is a small item. The ashes

INSIDE INSTALLATION, SHOWING METHOD OF HANDLING ASH

can be hoed or shoveled into the intake at least as easily and rapidly as into a car or wheelbarrow, and the conveyor promptly discharges them to the point of disposal. The work of repairs can be done by any man who can use a wrench.

The strong suction at the ash intake draws in all dust and gas liberated in the handling of ash, and clean dustless operation results. There are cases on record of ash tunnels so hot and full of gas and dust that men refused to work in them. These have been transformed by the installation of this type of conveyor into resting places where the men would go to eat their lunches.

The high cost of labor has forced plants to install labor-saving devices, and a suitable mechanical means of conveying ash became a necessity. The steam jet conveyor offered the best solution in many cases. It is usually possible to find some means of leading a pipe from the ash pits to the desired point of ash disposal, and unexpected obstructions can be avoided if the parts are provided with joints that permit a pipe or fitting to be turned to any desired angle. The conveyor can be readily adapted to any extension or alterations in the plant, and it is never necessary to discard material already on hand because of such improvements as such material can be readily utilized.

A steam jet conveyor, excellent in every detail of design, would be a total failure unless made of the proper material. Ash is highly abrasive, and unless every part of the device that comes in contact with the ash is made of the proper material, the results will be unsatisfactory.

A satisfactory installation depends upon three essential factors—proper design, suitable material and correct application. The successful manner in which these factors have been combined in the steam jet conveyor is evidenced by the number of systems purchased by engineering organizations after a careful study of the different types of apparatus available.

Legal Department

A MISSOURI MINING LEASE INTERPRETED—A lease covering coal lands in Missouri and executed in 1900 gave the lessee twelve years in which to remove all minable coal, in accordance with first-class mining practices, and provided that minimum royalties should be paid for each of the first eleven years regardless of production. In the event that more than the minimum quantity of coal should be mined annually, it was agreed that six cents per ton would be paid as royalty. There was a clause extending the time for mining against delays caused by strikes, breakage of machinery etc., and another reserving to the lessee the right to remove machinery, etc., after complying with the lease obligations. Interpreting the lease as a whole, the Missouri Supreme Court holds that the lessee, having retained possession of the premises and continued to mine coal, was bound to pay the minimum royalties for the first eleven years, and six cents a ton for all coal mined afterward, regardless of whether the land contained sufficient coal to cover the quantities contemplated by the lease; and that until payment of such amounts the lessee was not entitled to remove machinery, etc., installed on the premises. (Union Trust Co. of St. Louis vs. Wear Coal Co., 199 Southwestern Reporter, 230.)

RISK INCIDENT TO BLASTING OPERATIONS ASSUMED — Plaintiff, a coal miner experienced in loading and shooting charges of dynamite and powder, was injured by explosion of dynamite in a drill hole, which he was cleaning out on his and his foreman's supposition that the dynamite had previously exploded in an attempt to explode it simultaneously with several other nearby charges. Judgment in defendant operator's favor, in a suit brought by plaintiff to recover damages, has been affirmed by the Missouri Supreme Court, on the ground that the evidence sustained a finding that the accident resulted from an ordinary risk naturally incident to the employment. The Supreme Court said: "It is too well established to admit of controversy that the servant assumes the ordinary risks of his employment—in this case the manifold dangers of mining with explosives—and under such circumstances the duty of the master is confined to the exercise of ordinary care. . . . Plaintiff's familiarity with this character of work and the dangers attendant upon its performance freed the foreman, as the alter ego of the master, from more than the discharge of that general duty required of the master toward an experienced servant. . . . Had it been shown, as it was not, that the plaintiff had no knowledge or a limited one of the nature of the work, the rule as announced would have been inapplicable." The court further notes that the legal rule requiring an employer to provide his workmen with reasonably safe places in which to work is limited to such dangers as, considering the nature of the work, can reasonably be anticipated and guarded against. It is not applicable in a mine where an employee is continuously changing his place of labor, unless the dangerous nature of the place is due to a defect directly traceable to negligence of the employer or one which he could and ought to have remedied. (Britt vs. Crebo, 199 Southwestern Reporter, 165.)

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Finding a Mine Door Set Open

Letter No. 3—Regarding the question raised by Richard Bowen, COAL AGE, Sept. 11, p. 462, in reference to the answer given in a certain textbook, explaining how a man should proceed with the examination of a mine after finding a door set open whereby the ventilation was destroyed, let me say that I fully agree with the answer he quotes as given in the textbook, namely, that the fireboss should close the door and wait a proper time for the circulation to be restored before proceeding to continue his examination.

This answer clearly assumes that the mining laws relating to gaseous mines have been strictly obeyed. For instance, the Anthracite Mine Law of Pennsylvania (Art. 12, rule 38) requires that every workman shall see that no gas blower is left burning when he leaves his place. Failing to extinguish a burning feeder, he must report the matter immediately to the mine foreman. As I have stated, the answer assumes that this law has been carried out, in which case there would be no feeder burning at the face of room No. 5, as he has assumed.

Relying on this fact, the answer states very properly that the door should be closed and time given for the circulation to be restored, before the examination of the working places in that section is continued. In my opinion, it is the proper way for a fireboss to start his examination of a section of a gassy mine at the intake end.

The second feature presented by Mr. Bowen puts him in the position of questioning the statement that the fireboss "should follow the intake current into the mine." Let me say that, not only is this the practice commonly recommended in textbooks, but I believe it is safe to assume that 100 per cent. of all firebosses, superintendents and managers would advise the same. For my part, I fail to see how any competent fireboss would attempt to examine a gassy mine by following the return air.

Assuming, for the sake of argument, however, that the conditions are as shown in the sketch or figure presented by Mr. Bowen, with the exception that we will say no feeder is burning in Room 5. Is it not true that the fireboss making the examination would only become aware of the door standing open on the gangway when he had reached Room 7, after passing through and examining all places turned off the return air-course and the last room, No. 8, turned on the gangway? When he supposed his work was more than half completed he suddenly finds that something is wrong and what he has done must count for naught and be gone over again after remedying the trouble he has just recovered.

Mr. Bowen states that, as fireboss in many large gaseous operations, it has been his invariable custom to leave all doors and brattices the way he found them, until he had ascertained the actual conditions in each working place in the section. In following this practice, now, we will suppose that he, starting on the return, has reached Room 8 on the gangway and discovers that there is no air circulating in Rooms 7, 6, 5, 4, 3 and, at last, finds gas at the face of Room 2. All his work now counts for naught, as he must go down he must start again by entering Chamber 1 on the gangway and examining each place in turn, including the last chamber 8 and the same number of chambers on the return air-course, all of which he had previously examined and found safe.

Finally, applying this plan of proceeding to any gaseous section requiring about three hours of hard work, it is clear that this time would be more than doubled by the finding of gas in any one of the places at the extreme intake end of the section, provided the fireboss must continue to examine all rooms before closing the door. It may be asumed, of course, that his first preliminary examination has for its object only the ascertaining of the fact that there is no feeder burning or lights present, or other fire that would cause the ignition of the gas when the door is closed, and that this examination will not require as much time as the more careful examination of the places after the door has been closed and the circulation restored. However, the fireboss has almost twice the ground to go over and will not accomplish his work in the specified three hours.

On the other hand, by starting his examination at the intake end, not only is the fireboss traveling in fresh air and knows when and where the air is short-circuited; but he is doing his work safely and but once, saving time and steps. I hope we shall hear from many experienced firebosses and those in higher positions who know what the work is by experience.

Stockton, Penn. JOSEPH LAWRENCE.

Letter No. 4—Referring to the question raised by Richard Bowen, in his inquiry, COAL AGE, Sept. 11, p. 462, regarding the usual practice of starting the examination of a mine at the intake end, I would say that the answer given to the question as quoted by him from a certain textbook is correct, provided the mine is not subject to fires and gas feeders, although a gassy mine or one subject to fires would undoubtedly call for a modification of this practice.

In the plan submitted by Mr. Bowen with his question, it is evident that it would not be prudent to attempt to remove the gas shown in Room 2 if it has accumulated in great bulk, owing to the possibility of fire being at some point in the section and igniting the gas. It would be very inconvenient, however, for a fireboss to travel against the air and possibly unsafe by reason of his being compelled to breathe the gases generated by the fire.

Considering all the conditions, I believe the best course to follow would be to travel with the air and, leaving the door standing open as it was found, proceed with the examination. On reaching the fire, or burning feeder, it should be extinguished as quickly as possible. When satisfied of the condition of the section the fireboss can return and, closing the door, wait for the ventilation to be restored before taking steps to remove the gas. It may be necessary to erect a temporary brattice so as to deflect the air to the face and sweep the place clear of the gas. This plan, of course, will call for the making of a second examination of the section, before the fireboss can permit the workmen to enter the mine.

fire, is not uncommon in the examination of a mine. If I am rightly informed, some firebosses carry gas masks with them when making the examination, which enables them to approach and extinguish a fire that it would be impossible to reach but for the mask. Without a doubt, this is a step in the right direction and may often prove of great value by enabling the fire to be put out before it has gained headway, as it would if help must be summoned and the usual steps taken before the fire can be extinguished.

Linton, Ind. W. H. LUXTON.

Letter No. 5—Referring to the question of how a fireboss should proceed with his examination of a mine after finding a door set open on the airway, it is my opinion that, having first performed his duty of seeing that the air is traveling in the proper course and the usual quantity passing on the main airway and, finding the door set open controlling the circulation of air in the section of the mine that he is about to examine, he should "danger the section off" by placing a suitable signal at the entrance and proceed at once to report the matter to the mine foreman.

In case, however, the fireboss decides to take the whole responsibility on himself and continue his examination of the section, he should leave the door standing open as he found it and proceed in the regular order, but taking every precaution and watching for the first appearance of gas. Should he find gas, as has been suggested in this discussion, he must proceed to look further to ascertain if there is any fire or light that would cause the gas to ignite when displaced or driven out. The fireboss will then know the location and amount of gas and what the results would be if the door is closed.

Having assured himself of the conditions existing in the section, he should close the door and wait a reasonable length of time before making a second examination to ascertain what progress is being made in driving out the gas. It may be necessary to speed up the ventilator or alter the circulation in the mine so as to throw more air against the gas and clear the place. If he is unable to remove the gas before the time arrives for the men to enter the mine, he must danger the place off and allow no one to enter that section.

I heartily agree with the ideas already expressed that all doors and brattices should be left as they are found, until the fireboss has ascertained the actual conditions that exist in the section. However, in a matter of this kind, where a door has been carelessly set open and left, I do not feel that the fireboss should be held responsible for what may happen as a result of somebody's carelessness. If it can be ascertained who left the door open, he should be punished in a manner to make him understand the purpose of mine doors. Spraggers and motormen often leave doors open for long intervals just to save themselves a little trouble. They are seemingly ignorant of the effect of so doing.

Regarding the question of following the intake air, there is nothing in the mining law to compel a fireboss to do this. The law requires him to see that the air is traveling in its proper course and that the usual quantity of air is in circulation. Personally, I believe that not more than 50 per cent of the firebosses follow the intake air, unless the geological conditions favor their doing so.

One thing is evident, and that is a fireboss can judge better the amount of air traveling in an airway when he proceeds against the current than when traveling with the air. Also, he can scent the smoke or gases of a fire more quickly when starting at the return end of a section than when he begins the examination at the intake end. This might save two hours or more in fighting a fire that has started at a point near the return end of the section.

When starting on a new run, it has been my practice to carefully study the various routes and pick out the one that will permit the work to be done most quickly, easily and to the best advantage, everything being taken into consideration, and still perform my duty as fireboss to the best of my knowledge and ability.

Johnstown, Penn. FIREBOSS.

Letter No. 6—As fireboss, I am now working in a gaseous mine and have been much interested in the discussion, in Coal Age, regarding a fireboss finding a door set open when starting to make his regular examination of a mine or section. All gaseous mines have two or more sections where men are working, and these must always be considered in case a door is found open in any one section, especially if the men are at work at the time.

In making the regular examination of the mine in the morning, if I found a door standing open on the airway when starting to make my rounds, I would not close the door until I had examined to know the conditions prevailing in that section. Instead, I would leave a sign on the open door to prevent anyone from closing it who might happen to be in the mine. I have learned by experience that it will not do to close a door that is found standing open, before first finding out if gas has collected anywhere in a body that would be dangerous.

Leaving the door as found, I would go as far as possible in examining the section and, if necessary, would return and get help to remove gas or extinguish any fire that might be burning. I would not, under any circumstances, close an open door before assuring myself that it was perfectly safe to do so. At times, no doubt, it may be possible to examine the conditions beginning at the return end of the section, which would give a better opportunity to detect what might be wrong. The fireboss must report to the mine foreman promptly any trouble that cannot be removed without help. But, in no case, should he close the door until he is sure that the section will be safe when the circulation is restored.

Rockwood, Tenn. FIREBOSS.

Child Labor in Mines

Letter No. 3—My attention was drawn to this subject by reading the interesting letter of A. A. Gillen, COAL AGE, Sept. 11, p. 457, in which he aptly describes the position of a hard working man, the father of an average family. In his letter, Mr. Allen has shown himself to be broad-minded, by considering both sides of the question. Like him, I believe in giving children every opportunity to gain an education. Nevertheless, in my own case, conditions were such that I was compelled to take my oldest boy from high school at the age of 14 when he was half through the sophomore grade. In doing so, I chose the lesser of two evils, cutting short the boy's schooling or depriving the family of certain necessities, as the lad was needed at that time to help out the family income.

I fully indorse Mr. Allen's statement that "boys should know what it is to do a fair day's work before they reach 16 years of age." From experience, I know that this can be done without depriving the boys of an oportunity to educate themselves in any technical calling to which they may be inclined, provided they are ambitious to accomplish the task. But where there is no such ambition on the part of the boy and the parents' finances are limited, a greater injustice may be done the family if a boy between the ages of 14 and 16 years is not allowed to go to work in place of attending school.

It will frequently happen that boys between 14 and 16 years of age, kept in school contrary to their inclination, spend their spare time in idleness and cultivate many habits that are harmful to themselves and disgrace the family. While the law is all right in general, there are many instances where it is unjust to the boy and a burden to his family to

be kept from earning his own living at the age of 14 and assisting, it may be, to support a widowed mother or younger brothers and sisters who would otherwise be dependent on charity.

Far better would it be to give such boys an opportunity to nourish their bodies and to assist in the support of the family, than to attempt to build up and develop their mental capacity to the detriment of their physical strength, and run the risk of a total collapse and failure. It is my belief, therefore, that boys of 14 should not be denied, by law, their right to work in the mine when the need of their employment can be shown.

Let me ask, how many well educated men among us were earning their own living when they were 14 years old or younger? Mr. Allen states that he entered the mine for work before he was 10 years of age. I, myself, started at 12 years of age and obtained my undermanager's certificate, at Newcastle-on-Tyne, when 21 years old, besides having received other Science and Art certificates before reaching that age and while working regularly 10 hours a day.

At the age of 27, at Edinburgh, Scotland, I obtained my manager's certificate, which was first-class. In the examination at Edinburgh, I remember, there were candidates who had not known a hard day's work in their lives and had every opportunity to prepare themselves, and yet they failed to pass the examination.

It is my opinion that work doesn't hurt a healthy well-nourished boy; but when boys are deprived of work between the ages of 14 and 16 years they will often be undernourished and those who should be assisted by their earnings are, at the same time, deprived of that support.

No doubt, the lawmakers who enacted the child-labor law were conscientious in their work; but it would seem that they did not recognize the necessity that often makes this law a burden to parents and is harmful to boys who have not the ambition to study and educate themselves.

Linton, Ind. JUSTICE.

Problem in Coal Extraction

Letter No. 7—After a careful reading of the article entitled "A Problem in Coal Extraction," COAL AGE, Aug. 7, p. 234, and taking into consideration the natural conditions described as existing in the seam, I am led to suggest a method evolved in my own practice and which, I believe, promises the largest recovery of coal at the lowest cost of production, while furnishing the greatest degree of safety.

The seam in question is said to be fairly gaseous but dry and overlaid with from 450 to 600 ft. of cover. The roof shale is described as containing slips and disintegrating rapidly under the action of the air. In order to illustrate more clearly my proposed method, let us assume that a portion of the southeast quarter in the development of the mine is under consideration.

Starting from the shaft bottom, it has been my custom to drive the main headings north, south, east, and west, thus dividing the mine into four quarters. Under the conditions assumed the main east headings are driven four abreast, which affords an intake haulage road and return airway for each section, on the east side of the mine. As these main headings are advanced, butt headings 8 or 10 ft. wide are driven, three abreast, on 1,500-ft. centers, as far as desired. From these cross-entries 8 ft. wide are also driven three abreast, on 600-ft. centers.

In this manner, the seam is laid out in panels of solid coal about 600x1,500 ft., and these are worked out on the retreating plan, as follows: As quickly as the cross-entries advance, stalls or rooms 12 ft. wide are driven, on 92-ft. centers, across the panel, holing into each other at a depth of about 250 ft. or half the width of the panel.

When the stalls or rooms are completed in any panel in Section No. 1, here considered, the work of drawing back the 80-ft. pillars in that section is started at the extreme northwest corner of the section. In driving the stalls or rooms, crosscuts or breakthroughs are made on 40-ft. centers, which not only affords good ventilation but expedites the work of drawing back the pillars.

The extraction of the pillars is now assumed as being completed in the first panel of Section 1, nearly completed in the second panel, and well under way in the third panel of the section. The work of drawing pillars is in progress in the first panel of Section 2, while rooms are still being driven in the second panel.

It should be observed, here, that the general line of fracturs is thus carried on a more or less fixed angle with the cross-entries. While this angle may vary with the conditions in the seam and the overlying strata, it has been my custom to carry the breakline on an angle of about 25 degrees with the entries.

It may be found desirable, at times, to start the work of extracting the pillars at opposite ends of each alternate section. For example, while retreating south in Section 1, as here suggested, this work may be conducted retreating north in Section 2, by starting the robbing at the southwest corner of that section. When this is done, all the coal from Section 2 is taken out on the haulage road on the east of that section. By using the worked out section for the return air, the danger of explosion is reduced to a minimum.

In my experience, the use of this method has proved an almost absolute guarantee against the loss of coal to any great extent. I would mine this seam in the center, say 3 or 3½ ft. above the bottom, by means of a mounted electric coal cutter, and blast all narrow work with four shots, using permissible powders.

None but approved electric mine lamps should be used and all open lights prohibited. I would employ storage battery locomotives for gathering purposes. It is my belief that if this method is properly handled it will give the best results in 80 per cent. of all coal seams, especially if the plan is modified to suit the local conditions.

Harmarville, Penn. C. W. ATKINS, Mine Foreman.

Letter No. 8—In the discussion of the problem presented in COAL AGE, Aug. 7, p. 234, regarding the question of obtaining a larger percentage of extraction, in the working of a seam of coal, it seems of prime importance to remember that the cost of a higher extraction must always be less than the price of the salvaged coal. In other words, it is easy to get a higher extraction of coal when no limit is placed on the cost of the operation. Moreover, in the discussion of this question, due consideration should be given to the relative cost of coal lands in different districts.

The problem presented in the article mentioned is the working of an 8½ to 11-ft. seam of coal, carrying an overburden varying from 450 to 600 ft. in depth. The top coal in this seam is left up to protect the shale roof, which disintegrates rapidly under the action of the air and contains numerous slip faults that often extend down through the top coal. The seam itself contains a hard silicious shale or "blue band," averaging 1½ in. in thickness.

The conditions described correspond closely to the Franklin-Williamson County coal field of Illinois, where the low cost of coal land has assuredly been the reason for the low percentage of extraction in that field, generally less than 50 per cent. I have frequently heard this question argued by the coal operators, superintendents, bosses and miners in that field, practically all of whom agree that on the average not more than 50 per cent. of the coal is taken out.

At one mine, in particular, I have seen thoughtful and intelligent efforts made to increase the extraction of the coal without making its cost prohibitive. My observation convinces me that a system that would work out all right in one place might not work at all in another district, and perhaps not even in an adjoining section of the same mine. For this reason, I conclude that any successful system must be a compromise that would work well in at least a majority of the mines in the field in question.

As the locomotive of today, which is a mechanically wonderful contrivance, is the product of scores of minds, each of whom has added some improvement; so, in a smaller way, the ideas I am about to present make slight additions to a method evolved in the experience of other mining men. The basic principle of the method was, I believe, first tried out successfuly, in this field, by James McSherry, of Duquoin, while in charge of a small local mine.

MINIMUM AMOUNT OF COAL REMOVED

The underlying principle on which the success of the method depends consists in the taking out of but a small percentage of the coal when driving up the rooms. For instance, in applying this principle, where the average distance between room centers was 40 ft., this was increased to 60 or 70 ft., which provided for a room pillar large enough to permit of turning a full width room in the pillar. This provides for one condition.

Where rooms were driven 18 ft. wide, and 230 ft. long, with crosscuts every 60 ft., it was Mr. McSherry's plan to start a room in the last sixty odd feet of each pillar, as soon as the last crosscut was through. These rooms driven up the center of each pillar gave the effect of short rooms driven on 35-ft. centers and sixty odd feet deep, in the last tier of pillar stumps, while two-thirds of the coal was left behind untouched and provided ample protection.

When these short rooms have been driven up, the machine is dropped back to the next row of crosscuts and starts to drive rooms in that set of pillar stumps, while the top coal and the remaining pillars are being drawn back in the section just vacated by the machine. The same method is followed in taking out each section, until the last set of stumps is reached, when the machine is started cutting into the pillar from the entry.

When driving rooms 24 ft. wide on 70-ft. centers, which practice is sometimes followed, splitting the pillars in this manner will leave a theoretical 11-ft. pillar, which will generally shrink in practice to about 8 ft. This, however, has been found just enough, in the average of this field, to hold the roof until the loader can get the top coal down, though not enough to carry over a squeeze.

By starting men in the rooms at the head end of the entry, the entry pillar can be drawn at the same time as the room stubs are robbed and a theoretical extraction of 80 per cent. may be obtained from the panel. Barrier pillars should be worked out by short rooms, as in the sketch accompanying the original article. But, owing to the higher percentage of extraction in the panel, a surface subsidence will usually take place and relieve the weight and insure a larger extraction of the coal in those pillars.

Having observed closely the successful working of this plan at Duquoin, I conceived the idea of adding to it or modifying the scheme in a manner according to the following variation which I will now suggest and describe. One often hears the statement made that it is usually better to approach old workings "face on," instead of driving rooms alongside with a protecting pillar, that it is hoped, will keep the weight from coming over. Should this pillar, for any reason, become too thin the whole room may be lost and frequently other rooms adjoining, but if the pillar is too thick, much coal is lost. On the other hand, the advantage of approaching the old workings "face on" is that if one room should hole through, the opening being small can be easily stopped and the adjoining rooms watched more carefully.

It was chiefly to obtain this effect that the scheme suggested itself to my mind of cutting off the headings approaching old workings or a boundary line, at a full room-length distance therefrom, by driving a pair of cross-entries parallel to said workings or boundary, as shown in the figure. However, further thought showed me that, in order to provide the required number of rooms to keep the machines busy, this plan requires the working out of two adjoining panels simultaneously, which gives also a longer open space for a break.

As may be assumed, the narrow work is stopped at about a room length from the old workings or the same distance from the boundary of the company's property. From this point, 18-ft. places, if feasible, are turned off at right angles and driven in a room length toward the old works or the boundary line. This is done as development work, and when the pillars are ready to be pulled back, men should be started in all the rooms at once, which should be enough to make a full machine run.

TWO MACHINES ARE EMPLOYED

The same method is employed here as described previously. The rooms are driven to the last crosscut before the face and the remaining distance is worked out by splitting the pillars up to the boundary or barrier pillar. Enough new rooms can now be started to make up a new machine run and to fill out the run of the first machine, as it drops back on the next set of split pillars. In this manner, two machines can be kept busy, while the original set of rooms is entirely worked out at a maximum speed.

In the working out of this plan, there will result an open space, with the exception of thin strips of pillar 8x60 ft., extending for a distance of approximately 900 ft. and running for a distance of 200 ft. in depth at the center to over 300 ft. at the side. The breakline can then be carried back in the shape of a spread out and inverted W (M). Care should be taken to cut the places in such order that the breakline will be maintained as started.

The only disadvantage that I can see, in the use of this plan, is that where gathering motors are employed, they will not be able to deliver empties on one side of the panel and pull loads off the other side, during the time they are working on the first set of rooms, but will have to double their run for this distance. Great advantage will be gained, however, in approaching old works "head on" and in quickly obtaining a sufficiently large open area to induce a fall that will break to the surface, and working back with this break following. I shall appreciate a full discussion of this plan, by readers, as the proposition has not as yet been tried out in actual practice.

Duquoin, Ill. MINING ENGINEER.

CORRECTION

Attention has been kindly called to a typographical error that occurred in the next to the last paragraph, in the reply to an inquiry regarding the "fluid ounce," on p. 337, in the issue of COAL AGE, Aug. 21, where the volume of the pint was given as 0.43718 liters (437.18 c.c.), instead of 0.47318 liters (473.18 c.c.) This paragraph should read as follows: There are practically 16⅔ fluid ounces in a pint (liquid measure, U. S.), since 1 pint is equal to 0.47318 litres, or 473.18 c.c., and $473.18 \div 28.3495 = 16.69$, say 16⅔ fl. oz.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Tennessee Foreman's Examination Held at Nashville, September, 1919

SELECTED QUESTIONS.

QUES.—What are the duties of a mine foreman?

ANS.—The Mining Laws of Tennessee require the mine foreman to keep a careful watch over all ventilating apparatus, airways, entries, travelingways, timbers, pumps and drainage, and to see that the miners advance their excavations safely, taking down all dangerous coal, slate or rock, or securing the same by props, caps and other timbers, which the foreman must keep at some convenient point near the entrance of the mine and deliver to the miners at their working places as needed.

The foreman must see that all breakthroughs, in Class A mines generating firedamp, are made not more than 60 feet apart in entries or airways, and not more than 75 feet apart in rooms, unless special permission is granted by the chief mine inspector to extend these distances in any particular case. In Class-B mines, generating dust in dangerous quantities, these distances are extended to 67½ feet on entries and 82½ feet in room pillars. In Class C and D mines generating neither firedamp nor coal dust in dangerous quantity, entries may be advanced 75 feet ahead of the air and rooms 90 feet. The law makes it the duty of the mine foreman to see that these provisions are carried out faithfully.

QUES.—How would you proceed to examine a gaseous mine to ascertain its true condition?

ANS.—Having carefully prepared his safety lamp and having examined the ventilating fan, the foreman or examiner should enter the mine by the intake air, if practicable, or proceed at once to the foot of the downcast shaft and ascertain that the usual volume of air is passing into the mine. Then, following the air current in its course, each entry, road and working place must be carefully examined for gas and other dangers that may be present. Where gas is discovered or timbers are found to have been dislodged by a shot, or a loose piece of roof is observed, and these dangers cannot be removed at the time, the place must be safeguarded by a proper danger signal placed at each entrance to warn men not to enter the place. It is always better to remove any danger at the time it is found, if this is practicable, but the time allotted to make the examination of a mine in the morning will not generally admit of this being done.

Having completed his rounds, the examiner must make out a report, stating the exact location of any dangers he may have found and their character. This report must be made in a book kept at the mine for that purpose and signed by the examiner, immediately on his return to the mine entrance or shaft bottom. He must then report to the foreman and withhold any checks of miners whose places he has found to be unsafe for work and not permit them to enter their places until those dangers are removed.

QUES.—How would you determine the quantity of air passing where the sectional dimensions of the entry are: Width, 10 feet; height, 5 feet 6 inches; and the anemometer registers 430 feet as the velocity of the air current?

ANS.—The sectional area of this airway is 10x5½=55 sq. ft. Then, assuming the anemometer reading represents the average velocity of the air current, the volume of air traveling in this entry is 55x430=23,650 cu. ft. per min.

QUES.—What, in your opinion, are the causes producing explosions in mines in this and other states; and what can be done to prevent these disasters?

ANS.—Some of the more common causes of explosions of gas and dust in mines are the following: Inadequate ventilation allowing the accumulation of gas in working places and void or abandoned portions of the mine; lack of thorough inspection and removal of accumulations of gas and dust; excessive use of black powder in blasting; overcharging of holes; drilling a hole too deep on the solid, or blasting off the solid; insufficient tamping, or tamping with coal slack or other inflammable material; failure to use permissible powders; failure to employ competent shotfirers to examine, charge and fire all shots except any that may, in their judgment, be unsafe; and, finally, lack of mine discipline and the enforcement of mine discipline and the enforcement of mine regulations and mining laws.

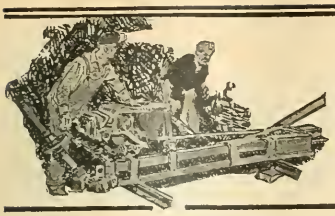
REGULATION FOR PREVENTION

To prevent, as far as possible, the recurrence of these disasters, strict mine discipline is required; also, a thorough inspection of the mine at regular intervals, by competent mine examiners, and a strict compliance with all mining laws and regulations, by mine officials and mine workers, are absolutely necessary. Where conditions require, all shots should be fired by competent shotfirers who are authorized to examine, charge and fire all shots that in their judgment are safe. A reliable and adequate system of ventilation must be provided and the roads, airways and working places of the mine kept free from accumulations of gas and dust.

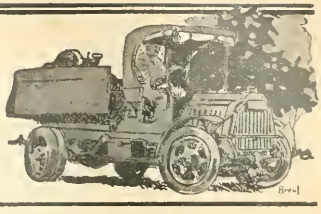
QUES.—If the fan engine or the motor actuating the fan should break down at a mine of which you are foreman, what effect would this have on the ventilation of the mine, and how would you proceed to keep the mine in operation for the balance of the day?

ANS.—The breaking down of the engine or motor operating a ventilating fan and the resulting stoppage of the fan would, in most every instance, necessitate the shutting down of the mine and withdrawing of the men, until the ventilating apparatus could again be put in operation. It would only be possible to continue the operation of a mine after the breaking down of the ventilating machinery, if some other means are at once available for producing necessary and adequate ventilation.

It may happen that a shaft mine will still have sufficient natural ventilation to permit work to be continued in some sections, provided the mine is generating no gas. Or, it may be possible to increase the circulation in the mine by means of a fire basket hung in the upcast shaft, or by erecting a small temporary furnace at the foot of that shaft. At times, use can be made of a steam jet placed at the bottom of the upcast shaft to increase the circulation and permit work to be continued in the mine. Otherwise, the men must be withdrawn and the mine shut down for repairs.



COAL AND COKE NEWS



Coming Meetings

American Society of Mechanical Engineers will hold its annual meeting Dec. 2-5 in New York. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

Canadian Mining Institute will meet Nov. 26-28, in Vancouver, B. C., Canada. Dr. E. T. Hodge, professor of geology at the University of British Columbia, has been appointed general secretary of this meeting.

Coal Mining Institute of America will hold its 33rd annual meeting Dec. 3 and 4 at Pittsburgh, Penn. Secretary, H. D. Mason, Jr., Mine Safety Appliances Co., Pittsburgh, Penn.

American Mining Congress will hold its annual convention at the Planters' Hotel, St. Louis, Mo., Nov. 17-21. Secretary, J. F. Callbreath, Muncey Building, Washington, D. C.

Recent Coal and Coke Patents

Mining Machine. W. E. Young, Uniontown, Penn., 1,315,271. Sept. 9, 1919. Filed May 3, 1919. Serial No. 294,431.

Apparatus for Burning Powdered Coal. A. J. Grindle, New-Castle-on-Tyne, and C. H. Stevenson, Gateshead, Eng., 1,315,385. Sept. 9, 1919. Filed Dec. 18, 1918. Serial No. 267,373.

Apparatus for Using Powdered Coal W. H. Stevens, Altoona, Penn., 1,316,399. Sept. 16, 1919. Filed March 31, 1916. Serial No. 87,962

Coal Handling Plant. C. S. Williamson, Chicago, Ill., 1,316,129. Sept. 16, 1919. Filed Feb. 26, 1916. Serial No 80,577.

Locomotive Boiler Furnace. J. C. Martin, Sausalito, Cal., 1,316,628. Sept. 23, 1919. Filed Jan. 31, 1919. Serial No. 274,585.

Trade Catalogs

Heat Treated Gearing. R. D. Nuttall Co., Pittsburgh, Penn. Bulletin No. 25. Pp. 24; 6 x 9 in.; illustrations. Notes the general treatment of gears, to insure better service both in manufacture and use.

Helical Gearing in Electric Railway Service. R. D. Nuttall Co., Pittsburgh, Penn. Bulletin No. 26. Pp. 19; 8¾ x 11 in.; illustrations. An analysis of Nuttall gear performance in electric railway service with comments of railway officials.

Explosives and Miscellaneous Investigations. Department of the Interior, Bureau of Mines. Bulletin 178-D. Illustrated; pp. 89 to 107; 5¾ x 9¼ in.

Typical Graphic Records. The Esterline Co., Indianapolis, Ind. Pp. 24; 8¾ x 11 in.; illustrated. A description of the type of curve drawing instrument and illustrations of its use in various industries.

Coal. The Underfeed Stoker Co. of America, Book Bldg., Detroit, Mich. Booklet. Pp. 31; 4¾ x 7 in.; illustrated. Prepared by R. T. Gray, advertising engineer, for the Underfeed Stoker Company. Gives analyses of coal from various sections of the country, as well as other information on coal consumption.

Flexible Shaft. Stow Manufacturing Co., Inc., Binghamton, N. Y. Bulletin No. 104. Pp. 56; 5¾ x 8¾ in.; illustrated. A price list and catalog of Stow portable electric tools, electric motors and special machines. This company specializes in flexible shafting.

Stow Motor-Driven Tools. Stow Manufacturing Co., Inc., Binghamton, N. Y. Bulletin No. 3. Pp. 27; 5¾ x 8¾ in., illustrated. A catalog describing the company's drills and grinders.

Fluid Meters for Low Pressure Gas and Air. Bailey Meter Co., Cleveland, Ohio. Bulletin No. 30. Pp. 15; 7¾ x 10½ in.; illustrated. Notes uses, principles of operation and characteristics.

The Nation's Market Place. Walter A. Zelnicker Supply Co., St. Louis, Mo Bulletin No. 270. Pp. 56; 3½ x 8½ in., illustrated. A list of railroad supplies and equipment; power and industrial plant machinery; contractors' equipment.

Personals

C. M. Snyder, formerly safety inspector of the Hillman Coal and Coke Co., of Pittsburgh, Penn., has been promoted to the position of district superintendent. His district embraces the mines operated by the United Coal Corporation, prior to its absorption by the Hillman company.

Robert MacFarland, superintendent of the Hillman company's Ella mine at Sunnyside, has been promoted to the position of safety inspector to succeed Mr. C. M. Snyder.

David Dunn, formerly mine-foreman at the Ella mine of the Hillman Coal and Coke Co., has been made superintendent of the Ella mine to succeed Mr. Robert MacFarland.

E. V. Freeman, first lieutenant of infantry, A. E. F., has returned to the Bluefield, W. Va., office of the Westinghouse Electric and Manufacturing Co., and will handle the sale of power apparatus in eastern Kentucky, with field headquarters at Middlesboro, Ky. **J. A. Hammond,** who came from the coal fields of western Pennsylvania, to join the Bluefield sales force of the Westinghouse company, will handle the sale of supply apparatus in the Kentucky territory mentioned above.

A. Beveridge, general manager of the Sabine Collieries Co., of Otsego, Wyoming County, W. Va., was brought to Beckley in Raleigh County recently in a dying condition, it was thought. Mr. Beveridge was hurried to a hospital on a special train on the Virginian railroad. He was badly injured in a monitor accident at the mines; at the same time another man was killed and several others reported injured. He is a man 55 or 60 years of age and came to West Virginia from the middle west.

Henry Devlin, who has been an inspector of mines in British Columbia since Feb. 1913, has resigned in order to take a position with the Canadian Collieries, Ltd. Previous to entering the civil service, Mr. Devlin was mine manager at South Wellington, Pacific Coast Mines.

Dudley Michel, who for five and one-half years has been attached to the staff of the Department of Mines, British Columbia, as instructor and organizer in first-aid and mine-rescue work, has left the service. He is taking a position with the Giant Powder Co.

Hugh Morrow is unofficially announced to have been appointed assistant to president J. W. McQueen, of the Sloss-Sheffield Steel and Iron Co. It is further stated that vice-president L. Sevier is soon to leave this company and that he will be succeeded by Mr. Morrow.

Arthur A. Allna, of Wilkinsburg, a suburb of Pittsburgh, Penn, recently resigned as assistant general superintendent of the United Coal Corporation, has accepted the position of superintendent of the Westmoreland-Fayette Coal and Coke Company.

Edwin Ludlow announces that he has opened an office at 149 Broadway, New York City, as consulting engineer, specializing in coal and coke.

David L. Wing contributed largely to the preparation of the series of coal cost reports, the first of which appeared

DAVID L. WING

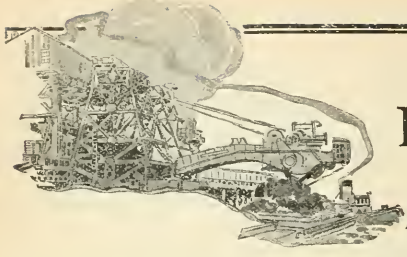
recently covering the central and southwest bituminous fields of Pennsylvania. During the course of this cost work, done by the Federal Trade Commission, many coal operators throughout the country have been brought in contact with Mr. Wing. Many employees, present and former, were under the general direction of D. L. Wing in the preparation of these reports.

Col. Noel Marshall has retired from the presidency of the Standard Fuel Co., of Toronto, Can., and his son, **Lt.-Col. K. R. Marshall,** has been elected to his place. A banquet and presentation was tendered the former by his competitors in the city, in commemoration of his 50 years in the coal trade.

George Roberts, who has been mine-foreman for the Milbar Coal Co., at Dixonville, Penn., has been transferred to the new plant of this company that is being opened at Diamondville, Penn. Mr. Roberts is succeeded by **Charles Abbott,** formerly mine-foreman of Vicot No. 26 mine of the Russell Coal Mining Co., at Clymer, Penn. These towns are all in Indiana County.

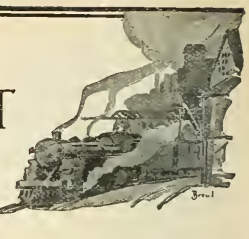
G. N. Pfeiffer, who has built up an engineering business in the southern part of Illinois, recently formed an engineering partnership with **A. C. Williams** The new firm of Pfeiffer & Williams, consulting engineers, has headquarters at Herrin, Ill. After this matter had been arranged, Mr. Williams disposed of his engineering office in Pittsburg, Kan.

F. D. Buffum, 3130 Middletown Road, Pittsburgh, Penn., a contractor for shafts, slopes and general construction, has gotten up a sheet of data on shaft construction for general distribution. This data should be interesting and of service to engineers and others having to do with shafts and slopes. "There is little literature on this particular subject," says Mr. Buffum, "and the sheet of data will be forwarded upon request."



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Coal Consumers Not Worried by Impending Strike—Soft Coal Market Generally Inactive, Except in Middle West—Anthracite Domestic Coals in Good Demand—More Vessels Allotted to American Coal Trade By Foreign Governments

Production of soft coal keeps pace with demand. No undue anxiety is shown by buyers to lay in surplus stocks against the possibility of a nation-wide strike of bituminous coal miners on November 1, consumers generally holding to the belief that the Government will step in at the last moment, should negotiations fail, and insist that the mines be operated.

Truth is, every manufacturing plant of any size on the Atlantic Seaboard has ample soft coal in reserve, and the accounts in great measure for the apathetic state of the market. Particularly is this evident in New England, where there is no buying interest whatever so far as steam coals are concerned.

Quite a different picture is presented by conditions in the Middle West territory. Steam coals, which heretofore were quite a problem to Middle West operators, are now selling at good prices, and instead of being difficult to dispose of are bringing premiums for prompt shipment. The demand for the prepared sizes of domestic coal from Illinois and Indiana mines is also keen.

There have been no new developments in prices the past week, though if the present negotiations with the miners ends in a strike it will mean that what little coal is produced will bring a large premium. At any event, if the miners succeed in obtaining an increase in wages it will add materially to the cost of the coal.

The slight falling off in the output of soft coal reported for the week ended October 4 can be traced directly to the lessened demand from the steel industry. The total production of bituminous coal (including lignite and coal made into coke at the mines) during this period was 11,470,000 net tons as against 11,606,000 net tons for the preceding week. The total output of coal has not been seriously reduced by the steel strike, for the general demand is sufficiently active to absorb the tonnage released by the steel industry.

Anthracite mines are striving to their utmost to supply the demand for the domestic sizes. Particularly urgent is the call for these coals from New England, for while that territory is overstocked with soft coal, many sections are in need of a large tonnage of the domestic sizes of hard coal. Steam sizes, on the other hand, are being disposed of with difficulty. Barley is the most troublesome size, as it encounters the competition from bituminous.

The output of anthracite for the week ended October 4 is estimated at 1,921,000 net tons, as compared with 1,964,000 net tons for the week preceding. While there has been some improvement in the quantity of domestic sizes shipped from the anthracite mines during the past week, the claim is made that shipments are still below normal for this time of the year.

The export and bunker trade is still active, with an upward trend noticeable in the prices of Pocahontas and New River coal. As a result of the irrefutable charges made recently by the U. S. Shipping Board, that the vessels of European countries in dire need of coal are being diverted to more profitable cargoes, Denmark, Sweden and Italy have assigned additional ships to ply in the American coal trade. Denmark has placed 16 ships with a total tonnage of 61,000 in this service.

PITTSBURGH

Coal Industry Feels Steel Strike—Lake Shipments Light — Possibilities of Miners' Strike Stimulates Demand in Some Quarters.

The steel strike has lost just a little more ground in the past week, but not enough to make a noticeable increase in the industry's consumption of coal. The coal industry feels the effect of the strike more than in the first week or two, when there were accumulated demands in other quarters that could be met with the coal released from the steel industry. Fears of a coal strike November 1, on the other hand, have tended to stimulate coal demand in some quarters.

Lake shipments are now quite light. The boats have been moving more slowly and there is little demand left.

The large byproduct coke plants in Youngstown and Cleveland are operating to an extent, but on the whole are hardly taking more than one-fourth as much coal as normally.

The coal market is somewhat easy compared with conditions just before the steel strike, running approximately as follows: Slack, $1.90@2.10; steam mine-run, $2.10@2.40; gas mine-run, $2.20@2.50; prepared gas, $2.60@2.80; per net ton at mine, Pittsburgh district.

CONNELLSVILLE

Furnace Coke Stiffened Sharply — Foundry Coke Demand Good—Production Light.

The coke market has experienced a sharp stiffening after its recession due to initial effects of the iron and steel strike. Coke operators were quick to reduce production when so many blast furnaces were closed by the strike, and in the past week, with several furnaces resuming, the demand for coke has been quite active in proportion to the advanced fully 50 cents in the week, several sales having been made at $4.25, while there is no prospect of any standard coke being offered at less.

Production of soft coke has been unusually great, owing to so many ovens having lengthened their running time, up to, say, 96 hours, but this soft coke finds rather a ready sale, and at relatively good prices, usually $3.50 or more. Foundry coke has continued in good demand. In the past fortnight it has been off about 25 cents, as compared with prices just before the iron and steel strike, this being due not to lessened demand but to heavier offerings as a number of producers can supply more foundry coke now that their furnace coke requirements are decreased. We quote the market at $4.25 for spot and prompt furnace coke and at $5.75@6.25 for foundry coke, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended October 4 at 157,600 tons, a decrease of 28,520 tons.

MID-WEST REVIEW

The coal market on all kinds and sizes has been booming for the last week. Some of our large industries are picking up as much open coal on the market as they are able to get, believing that this coal will be handy a little later on. Steam coals which heretofore have been a drug on the market are selling at good prices, and premiums are being offered for prompt shipments. The demand for prepared sizes, going to the retail trade is very strong. In fact the average operator can get more than a dollar above the present current price, if he so desires. Operators and distributors alike, but more especially operators, are maintaining prices at a level far below what they could actually get for their coal if whole is to be very much commended for the strong stand it has taken against profiteering. It is no exaggeration to say that the average operator in Illinois and Indiana could get anywhere from 75 cents to $1.50 per ton more for domestic coal than the present current price.

The labor situation appears to be at a deadlock, although the general opinion now seems to be that there will be no secession in mining on Nov. 1. It is thought that the operators and the United Mine Workers will be able to patch their differences, and it is hoped that this will prove the case.

CHICAGO

Good coal is being invoiced at reasonable figures, but those desirous of placing big orders at this time are having difficulty getting operators and distributors to accept additional business, as the mines now have enough business on their books to run straight through.

High-grade domestic coals from southern Illinois are selling at from $3.10 to $3.25. Good domestic coals from the Springfield and other districts are bringing a little less. Steam coals are firm. Two-inch screenings bring around $2.20 and mine-run anywhere from $2.35 to $2.75, according to the district, and the quality. Eastern coals are almost impossible to get. Good splint block and Kentucky block are bringing anywhere from $4.50 to $5, mines. Pocahontas coal is practically impossible to get. Good third vein Pocahontas or New River is bringing around $5.50 to $5.75 for the prepared sizes and $4.25 for the mine-run. The anthracite people have discontinued taking business, having all they can do to fill the orders on their books.

It is thought that a short spell of cold weather will show the public just how serious the present coal situ-

COAL AGE

Volume 16 New York, October 23, 1919 *Number* 17

Coal Operators as Agents of the Public

By R. Dawson Hall.

MUCH like the rest of us, the coal operators are opportunists and often seek to avoid trouble by a somewhat too-ready compliance with unreasonable demand. When the mine workers approach them with a demand for a six hour day and a five day week, with a 60 per cent advance in wages, and accompany that demand with a threat that the mines will be nationalized if the operators resist, no wonder that some of them tend to weaken in their opposition and show a readiness to deliver over to the mine workers all that is demanded.

Every mine executive is, at first, disposed to fight the mine worker's program to the last ditch, still remembering the days when such resistance was extremely profitable because labor was not yet in the hands of a nation-wide trust. By getting a rate lower than that of his competitor, one operator could undersell the other. But with the advent of the labor unions everything has changed. Resistance now seems to some to be only a folly, a sacrifice to the public which the public has not sufficient clearness of vision to support by its sympathetic interest and approval.

The operator now sees that if he concedes what the mine worker demands the public will be obliged to pay the additional cost of production as the natural outcome of competitive conditions, while if he fails to make concessions and thus permits a nation-wide strike the government will step in and take away his property on the ground that the public must have coal.

The mine workers have well timed their trouble-making. They will strike on Nov. 1, when the consequences of the delay in buying coal and mending railroad cars begins to be keenly felt and when winter, with its sharp, frigid mornings, warns us of the danger of being insufficiently supplied with fuel.

The public has not shown any interest in its own defense, why should the operator put his property in jeopardy in defense of the careless public? If he concedes the wage increase he appears before the world as a generous paymaster; if he refuses it, he is to be rated as an inhumane niggard and his property seized by the state.

It is for the consumer to speak and speak plainly, for it is he who will pay the bill. In 1914, inside day labor at the mines was paid $2.84 per day of eight hours; on Nov. 1, 1919, that same labor is seeking to receive $8 per day of only six hours. Thus the pay to inside day labor at the close of 1919 would be 3-¾ times as much as in 1914, whereas the cost of living, which alone could excuse this increase, has advanced barely 75 per cent. But this is not all. The new way of reckoning what constitutes a day will make a further decrease in service and therefore a further advance in the cost of production.

In 1914 outside day labor got $2.24 per day of eight hours, and on Nov. 1, 1919, if it gets all its demands, it will receive $6.96 per day of six hours or 4 1-7 times as much as in 1914. The world is not growing in power of production as fast as these large increases of wage would seem to indicate. In fact, the men whose wage ambitions have been recorded are known to be actually less efficent than ever before.

Let the public show the operators that it stands firmly at their back in their defense of the cause of the public. Let public opinion everywhere announce that it will not for a moment suffer such unconscionable profiteering from any trust, labor or other. Firmly let the public declare that it will never, with the threat of nationalization of the industry, strike down the operator simply because he tries to perform his duty to society in resisting excessive wage advances and reduced working time.

Occurrence and Origin of Finely Disseminated Sulphur Compounds in Coal*

By Reinhardt Thiessen†
Pittsburgh, Penn.

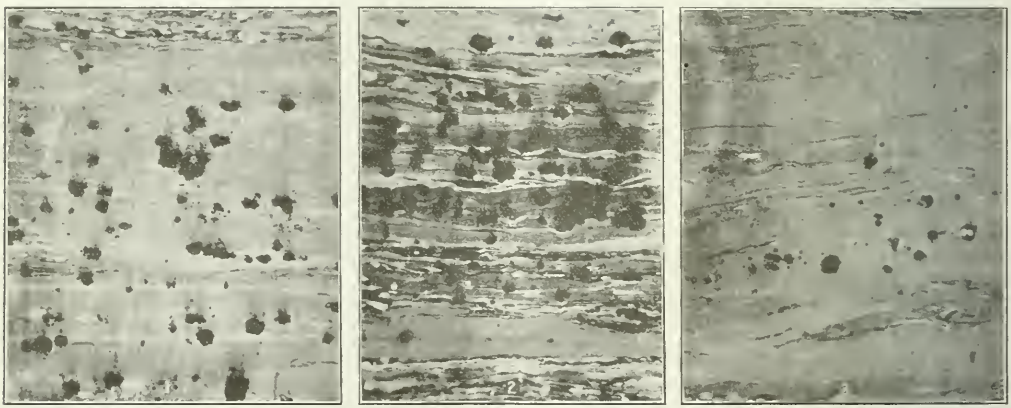
SYNOPSIS — *Sulphur occurs in coal as pyrite in two general forms—sulphur balls or lenses, and as minute particles scattered through the mass. All coals so far examined contain these microscopic particles. It would appear that their presence is due to the sulphur originally contained in the plant matter from which the coal has been evolved.*

UNDER sulphur in coal is usually understood that form of sulphur which is combined with iron and known as pyrite. It occurs in the form of balls, lenses, nodules, continuous layers, thin sheets, or flakes, both in horizontal planes and vertical cleavage fissures. But pyrites also occur as fine microscopic particles, or nodules, disseminated through the compact coal. This form has had but little consideration. Finally, there is sulphur in coal in an amicroscopic form (not visible with an ordinary microscope), probably combined with the organic matter that exists in the coal. This form has had considerable attention from a scientific standpoint, but has probably not been recognized sufficiently on the economic side. One or the other, or both, of these two latter forms may comprise the larger part of the sulphur content of coal, especially after it has been washed or otherwise prepared for use.

All coals that I have examined contained a varying amount of sulphur in very small globules, or particles, of pyrite. These particles are seen in a thin section as roughly rounded opaque dots (Figs. 1 to 10.) When isolated, they are generally shown to be approximately spherical in shape, with a rough outer surface. They vary in diameter from a few microns[1] to a hundred microns, the majority measuring from 25 to 40 microns; relatively few exceed the latter diameter. They are, therefore, extremely small objects. Their size is best appreciated by comparing the illustrations, in which they are shown at a magnification of 100 diameters, with some known area like the period used in the ordinary printed page. The period is about 0.6 mm. in diameter, and when magnified 100 times, will cover a circular area of about 2½ in. in diameter. Frequently a number of these particles are joined together in horizontal rows; occasionally, a number are grouped together into small lenticular masses or into irregular groupings. Occasionally a number have coalesced into one compact and irregular shaped mass.

During the process of preparing the coal sections, many of the globules break into innumerable small cubical fragments, which usually form a streak on either side of the globule. These are so small that it requires a very high magnification to distinguish one from the other. This is shown in almost all the illustrations, but particularly in Figs. 1 and 2.

The amount of pyrite in this form varies considerably in different beds from which coals have been examined and also in different samples from the same



FIGS. 1 TO 3. CROSS-SECTIONS OF COAL FROM INDIANA AND ILLINOIS

Fig. 1—Thin cross-section of coal from Vandalia mine No. 82, near Terre Haute, Ind., No. 5 bed, showing a thin layer of anthraxylous coal with numerous microscopic pyrite globules. Pyrites globules are shown black as irregular roughly rounded areas. Many have been partly broken and fragments, consisting of minute cubes, have been dragged to some distance over the section. Anthraxylon is that part of coal derived from parts of logs, stems, branches or roots. ×100. Fig. 2—Thin cross-section of coal from Vandalia mine No. 82, near Terre Haute, Ind., from strips of anthraxylon embedded in an attritus or debris. Black, roughly round areas represent microscopic pyrite grains; white irregular strips represent cuticles; and short linear patches represent spores. Tendency of pyrite globules is to form rows along thin strips of anthraxylon. Attritus is that part of coal derived from all sorts of macerated plant parts and plant products ×100. Fig. 3—Thin cross-section of coal from LaSalle, Ill., showing a thin layer of anthraxylous coal, including a number of pyrite globules. ×100.

*Paper presented before the American Institue of Mining Engineers, Chicago, September, 1919.

†Research Chemist, U. S. Bureau of Mines.

[1]A micron is a unit of length equal to 0.001 millimeter, or about 0.00004 inch.

bed, or even in different parts of the same section. A section without these pyrite particles is rarely obtained; so far, no regularity has been discovered. Some of the coals examined contained, on the whole, relatively large amounts, others only small amounts. There is more finely disseminated pyrite in the coal from the Vandalia mine No. 82, of the No. 5 bed, in Indiana, than in any of the other coals studied. Figs. 1 and 2 show common appearances. All sections of this coal contain scores of pyrite particles, and in some laminæ they are so numerous that it is impossible to cut sections. This finding is in harmony with the analysis of the coal from this bed, which shows from 2.46 to 4.21 per cent. of sulphur.

SULPHUR CONTENT OF ILLINOIS COALS

The Illinois coals from beds No. 6 and No. 2, containing from 0.50 to 6.79 per cent. sulphur, by analysis, as far as they have been examined, do not contain nearly as much pyrite in this form. Nevertheless, there is hardly a section made in which none is observed. As in the Vandalia coal, it is here irregularly distributed. Similarly, in some sections, the globules are so numerous that it is difficult to cut a satisfactory section from it. Normal appearances of some of the Illinois coals are shown in Figs. 3 to 5. Different coals from the different beds of Illinois have not been compared in this respect.

The coal from the Pittsburgh seam, analyzing from 0.78 to 2.83 per cent. sulphur, apparently, contains less pyrite in this form than the Illinois coals. It is of general occurrence, however, and, on the whole, an appreciable amount of the sulphur is present in this form of pyrite. A sample of coal examined from the Sipsey mine in the Black Creek Bed, Alabama, analyzing from 0.83 to 1.27 per cent. of sulphur, shows similar contents (Fig. 6.)

All the sub-bituminous coals and lignites examined from ground sections revealed globules of similar form and appearance. Fig. 7, of a sub-bituminous coal from Stone Canyon, California (4.48 to 4.95 per cent. sulphur by analysis), represents average conditions of the sections examined. Some of the samples of lignites were found to contain relatively large amounts of it. Fig. 8 shows less than the average conditions.

The largest number by far of the pyrite globules are found in the anthraxylon of the coal—that is, that part of the coal derived from the woody portions of plants—although a considerable number are distributed through the attritus, or débris. The pyrite globules are readily distinguishable from the resinous inclusions of the anthraxylon, in that the pyrite globules have a yellowish glistening appearance and are opaque, while the resinous inclusions are dull and are at the most slightly translucent. They are also distinguished from resinous globules by their outline, which is usually rough, or ragged, while the outline of the latter is usually smooth.

A certain amount of sulphur has been found to be present in coal in an amicroscopic form. Although, in certain samples, no sulphur can be detected ordinarily by the microscope, microchemical and qualitative chemical tests reveal sulphur. When such samples are burned, in some cases, their ashes show sulphur by microchemical tests. Also, recent observations and analyses of a large number of samples from different coals have shown that, in a number of cases, more sulphur is found than can be accounted for if this material were combined only with the minerals found in coal. This form of sulphur is probably that recognized as organic sulphur. Little or nothing is known of organic sulphur and it is not even positively known that sulphur exists in this form. But there are a number of observations on record that lead one to assume that it is present as such.

Prof. T. G. Wormley,[2] of the Ohio State Geological Survey, was apparently the first to call attention to the fact that many coals that contain but little iron have a large percentage of sulphur, a larger amount than could be accounted for if it were combined only with the iron found in the coal. His experiments go to prove that a large part of the sulphur found in coals exists as some organic compound, the exact nature of which he was not able to determine. A few years later a number of analyses made by Andrew S. McCreath[3] for iron and sulphur show that the sulphur in most cases is largely in excess of the amount required to convert the iron into iron pyrite. In only two instances did all the sulphur seem to exist as bisulphide of iron.

Kimball[4] a few years later reviewed the whole field of sulphur in coal, and concludes that some of the sulphur may be combined with the organic matter of coal, the same as it is supposed to be combined with rubber in vulcanized rubber. Drown, [5] in the effort to develop a better method for the determination of sulphur in coal than was in vogue at that time, incidentally observed, among other interesting results of his analyses, figures that led him to believe that sulphur must exist in coal as organic sulphur.

Little work has been done since on the organic sulphur in coal until recently, when the work was resumed in the coal laboratory of the Pittsburgh Station of the Bureau of Mines, as already referred to. At about the same time, the study was resumed in the Engineering Experiment Station, University of Illinois, by Parr and Powell,[6] with results that led to the conclusion that sulphur exists as organic sulphur in coal. It is, therefore, highly probable that sulphur, like nitrogen, is still present in organic compounds similar to those existing in living plants.

SOME DOUBT AS TO ORIGIN OF PYRITE

The origin of the pyrite in coal is a matter of much speculation. The consensus of opinion appears to be that it must have been deposited by circulating waters or by seepage through the superincumbent rocks. Both sulphur and iron are found in underground waters. If in the form of sulphates originally, the organic matter of the coal is supposed to have reduced them to sulphides. The possibility that the sulphur in coal may have had its origin through the plants that contributed to the coal appears to have received but little consideration, although some admit of the possibility.[7] That this is not improbable will be shown in the following consideration of sulphur in plants.

Sulphur is an essential element in almost all proteins

[2] Some Theoretical and Practical Conclusions on Coal. Geological Survey of Ohio (1873) 1, 360-364.

[3] Second Geological Survey, Pennsylvania, Report of Progress in the Laboratory of the Survey. M (1874-75) 30-32, and Report MM (1876-78) 123-126.

[4] *Transactions* (1880) 8, 181-204.

[5] *Transactions* (1881) 9, 656-663.

[6] A Study of the Forms in Which Sulphur Occurs in Coal. In Press. Engineering Experiment Station, University of Illinois.

[7] T. G. Wormley: *Op. cit.*
Editorial: Original Sulphur in Coal. *Coal Age* (1913) 4, 273-274; The Element Sulphur. *Coal Age* (1913) 4, 586.

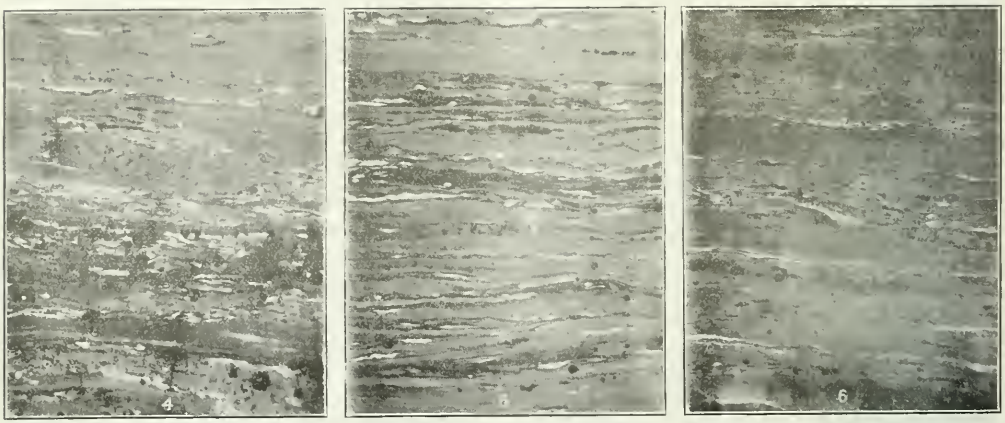
and proteins are essential to all living organisms—plants as well as animals. Being an essential element of proteins at once signifies its wide distribution and universal presence wherever there is life. Wherever there are, or were, peat-forming deposits there are, or were, living organisms; hence, wherever there are coal beds, whether lignites, sub-bituminous or bituminous, there was life and, therefore, proteins. The percentage of sulphur present in proteins may be small, but the universal presence of plants in large numbers and other living organisms, hence of proteins, must make the total amount of sulphur thus combined tremendously large. The proteins are, therefore, of great importance in the history and the chemistry of the sulphur found in coal.

Proteins are of such complex structure that their chemical investigation is a matter of extreme difficulty. Investigations are rendered even more difficult by the fact that, with a few exceptions, they do not crystallize, and cannot be distilled without decomposition. A number of groups of nitrogenous compounds are classed as proteins, making the number of proteins quite large; a few of the most important and best known are albumin, globulin, edestin, gladin and legumin. From a physiological standpoint, the proteins form well-defined groups, but from a chemical standpoint it is a difficult matter to define them exactly and to embrace each in well-defined limits. Although they may exhibit great differences in physical and chemical behavior, they do not differ much from one another in their chemical composition and the elements carbon, hydrogen, oxygen, nitrogen and sulphur, always present, vary only within small limits in the different ones, as shown in the following table: Carbon, 50 to 55 per cent.; hydrogen, 6.5 to 7.3 per cent.; oxygen, 19 to 24 per cent.; nitrogen, 15 to 17.6 per cent.; sulphur, 0.3 to 5 per cent. Some also contain from a trace to 0.5 per cent of phosphorus.

Different kinds of proteins from different sources give quite constant results within small limits. Albumin, for example, from a number of seeds and nuts was found to be similar in all cases and its composition was the same: Carbon, 51.25; hydrogen, 6.88; oxygen, 22.25; nitrogen, 18.69; and sulphur, 0.93. Other examples[5] are:

	Legumin of Pea, per Cent.	Edestin of Pea, per Cent.	Vignin of Cow Pea, per Cent.	Globulin of Cow Pea, per Cent.
Carbon	52.20	53.3	52.64	53.25
Hydrogen	7.03	6.99	6.95	7.07
Nitrogen	17.90	16.30	17.25	16.36
Sulphur	0.39	1.06	0.50	1.11
Oxygen	22.48	22.34	22.66	22.21

Although relatively little is known of the structure of the proteins as a whole, after many researches and investigations the conclusion has been reached that they are built up of a group of amino acids. In other words, the amino acids form the foundation of protein just as bricks form the walls of buildings. Cystin is the one responsible for the sulphur in proteins; its formula is $C_6H_{12}N_2S_2O_4$. By hydrolytic cleavage with mineral acids, the sulphur of the protein substance is regularly split off as cystin. The sulphur in this group is regarded as a derivative of hydrogen sulphide, since hydrogen sulphide and some methylmercaptan, CH_3SH, are split off in the putrefaction of proteins..[6]



FIGS. 4 TO 6. CROSS-SECTIONS OF COAL FROM ILLINOIS AND ALABAMA

Fig. 4—Thin cross-section of coal from Sesser, Ill., No. 6 bed, showing pyrite globules in dull coal, which here is composed of thin strips of anthraxylon and attritus; the latter includes spores, shown white. ×100. Fig. 5—Thin cross-section of coal from Shelbyville, Shelby County, Illinois. Pyrite globules are distributed through whole section; here and there, several have joined and others have coalesced. Globules are somewhat smaller than in other sections shown. ×100. Fig. 6—Thin cross-section of coal from Sipsey mine, of Black Creek bed, Alabama. Some pyrite globules have coalesced into lenticular masses, smaller globules are distributed through whole section. ×100.

While most of the sulphur in plants occurs in the proteins, a number of plant families contain other sulphur. In the mustard family, the sulphur is found both as nitrogenous substances, the oils of mustard, combined with glucose and other compounds to form glucosies, and as sulphides; while in the onion family, sulphur occurs only as sulphide.

Nine elements are regularly constituents of the ashes of plants—sulphur, chlorine, phosphorus, silica, potassium, sodium, calcium, magnesium and iron. Here and there a few other elements, like manganese and aluminum, are also present. The largest amounts of

[5]Thomas B. Osborn and George E. Campbell: Legumin and Other Proteids of the Pea and Vetch. *Journal* American Chemical Society (1896) 18, 583-609; (1897) 19, 494-500; (1897) 19, 509-513; (1898) 20, 348-375.

[6]Olof Hammarsten: Text-book of Physiological Chemistry. *Transactions* by John A. Mandel. Wiley, 1911.

sulphur are found in the ashes of plants or plant parts and organs rich in proteins, and in the ashes of the cruciferæ and the onions, rich in oils of garlic, oils of mustard and their glucosides. In the ashes of these plants, as high as 4 to 8 per cent. of sulphur are found, while the ashes of leaves contain usually from 1 to 2 per cent. of sulphur.

The wood of trees is generally low in ash content, but sulphur is a constant component in varying amounts. In some wood ashes it is found in considerable quantities; as in Prunus mahaleb or Maheleb cherry, 2.8 per cent. sulphur; Morus alba or white mulberry, 3.9 per cent. sulphur; and Pinus strobus or white pine, 3.7 per cent. sulphur. It should be noted in this connection that the percentage of sulphur in ashes is not a true index of the original content of sulphur in the plant from which they came, since a considerable part of the sulphur escapes during burning.

In a study of the sulphur in plants, it is necessary to make the deductions from the living plants, because it is only these whose chemistry can be studied. There is, however, every reason to believe that the chemistry of the plants of any geological period, whether of the Paleozoic, the Tertiary, the Cretaceous, or the Recent is the same. Paleobotany teaches that the plants of all ages, as far as can be learned from their anatomy, morphology and structure had the same kinds of organs, produced the same kinds of products and performed the same functions as those of today. The main difference in the plants of the different periods was that different phyla were represented more predominantly during the different times. During the Paleozoic times, the Lepidodendrons, the Calomites, and the Cycadophytes, plants to which the Lycopodiums or club-mosses, the Equisetums or horsetails, and the Cycads, respectively, of today belong, formed the bulk of the coal-forming plants.

PLANT FORMS HAVE SIMILAR CHEMISTRY

During Tertiary times, the Conifers or pines appear to have been the predominant coal-forming plants. Today both the conifers and the dictotyledonous plants—that is, the pines and ordinary leafy plants—are the peat-forming plants, while the horsetails and the club-mosses form but an insignificant part. A chemical study of all the different plants of the different phyla living today has shown that the chemistry of their products is similar. Cellulose, ligno-cellulose, protein, chlorophyl, etc., have a similar composition respectively, no matter in what plant they are found. There is, then, every reason to believe that the sulphur contents of the plants of any period were similar to those of the plants of today. It is also possible that certain plants of ancient times were particularly rich in non-protein sulphur, like the onion and the mustard families of today.

The sulphur in the higher plants must be taken in through the roots, or organs functioning as roots, as sulphates only. The sulphates may be in the form of calcium, magnesium and potassium sulphate. They must be reduced by the plant, but how and where this is done is not known. In the plant, sulphur is found chiefly as hydrogen sulphide derivatives, as in the cystin components of proteins and in sulphides, or sulphides combined with other substances in the form of glucosides. The plants must, therefore, carry out a sulphate reduction. The assimilation of hydrogen sulphide must proceed rapidly, since it is a violent and most destructive poison to protoplasm.

Proteins yield hydrogen sulphide on putrefaction; likewise plants containing sulphides or sulphides in glucosides yield hydrogen sulphide and some mercaptan. Proteins and glucosides are relatively easily decomposed, yet a considerable amount of sulphur may have been retained in the original tissue as organic sulphur probably still as a sulphide. This would be indicated by the fact that a large amount of vegetable matter escapes putrefaction, as in peat formation and in the large amount of well-preserved plant tissue found in coals and lignites. But neither H_2S nor the sulphur of the plant that has escaped putrefaction is available to plants; in fact, H_2S is a deadly poison to them. It is, therefore, of considerable importance to know how sulphur in this compound can again be made available for plants or, in fact, how any form of sulphur other than a sulphate may be made available. This is accomplished through the intervention of so-called sulphur bacteria, of which there are several quite well-known groups.

While hydrogen sulphide is a violent poison to higher plants, certain lower forms, both bacteria and fungi, may utilize it as a source of energy. Well-known forms are Beggeatoa, Thiophysa, Thiospirrillum and Thiothrix. Beggeatoa is the best known because of the studies of Winogradsky who finds that this organism occurs in all swamps in which the water and soil contain enough sulphates or hydrogen sulphide. The sulphate, however, must be reduced by means of putrefaction to H_2S before it is available; this is accomplished by any plant during its life and decay. It also lives abundantly in sulphur springs. H_2S is first oxidized to elementary sulphur, which is deposited in the protoplasm as amorphous sulphur, seen as highly refractive inclusions in the protoplasm. This sulphur is gradually oxidized in the organism to H_2SO_4. There take place, therefore, two reactions within the body of Beggeatoa, which may be expressed thus:

$$2H_2S + O_2 \rightarrow 2H_2O + S_2$$
$$S_2 + 3O_2 + 2H_2O \rightarrow 2H_2SO_4.$$

The sulphuric acid set free combines at once with carbonates to form sulphates. These may be calcium sulphate, sodium sulphate, potassium sulphate, or magnesium sulphate, and perhaps iron sulphate, all of them available to the plant for another cycle. By this means, Beggeatoa derives its energy. In order that they may thrive, a constant supply of H_2S is necessary, which substance is usually furnished by decomposing vegetable matter. When the supply is plentiful, grains of sulphur are deposited in the protoplasm of the bacteria; when the supply is scarce, they are dissolved and oxidized to H_2SO_4. A proper supply of oxygen is necessary for both processes. Thiothrix is a sessile form, whose habits and character are similar to Beggeatoa.

RED SULPHUR BACTERIA IS PRESENT

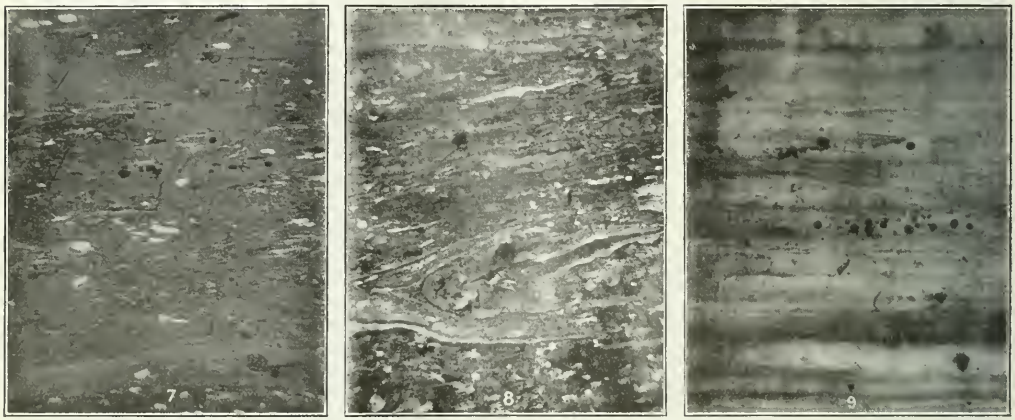
Other forms are the so-called red sulphur bacteria. These possess a red pigment, called bacteriapurpurin, which possibly has a function similar to that of chorophyl in green plants. These bacteria can live in water rich in H_2S, and, in fact, are not killed in concentrated solutions of it. They are anaerobic. According to Winogradsky, they always live in company with other organisms containing chlorophyl, and hence are able to decompose CO_2. The oxygen thus set free is available for the oxidation of H_2S to sulphuric acid.

The present state of our knowledge may be sum-

marized as follows: Plants contain sulphur largely in the form of proteins and during putrefaction sulphur is set free as hydrogen sulphide, a form that cannot again be directly utilized by plants; sulphur bacteria, on the other hand, oxidizes it to sulphuric acid, which immediately attacks the carbonates and changes them to sulphates. It is possible that other chemical reactions are going on without the intervention of bacteria. Hydrogen sulphide, in the presence of water in which any of the heavy metals are dissolved, will be precipitated as a sulphide, which may readily be oxidized to a sulphate. Ferric sulphate may be directly reduced by hydrogen sulphide to ferrous sulphate with a simultaneous precipitation to sulphur, and a further reaction of hydrogen sulphide, sulphur and ferrous sulphate slowly gives rise to ferric disulphide or pyrite. This reaction may be represented by the equation $FeSO_4 + H_2S + S = H_2SO_4$.[10] But whether such reactions could take place under such strongly reducing conditions as exist in the peat bogs is doubtful.

of sulphur. Chemical analysis of peats from many sources show all the way from 0.29 to 4.21 per cent. It is, therefore, not far different from the nitrogen content. Iron is also invariably present in peat.

In previous studies on peats, lignites, sub-bituminous and bituminous coals, it has been shown that there is a continuous loss of cellulose substances and a relative concentration of resin, resin waxes and waxes. It is a difficult matter to make fair estimates as to how much of the original peat deposit has disappeared during the transformation from peat to coal. But observations made on the anthraxylon components—that is, components derived from wood in bituminous coals—show that these have been compressed or reduced to one-tenth to one-fortieth of their original mass. Let it be assumed that they have suffered a reduction to only one-tenth of their original mass, which is a conservative figure. Let is also be assumed that none of the sulphur contained in the peat bog has been removed, which is a fair assumption, since the consensus of opinion is that



FIGS. 7 TO 9. CROSS-SECTIONS OF COAL FROM CALIFORNIA, MONTANA AND WISCONSIN

Fig. 7—Thin cross-section of sub-bituminous coal from Stone Canyon, Contra Costa County, California. Coal shown consists of rather finely macerated woody matter, including resinous particles and cuticles, besides pyrite globules, shown in black. ×100. Fig. 8—Thin cross-section of lignite from Montana. Section shown consists of macerated woody matter and other plant debris, including some spore and cuticular matter. Only two pyrite globules are shown. ×100. Fig. 9—Thin section of woody peat, into minute cubical fragments. ×100.

Sulphates are generally detected in peat, especially in the upper strata, by microchemical tests; in many instances they are present in relatively large amounts. Calcium sulphate appears to be the chief one in the peat bogs investigated. When peat is permitted to dry very slowly, calcium sulphate crystallizes out, in certain cases in relatively large quantities.

Sulphur is present in these bogs, irrespective of the horizon from which taken, whether from near the surface, halfway down, or at the bottom of a bog 10 to 12 ft. deep. Since the plants growing in a bog, in dense and luxuriant masses, subsist on the residue of the plant growth that preceded them, it is evident that the plants now living in the bog are not able to take in nearly all the sulphates contained in the deposit. There is, therefore, by far more total sulphur in the bog, in both the dead-plant and the living-plant matter than is needed for the cycle. There is thus an accumulation of sulphur. The peats upon which most of these investigations are based contain from 0.89 to 1.63 per cent. all the sulphur contained in coal has been carried into the deposit from the outside. There could, therefore, not have been a loss. There are found in peats, according to the figures given above, from 0.29 to 4.21 per cent. of sulphur. If there were then only a reduction to one-tenth of the original mass, and no loss of sulphur, there would be from 2.9 to 42.1 per cent. of sulphur in the resulting coal. There is more than enough sulphur in peat to account for all the sulphur in coal.

Peats contain pyrite in the same form as found in the coals. As shown in Figs. 9 and 10, the pyrite nodules in peat are lenticular to spherical in form, with a rough surface, and often several are grouped together in a manner similar to the coal pyrite. They break up into minute cubes when the microtome knife strikes them in making the section.

Although the pyrite globules have not been investigated completely, their origin is of enough importance to be briefly considered. In samples of fresh woody peat are found numerous organisms living in the wood fibers or wood cells. They are stained brilliantly red by safranin, and are clearly differentiated from the

[10] E. T. Allen: Sulphides of Iron and Their Genesis. *Mining & Scientific Press* (1913) 103, 413-414.

peat substance, since resinous and dead peat matter do not take this stain well. They are, in general, of a spherical form and vary greatly in size within certain limits, but are not much larger than 30 or 40 microns.

Besides a transition in size, transitions in certain physical characters are noted. In color, they range from light pale yellow, through yellow, light brown, brown, dark brown, to black; simultaneously with the color, they range from transparent to opaque; and parallel to this there is a transition in staining qualities, from a stage in which they take a bright stain through stages in which the staining quality fades away together with an increase in natural color to a point where they are black and opaque, and where they will not take a stain. These stages of the various characters and qualities indicate that they represent different stages in the age of the organisms. Often all the stages may be observed in the same section or preparation. The black opaque stage, and the one that will no longer

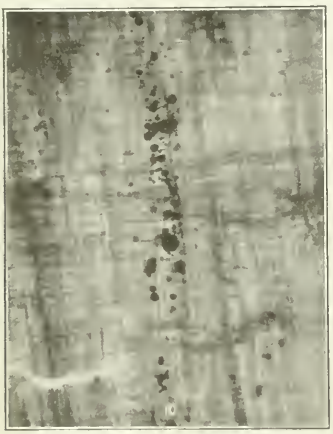


FIG. 10. CROSS-SECTION OF COAL FROM WISCONSIN

Thin section of woody peat taken from peat bog near Hayton, Wis., showing considerable number of pyrite globules lodged in wood fibers. It will be noticed that they are strung out in cavities of wood fibers.

admit of a stain, is the one that will break into minute cubes, and is the stage recognized as pyrite globules.

The organism is of the plasmodium type, and has been obtained, up to a certain stage, in pure cultures in proper culture solutions under anaerobic conditions. These organisms are evidently either sulphur bacteria or iron bacteria. Their study has not been completed and many points in their history and behavior have not been satisfactorily cleared up. They require further study, and the observations made on them need further verification.

There are then disseminated through the peats pyrite globules of microscopic size similar in appearance, form, and behavior to those in the coals; similar pyrite globules are disseminated through the lignites and the sub-bituminous coals. They can be traced clearly from the peats to the bituminous coals in a continuous chain. On those found in the peats, there appears to be evidence that they are of organic origin. There is, therefore, reason to assume that they are of the same origin in the lignites and the sub-bituminous coals, the next steps above peat in the succession of coal formation. If this is correct, then there is every reason to believe that those in the coals are of the same origin.

All the coals that have been examined microscopically contain microscopic grains of pyrite disseminated through them. These are distributed irregularly and usually occur in colonies. Different coal seams vary in the total content of this form of pyrite; different horizons differ in the total content; and different parts of a section may differ widely in the number of globules present.

The majority of the globules are roughly spherical in form with a rough surface. They readily break into numerous minute cubes. Coals also contain amicroscopic sulphur, probably as organic sulphur. Although the presence of organic sulphur has been known for a long time its chemical form is not known.

SULPHUR PRESENT IN PLANT FORMS

Plants contain sulphur in two forms; as a component of proteins and as non-protein sulphur. The sulphur in proteins is universally present in all plants while the other form occurs only in certain families, but in some of these it occurs in relatively large amounts. On decomposition, the sulphur in plants is set free mainly as hydrogen sulphide.

The sulphur is taken in by the higher plants as a sulphate; hydrogen sulphide is not available and must first be oxidized to a sulphate. Hydrogen sulphide may be oxidized under strongly reducing conditions through the agency of sulphur bacteria, resulting in sulphates. All plant ashes contain some sulphur.

Sulphur is present in peat bogs from 0.29 to 4.21 per cent. Calcium sulphate often crystallizes out when peat is dried slowly. Peats contain pyrite in the form of microscopic grains, similar to those found in the lignites, sub-bituminous and bituminous coals. There is evidence to show that the pyrite grains in peat are of organic origin.

The reasoning on the origin of sulphur in coal applies to microscopic pyrite and organic sulphur; lenses, balls, and sheets of pyrite may have a secondary origin.

I am deeply indebted to A. C. Fieldner, supervising chemist of the Pittsburgh Experiment Station of the Bureau of Mines, for valuable suggestions and assistance in the work here described.

Successful Accident Prevention

That accidents can be reduced by precaution has been proved by the United States Steel Corporation from 1907 to 1918. That company estimates that the precautions instituted saved from serious injury in 1918 a total of 3094 persons who would have been injured if the physical and moral hazards had continued as they were in 1906. The saving in serious accidents from 1907 to 1918, both included, as estimated on the basis of the loss in 1906, totals 22,909.

With such a saving in accident who shall say that safety work does not pay big dividends in human happiness, steady production and lowered accident rates, the first being by far the most important of all profits? The showing would have been far more favorable than it is had the old method of computing the seriousness of accidents been maintained. But on Jan. 1, 1911, a thereafter a new classification of serious accidents was inaugurated, more accidents being reported and classified as serious than was formerly the case. This accounts for a slight increase in the accident in 1911 and the two following years.

Coals of Ohio and Their Limitations for Byproduct Coke*—I

By Wilbur Stout†
Columbus, Ohio

IN OHIO, the annual output of coke made from native coals has averaged not more than 70,000 tons, or about enough to run a 200-ton blast furnace. Raw coal locally mined from the Sharon, or No. 1, bed was used for iron smelting in Mahoning furnace at Lowellville, Mahoning County, as early as 1846. This practice was continued in the Youngstown district until the coal became scarce and the Connellsville coke more popular. At present, the Sharon bed contributes a part of the fuel for the production of ferrosilicon iron at Jackson, Jackson County. However, coke from other states still has the preference.

> The need for local coking coal in Ohio is urgent. The quantity of coal available for this purpose is large, but the quality is in general below the standard for coke making. Three beds, however, offer possibilities, and if these fuels are mixed with high-grade coals from other states a coke would result that would embody decided commercial possibilities.

In this state, coke, on a commercial basis, was first made in Jefferson County probably about 1861 or 1862. The coals used were the Steubenville Shaft, or Lower Freeport, and the Strip Vein or Middle Kittanning. The practice, however, was discontinued before 1880 because of the competition of superior foreign cokes. Beehive ovens, later built at Leetonia, Columbiana County, were operated for only a few years; the coal used at this place is the Lower Kittanning or No. 5. In a desultory way, slack from Pittsburgh coal has been coked at a few places in eastern Ohio, and attempts, either for experimental or for commercial purposes, have been made in other parts of the state. Small quantities of coke were made from the Upper Freeport coal at Salineville. Columbiana County, and near Nelsonville, Hocking County; the results were poor. Tests were made of the Middle Kittanning coal near Zanesville, Muskingum County, at Moxahala Furnace, Perry County, and at Washington Furnace, Lawrence County; the cokes were all high in sulphur and ash. Attempts were made to coke the Clarion coal at Vinton Furnace, Vinton County; a small battery of molding ovens and a pile of high-sulphur coke yet remain to tell the story. The Pittsburgh coal was coked on a commercial scale at Utley and at Lathrop, Athens County, but the operations were not successful and were soon abandoned.

These failures and indifferent successes are not to be attributed to a lack of demand for a first-class coke, as Ohio has held a commanding place for many years in iron smelting; nor do they arise from a deficiency of coals, as the state has a vast reserve of such material. They are to be described to the inferior quality of the native product offered to the trade. The cokes were too high in ash and sulphur or were wanting in structure. Some of the purest coals have but little cementing properties whereas others with high sulphur and ash have, at least, fair bonding proclivities. Further, Ohio coals are all high in moisture and volatile matter and, therefore, give low yields of coke. Broadly speaking, this state has no coals available in large quantities and at a low cost that will make a first-class coke in the beehive oven.

The introduction of the retort oven, however, has changed the situation somewhat. Coals not successfully coked in the beehive oven may make a fair product in the byproduct oven. Furthermore, mixtures of coals often give good results. Besides the coke, other products of value are also obtained and the yield of these is high with the highly volatile coals. In this state, the future prospects are good for the sale of the excess oven gas for domestic and industrial purposes as the supply of natural gas seems near exhaustion. The byproduct oven is a profitable investment in Ohio as attested by the number that have been built and are now under construction. These plants are widely distributed over the state, the kinds and locations being given in Table I.[1] Besides, there was under construction by the Domestic Coke Corporation, Cleveland, a 60-oven plant, of the Semet-Solvay type, with an annual coke capacity of 311,000 tons.

TABLE 1. BYPRODUCT COKE PLANTS IN OHIO, JAN. 1, 1919

Name of Company	Number of Ovens	Kind of Oven	Annual Coke Capacity
Cleveland Furnace Co., Cleveland	100	Semet-Solvay	337,500
Republic Iron and Steel Co., Youngstown	134	Koppers	744,600
Youngstown Sheet and Tube Co., Youngstown	306	Koppers	1,425,000
Toledo Furnace Co., Toledo	94	Koppers	408,600
United Furnace Co., Canton	47	Koppers	204,400
Hamilton Otto Coke Co., Hamilton	100	Otto	168,000
River Furnace Co., Cleveland	204	Koppers	960,000
LaBelle Iron Works, Steubenville	94	Koppers	445,000
Brier Hill Steel Co., Youngstown	84	Koppers	379,000
Portsmouth-Solvay Co., Portsmouth	108	Semet-Solvay	559,000
National Tube Co., Lorain, O	208	Koppers	850,000
Ironton Solvay Coke Co., Ironton	60	Semet-Solvay	311,000
American Steel and Wire Co., Cleveland	180	Koppers	750,000
Dover Byproduct Co., Dover, Ohio	24	Roberts	100,000

These operations are all successful, although they are handicapped through having to haul their coals from points in Pennsylvania, West Virginia, and eastern Kentucky. When the additional expense of transporting coke over coal is considered, but little lowering of cost is gained by placing the ovens in the coal fields; moreover, the products are not there readily handled. In none of these plants have Ohio coals been used regularly, even as a part of the charge, except in the Roberts ovens at Dover. The only byproduct plant in Ohio using local coal exclusively is at Tunnel Hill, Coshocton County, which has been in operation about three years. In this a cannel coal obtained from the hills nearby is coked chiefly for its coal-tar products, the yield of which is high. The coke produced is not of metallurgical quality.

The chief coal-bearing rocks of Ohio are of Penn-

*First installment of a paper presented before the Chicago meeting of the American Institute of Mining Engineers, September, 1919.

†Assistant State Geologist.

[1]List furnished by M. J. Tucker, Librarian, *Iron Trade Review*, Cleveland, Ohio.

sylvania age, although the deposits laid down during Dunkard time contain a few thin beds of low-grade fuel. The total thickness of such strata is, approximately, 1500 ft. Of this, not to exceed 70 ft. is coal, much of which is found in beds too thin to be of value except for local domestic purposes. The coal fields lie in the eastern and southeastern parts of the state and have a total area of over 10,000 square miles. The Pennsylvania system is divided into four formations, the Pottsville, Allegheny, Conemaugh and Monongahela; and the Dunkard series into two, the Washington and Green. These formations are further subdivided into

TABLE II. STRATIGRAPHIC RELATIONS

	Formation	Member	General Description	Thickness Ft.	Thickness In.
Dunkard Series	Washington	Washington "A"	Coal, thin, unsteady	2	0
			Interval	60	0
		Washington	Coal, persistent, shaly	5	0
			Interval	65	0
		Waynesburg "A"	Coal, impure, rather steady	2	0
			Interval	38	0
Pennsylvania System	Monongahela	Waynesburg, No. 11	Coal, persistent, shaly	3	0
			Interval	60	0
		Uniontown No. 10	Coal, locally developed	3	0
			Interval	107	0
		Meigs Creek, Sewickley, No. 9	Coal, persistent	4	0
			Interval	34	0
		Pomeroy, Redstone, No. 8a	Coal, locally developed	4	0
			Interval	30	0
		Pittsburgh, No. 8	Coal, persistent	5	0
			Interval	188	0
		Harlem	Coal, persistent, but thin	1	6
			Interval	28	0
		Barton	Coal, thin, unsteady	1	0
			Interval	29	0
		Anderson	Coal, persistent, thin	2	0
			Interval	23	0
	Conemaugh	Wilgus	Coal, locally developed	3	0
			Interval	56	0
		Mason	Coal, unsteady, thin	1	0
			Interval	30	0
		Mahoning	Coal, persistent, usually thin	1	0
			Interval	37	0
	Allegheny	Upper Freeport, No. 7	Coal, locally developed	5	0
			Interval	45	0
		Lower Freeport, No. 6a	Coal, unsteady, usually thin	3	0
			Interval	41	0
		Middle Kittanning, No. 6	Coal, persistent	4	6
			Interval	31	0
		Lower Kittanning, No. 5	Coal, locally developed	3	0
			Interval	27	0
		Clarion, No. 4a	Coal, unsteady	3	6
			Interval	24	0
		Brookville, No. 4	Coal, thin, unsteady	3	0
	Pottsville	Tionesta, No. 3b	Interval	22	0
			Coal, usually thin	4	0
			Interval	17	0
		Bedford	Coal, unsteady, in places cannel coal	2	0
			Interval	14	0
		Upper Mercer, No. 3a	Coal, unsteady	3	0
			Interval	36	0
		Lower Mercer, No. 3	Coal, thin, unsteady	2	6
			Interval	74	0
		Quakertown, No. 2	Coal, locally developed	3	0
			Interval	87	0
		Sharon, No. 1	Coal, unsteady	3	0

members. The chief stratigraphic relations are shown in Table II, in which the average thicknesses of the coals in the main fields and not for the total area are given. The intervals separating the beds are normal for the state.

The Pottsville, the oldest formation in the Pennsylvania system, extends southward from Trumbull and Geauga Counties, on the north, to the Ohio River, on the south, in Scioto and Lawrence Counties. The belt varies from 10 to 40 miles in width but averages only about 15 miles. This formation is nearly 250 ft. thick and contains at least ten well-defined coal beds, of which, however, only four have been mined for railroad shipment; in fact, only two beds have been extensively worked. In general, the quality of the Pottsville coals is excellent, but they have little coking properties.

Sharon or No. 1 Coal.—The Sharon, or No. 1, coal, lies on or not far above the Sharon conglomerate, the basal member of the Pottsville formation. Its position is also about 90 ft. below the Quakertown, or No. 2, coal. It is confined to two small areas, one in the northern part of the state, centering around Massillon, Stark County, and the other in the southern part, lying near Jackson, Jackson County. In these fields, the bed is broken into somewhat isolated and irregular pockets, which causes trouble and expense in mining. The Massillon is by far the larger and more important area and embraces parts of Stark, Wayne, Summit, Portage, Medina, Mahoning and Tuscarawas Counties; only a small part of the area, however, contains coal. At present the field is only a small producer, as much of the coal has been exhausted. This fuel was formerly used quite extensively in the raw state for iron smelting in the Youngstown district. The following section is about typical for the bed:

	Feet	Inches
Shale and sandstone	30	0
Coal, Sharon	4	6
Clay, siliceous	4	0
Conglomerate, Sharon	30	0

Where present, the thickness of the Sharon coal varies from 1 to 7 ft., but the usual measurement is between 3 and 5 ft. The bed is not regularly separated into benches by partings but in places it contains thin layers of bony material. Sulphur balls are uncommon. The roof is shale, strong and durable, and the floor is a siliceous clay, well able to support the weight of the overburden. Under such conditions a high yield of fuel is obtained from a given area. The average quality of the coal is shown by the following analysis: Moisture, 5.52 per cent.; volatile matter, 37.60 per cent.; fixed carbon, 52.84 per cent.; ash, 4.04 per cent.; sulphur, 1.17 per cent. In parts of the field, the sulphur is considerably below 1 per cent. The moisture, volatile matter and fixed carbon are rather constant and the ash seldom exceeds 6 per cent. The coal is open-burning and non-cementing and therefore not fitted for coke making. Moreover, the yield in the byproduct oven would be low.

In the Jackson district, the Sharon coal is confined to parts of Scioto, Liberty, Coal, Washington and Jackson townships, Jackson County and to Marion, Beaver and Jackson townships, Pike County. The total area is approximately 28 square miles of which not more than 15 square miles is left for future consumption. This is so broken, however, that but little of it could be mined in a large way. The following section is representative of the coal worked at present:

	Feet	Inches
Shale	20	0
Coal, good	2	9
Coal, bony (Sharon)		2
Clay, siliceous	1	0
Conglomerate, Sharon	40	0

The Sharon coal in the Jackson district varies from 2 to 5 ft. in thickness but averages close to 3 ft. The conditions for mining are good except that the coal lies on the uneven floor of the Sharon conglomerate and therefore contains rolls and dips. The composition is as follows: Moisture, 8.20 per cent.; volatile matter, 32.88 per cent.; fixed carbon, 52.55 per cent.; ash, 6.37 per cent.; sulphur, 0.49 per cent. The Sharon coal in the Jackson district contains less sulphur than any other coal in the state and on this account it has been

regularly used for many years for iron smelting. The ash is clay-like in character and in local areas of the field is high. The coal is non-coking and in every respect similar to the Massillon.

The unfortunate thing is that the supply of Sharon coal in either the Massillon or the Jackson district is scarcely sufficient to warrant the establishment of important works. Mixtures of this coal with a high cementing coal, for example standard Connellsville from Pennsylvania, should give a product of metallurgical quality. A half-and-half mixture of these two coals should give a yield of approximately 62.24 per cent. coke,[2] having an analysis about as follows: Volatile matter, 1.61 per cent.; fixed carbon, 89.56 per cent.; ash, 8.83 per cent.; sulphur, 0.90 per cent. No tests, however, have been made with such a mixture of coals to determine the yield and structure of coke. The results may be unsatisfactory.

MAP SHOWING COAL MEASUREES BY COUNTIES

Quakertown, Wellston, or No. 2 Coal.—In ascending order, the next coal of importance in the Pottsville formation is the Quakertown, or No. 2, which is also known as the Wellston and Jackson Hill coal. It lies on the average about 90 ft. above the Sharon coal and nearly 100 ft. below the Lower Mercer limestone, which is a useful bench for reference. This coal is confined to two small areas in southern Ohio, one around Wellston, Jackson County, and the other near McArthur, Vinton County. The Wellston field, which has been worked since 1872, is by far the larger. The total area of the field is nearly 40 square miles, but not more than 15 square miles remains for future mining. In the part first worked, but now practically exhausted, the bed is 3 ft. to 4 ft. 6 in. thick, but in that now mined it will not average over 2 ft. 6 in. For domestic purposes, this fuel has had a wide reputation for many years. The quality of the coal is shown by the following analysis: Moisture, 9.29 per cent.; volatile matter, 32.96 per cent.; fixed carbon, 54.26 per cent.; ash, 3.49 per cent.; sulphur, 1.25 per cent.

The bed is quite free from shale or clay partings and from nodular pyrite. The roof is a tough shale and the floor a siliceous clay, both favorable for high yields in mining. For a thin coal, all the mining conditions are excellent. In the McArthur field, the members average about 3 ft. in thickness but the known area is only a few square miles. The quality of the fuel is excellent, being low in both sulphur and ash.

The Quakertown is one of the purest coals in Ohio and the structure of the bed is such that but little extraneous material is introduced into the fuel in mining. It is a free-burning, non-cementing coal and therefore is not suited for coke making. The cost of mining a thin bed and the small supply now known are also conditions unfavorable even for using it as a part of the burden. The Quakertown coal must be excluded from the list for making byproduct coke.

Lower Mercer, No. 3, Coal.—The lower Mercer, or No. 3, coal lies from 10 to 30 ft. below the Lower Cercer limestone and is unsteady in its extension across the state, being wanting in many places. Where present it is usually thin, seldom expanding to as much as 3 ft. In general the quality of the fuel is poor, as it is high in sulphur and ash. In a few places, cannel coal is present on the horizon. The Lower Mercer member has furnished no coal for railroad shipment and only small quantities even for local domestic purposes.

Upper Mercer, No. 3a, Coal.—The normal position of the Upper Mercer, or No. 3a, coal is about midway in the interval between the Lower Mercer and the Upper Mercer limestones. In the southern part of the state, the member is present with some regularity but in the central and eastern parts it is more uncertain. The thickness of the bed is seldom as much as 3 ft. and usually is below 2 ft. The quality of the fuel is generally good, as it is low in sulphur and ash. The Upper Mercer coal has been mined only for local domestic purposes.

Bedford Coal.—The Bedford member, also belonging to the Mercer group of coals, lies directly, or at most only 1 ft. or so, below the Upper Mercer limestone. It is unsteady in extent and thickness and variable in composition and structure. It is found in local areas

[2] In calculations used in this paper involving Pittsburgh, or No. 8, coal from Pennsylvania its composition is assumed to be as follows: Moisture, 2.6 per cent.; volatile matter, 31.8 per cent.; fixed carbon, 58.64 per cent.; ash 6.96 per cent.; sulphur, 1.08 per cent. The yield in coke in the byproduct over is considered to be the fixed carbon plus the ash plus 1 per cent. for unexpelled volatile matter and deposited carbon from dissociated paraffins. The loss in sulphur is taken to be one-half or one atom of sulphur split off from the pyrite molecule.

in Muskingum, Licking, Coschocton, Tuscarawas, Holmes, Stark and Mahoning Counties. The best known field is in Bedford Township, Coschocton County, where it has excellent thickness over a few square miles and where it is represented by both cannel and bituminous coal. The thickness varies from 3 to 9 ft. but averages about 5 or 6 ft. The following section taken near the village of Mohawk, Coshocton County, shows the stratigraphic relations:

		Feet	Inches
Flint, gray, calcareous	Upper Mercer	1	3
Shale		0	2
Limestone, gray, shaly		2	2
Shale, gray		2	8
Flint, black		1	9
Coal, bituminous, with bony partings	Bedford	2	2
Coal, cannel		5	6
Shale and covered		14	0
Limestone, Lower Mercer		3	6

The bituminous coal occurring with the cannel is usually of poor quality as it is high in ash. The mining conditions are good. The quality of the cannel coal is shown by the following analysis: Moisture, 2.35 per cent.; volatile matter, 47.05 per cent.; fixed carbon, 37 per cent.; ash, 13.60 per cent.; sulphur, 2.33 per cent. At present this coal is coked by one plant chiefly for its coal-tar products; the coke is not of metallurgical quality.

Tionesta, No. 3b, Coal.—The Tionesta, the highest coal bed in the Pottsville formation, lies about midway in the interval between the Upper Mercer and the Putnam Hill limestones. It is unsteady, appearing in workable thickness only in small isolated areas across the state. The larger of these are found in Scioto, Jackson, Vinton, Tuscarawas and Stark Counties. In the best developed areas, the bed is from 3 to 6 ft. thick and is usually broken by one or more partings. At present, this coal is mined for railroad shipment only near McArthur in Vinton County. The section here follows:

		Feet	Inches
Shale, calcareous, fossiliferous		10	0
Coal, part bony	Tionesta	1	4
Clay		0	7
Coal, part cannel		3	8
Clay, siliceous		4	0

The Tionesta coal is usually high in ash that is clay-like in character. It is a free-burning fuel with little cementing qualities and therefore not suitable for coke making. Furthermore, the areas in which the coal has workable thicknesses are too small to yield the large quantities of fuel demanded for byproduct ovens.

(*To be Concluded*)

Two Blasting Cap Accidents

On Dec. 12, 1918, Jesse Mack, a coal loader, handed the shotfirer two electric blasting caps. As the latter was untwisting them, by pulling the wires through his hands, they exploded and the end of one of the caps struck Jesse in the eye, causing him to lose his eye.

On Apr. 16, 1919, Constanti Augustine was straightening out the wire on an electric blasting cap by holding the cap in one hand and pulling the wires through the other when the cap exploded, seriously injuring two of his fingers.

This second accident, quite similar to the first and apparently unexplainable, caused a careful investigation to be made of electric blasting caps and brought out the fact that a certain percentage of them could be made to explode by holding the cap and giving a vigorous jerk on the wires that entered it.

It has been a common practice for men to hold caps in one hand and straighten the wires by pulling them through the other hand. This has been proved by the recent tests to be a dangerous practice. Stop doing it, or you will blow off a finger.

In some of the caps these wires are not firmly sealed and a vigorous pull causes them to slip inside the detonator. The fulminate of mercury with which the cap is loaded is so sensitive that the slight slippage of the wire inside the charge causes the detonator to explode.

Straighten out the wires on electric blasting caps carefully by first untwisting them, then by holding the wire in one hand some distance from the cap you can pull the remainder of the wire through your other hand and thus remove the bends and kinks.

Electric blasting caps are perfectly safe if carefully handled, but they are filled with an exceedingly sensitive explosive and must never be roughly treated.—*Mutual Monthly Magazine of Consolidation Coal Company.*

Seek Additional Appropriation for Collection of Coal Statistics

One direct effect of the Senate investigation of the coal situation has been to call nation-wide attention to the parsimony of Congress in withholding the appropriations for coal statistics. A strenuous effort was made earlier this year by Dr. George Otis Smith, the Director of the Geological Survey, to secure an appropriation to continue the more important statistics gathered by the Fuel Administration. The request was refused by the Appropriations Committee.

One of the first things which developed during the coal investigation was that neither the Railroad Administration, the coal operators nor the consumers had any definite idea as to the amount of coal in storage or of the amount which probably would be consumed during the coming winter.

At the request of Chairman Frelinghuysen of the special committee investigating coal, the Secretary of the Interior has approved a supplemental estimate for $40,000, "for the collection by the U. S. Geological Survey of additional statistics of coal and coke production, distribution and consumption, including a special inventory of present stocks of coal and requirements for the winter of 1919-20."

The first deficiency bill already has passed the House but it is the intention, however, of amending the bill in the Senate so as to provide for the additional statistics.

To prevent interruption of rescue work following a mine disaster and to keep unauthorized persons from entering the mine or shaft, guards should be stationed at each opening and each opening should be roped off. It should be the duty of the guards to see that no person enters any opening with an open-flame lamp or without an official pass in the form of a check bearing a number. Records of these checks should be kept by clerks stationed near the mine entrance.—*Rescue and Recovery Operations in Mines.*

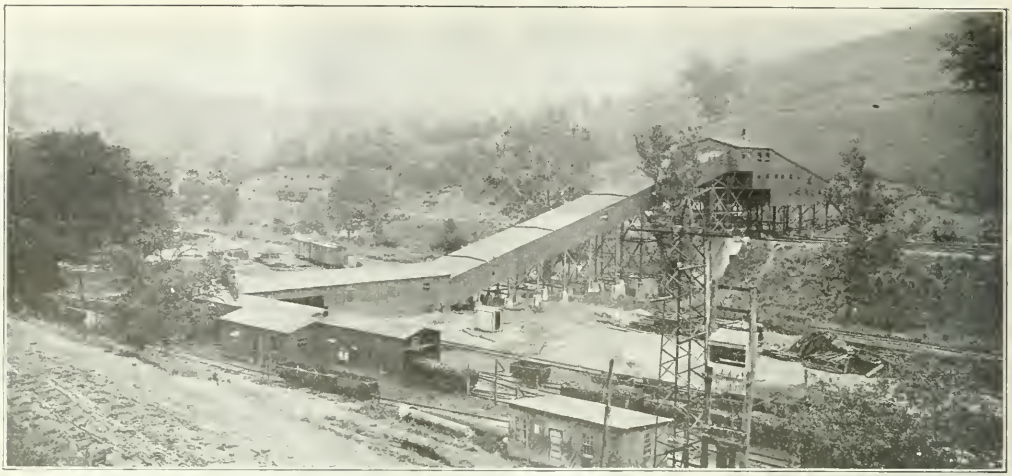


FIG. 1. GENERAL VIEW OF THE TIPPLE

New Coal Tipple of the Consolidation Coal Company

Built of Steel. It Embodies Many Modern Ideas in Respect to Safety, Simplicity and Efficiency

By William Brasack
Fairmont, W. Va.

Prepares coal from three drift mines, and the ultimate capacity will be 5000 tons per day. The equipment is installed in duplicate, consisting of two equal and similar halves, only one of which is now working. The installation will be made in the second half when the output of the mines served renders this necessary. The design of the tipple is such that any combination of sizes of prepared coal may be loaded either separately or in combination.

THE Consolidation Coal Co. recently completed a new and modern steel tipple to handle the output of three new mines known as Nos. 88, 89 and 90. This tipple, as well as the mines it serves, is located in the Fairmont coal region, near the town of Wyatt, W. Va., and is reached by the Western Maryland R.R. The bed of coal worked is the well known Pittsburgh Seam, which has an average height of 8 ft. at this point and is a good steam fuel with comparatively few impurities.

The mines are all drift operations, and the coal is brought to the tipple in trips of as many as forty mine cars, each having an average capacity of 3½ tons. The railroad tracks at the tipple site are about 18 ft. higher in elevation than the mine car dumping point and are located about 300 ft. away on the opposite side of Bingamon Creek. This local situation called naturally for an elevating conveyor system.

The ultimate capacity of the tipple will be 5000 tons per day of 8 hours, and in order to handle this amount of coal it was decided to design the conveying and screening equipment double throughout, one-half only being installed for the present, until the mines are sufficiently developed to necessitate installing the rest of the machinery.

Fig. 1 is a general view of the tipple, and Fig. 2 shows what the arrangement of the entire equipment will be when the tipple is completed. The incoming trip of mine cars is received by the trip feeder after the locomotive cuts loose and switches back over a separate track to take a trip of empties back to the mine. The trip feeder consists of a heavy 12-in. pitch strap chain with tilting conveying dogs spaced every 12 ft., running in substantial steel guides over a pair of sprockets. The head sprocket is driven through three gear reductions from a 15-hp. motor, the first reduction having cut teeth and a bakelite micarta noiseless pinion. The dogs of the chain engage suitable attachments that have been placed upon the mine cars. The large gear is connected to the head shaft by means of a special spring coupling, which absorbs the heavy shock and jar that occur when the trip is started. Fig. 3 shows the trip feeder in operation with the gear guards removed.

The trip feeder moves the mine cars at the rate of three per minute over the track scales, where their contents are weighed (without the cars stopping) by means of a quick-reading dial. They then run by gravity to the dump.

The dump is of the ordinary crossover type, connected with a single-horn car stop. It discharges the coal into a hopper located below in a concrete pit. After being emptied, the cars run by gravity over a kickback to the empty tripmaker. This apparatus is of a design similar to the trip feeder except that the conveying dogs are spaced only 4 ft. apart (see Fig. 4). The empty cars

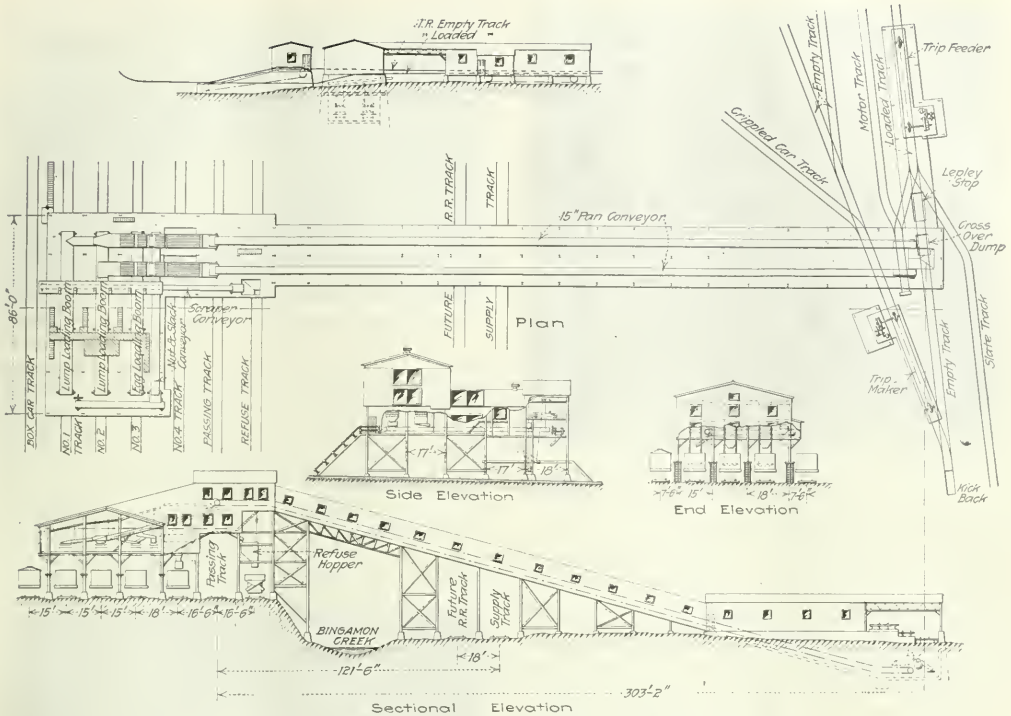


FIG. 2. ARRANGEMENT OF EQUIPMENT IN THE COMPLETED TIPPLE

run up grade through their accumulated momentum to a certain point, where they are kept from running backward by a pair of heavy tilting dogs, or so-called "grass hoppers," until picked up by the next conveying dog, which elevates the car to the level of the empty return track and pushes it forward, thus making up an empty trip at a point accessible to the locomotives.

The hopper under the dump, acting as a distributing reservoir, has a capacity of 8 tons of coal. It has two outlets, each leading to a reciprocating feeder, illus-

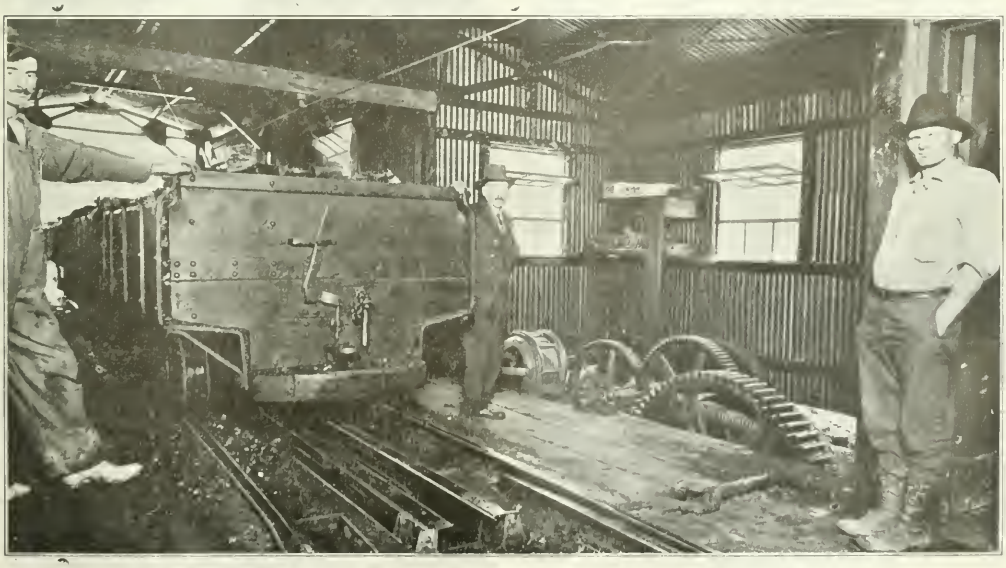


FIG. 3. TRIP FEEDER IN OPERATION (THE GEAR GUARDS HAVE BEEN REMOVED)

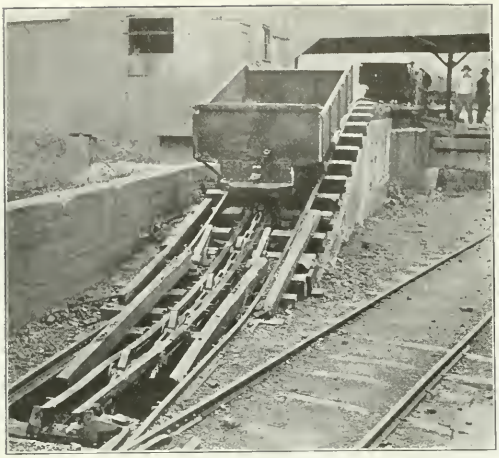


FIG. 4. CARS RUNNING OVER CARFEEDER

trated in Fig. 5. This feeder has an oscillating bottom plate running at 75 double strokes per minute, driven from an adjustable eccentric through gear and belt reductions by a 10-hp. motor. It delivers the coal uniformly to an apron conveyor at the maximum rate of 300 tons per hour.

The apron conveyor is 3 ft. 6 in. wide between moving side plates and 310 ft. long from center to center of head and foot sprockets. It conveys the coal to the screening house located on the opposite side of the creek. The conveyor chains are made of heavy 15-in. pitch steel links, with steel thimbles and pins, and provided with special roller-bearing supporting wheels running on T-rails carried on a steel frame, as shown in Fig. 6. The S-shaped pans and moving sides are built overlapping, thus making a dust-tight discharge (see Fig. 7). The head shaft is driven through two pairs of gears and a belt reduction from 50-hp. motor. The first (or primary) pair of gears is of the equalizing type, which reduces the jerky motion (inherent to all sprocket drives and especially noticeable with large-pitch chains and a small number of sprocket teeth) to a uniform movement.

A noiseless friction stop has been provided which keeps the loaded conveyor from running backward when the motor is purposely stopped or when the power supply fails or the belt slips off. This device can be seen in Fig. 7 in the lower right-hand corner. It consists of a pivoted wooden block resting upon a brake pulley. This offers little or no resistance when the device is running forward, but acts instantly and effectively when the conveyor stops, never allowing it to run backward even a small amount.

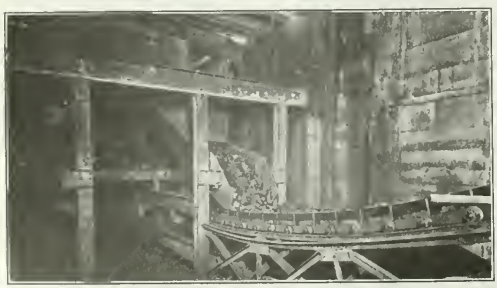


FIG. 5. RECIPROCATING FEEDER WITH OSCILLATING BOTTOM

The apron conveyor discharges the coal to the shaker screens, a side view of which is shown in Fig. 8. The shaker screens are of the continuous bottom-and-gate-discharge type. They are 6 ft. wide and handle a maximum of 300 tons per hour. The two sections are balanced and connected to each other by a patent spring connection which absorbs all shocks arising from acceleration and retardation, and reduces vibration to a minimum with a consequent power saving.

These screens are suspended from overhead beams by adjustable and cross-braced hanger rods, and are driven by a set of wooden connecting-rods from a crankshaft $4\frac{1}{2}$ in. in diameter, running at 100 r.p.m. This crankshaft in turn is driven from a 20-hp. motor through a single belt reduction provided with an automatic belt tightener, thus forming a somewhat elastic connection between armature and crank shafts. On account of their slow surface speed the cranks never run hot, which is a not uncommon failing with eccentrics.

The shakers are provided with self-cleaning lip screens with 14 ft. of $\frac{3}{4}$-in., 8 ft. of $1\frac{1}{2}$-in., and 6 ft. of 4-in. clear mesh plates, separating the coal into $\frac{3}{4}$-in. slack, $1\frac{1}{2}$-in. nut, 4-in. egg and lump. Slack is discharged into a large hopper, provided with a bottom

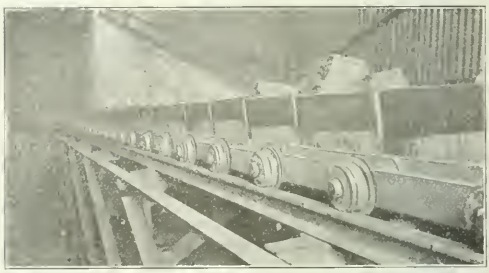


FIG. 6. ROLLER BEARING SUPPORTING WHEELS OF CONVEYOR

gate, and is loaded over an adjustable chute with extensions for low cars on track No. 4. Nut is discharged over a set of chutes and loaded either separately on track No. 3, or it may be mixed with the slack in the big hopper, or mixed with the egg, or discharged into a special slack and nut conveyor, either separately or along with the slack, for further disposal. Egg is either discharged separately on track No. 3 or mixed with the lump, while lump is discharged to track No. 2. The future (or second) shaker screen outfit will discharge the lump to track No. 1.

Picking tables of the apron conveyor type, with loading boom extensions, are installed over the egg and lump tracks. These tables are 5 ft. wide for lump and 4 ft. wide for egg. They are driven in two units from two 10-hp. motors through a train of gears, the first gear being cut and meshing with a bakelite micarta noiseless pinion. Each picking table is driven through a clutch and can be stopped and started individually. The picking space on each table is 20 ft. long. A partition to exclude dust separates the picking room from the screenhouse, and the former is well lighted through side windows and a skylight which extends over the whole room, as may be seen in Fig. 9, which shows the

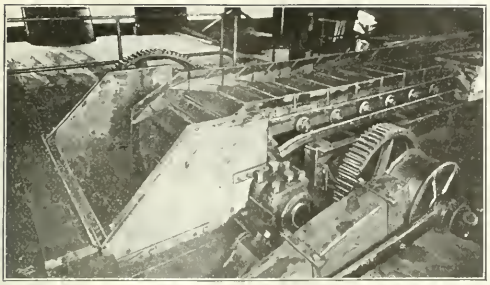


FIG. 7. OVERLAPPING SIDES OF CONVEYOR

picking house in course of erection. The loading booms are 28 ft. long from pivot to foot shaft, allowing loading into the bottom of railroad cars at a tipple clearance of 18 ft. above the top of the rail.

The loading booms are partially counterbalanced and are suspended by bails from hoists located on a floor above. Each boom has its individual hoist, which is worm geared and therefore self-locking. Each is driven through bevel friction wheels and a belt from a common countershaft, in turn driven from a 10-hp. motor by another belt reduction. The hoists are operated by hand lines. These are carried to the operator's cabin, which is located above the tracks in such a position that the operator can observe and control all the loading booms. All starting boxes for the picking table motors are likewise located in this cabin, which is plainly shown in Fig. 9.

A mixing conveyor of the chain and scraper type is located crosswise in front of the loading booms. This conveyor receives coal from the slack and nut conveyor previously mentioned, also, if desired, the egg and lump coal from the loading booms over tracks Nos. 2 and 3, and discharges into a small receiving hopper located over track No. 1, whence it may be loaded into open cars on track No. 1 or by means of a Manierre box-car loader deposited in box cars on track No. 0. It is therefore possible to load any combination of picked coal on tracks Nos. 1 and 0, either in open or box cars.

The discharge from the loading booms into the mixing conveyor is effected by means of a special hinged discharge chute which automatically, by means of a cam and roller device, swings into or out of place when the booms are raised or lowered.

A large bypass has been provided in the upper section of the shaker screens, which allows loading run-of-mine coal into the big hopper over track No. 4 in case the shaker screens should be out of commission.

Refuse from the picking tables is cast into small boxes or chutes and discharged through the picking-table floor into a refuse conveyor of the chain-and-scraper type. This runs directly under the floor of the picking room and carries the refuse back over the passing track into a hopper located over the refuse track, whence it is drawn through an undercut gate into a refuse dump car for final disposal.

All moving machinery throughout the tipple has been guarded by hand rails or special guards wherever there is a possibility of accident.

The steel structure is substantial throughout, H columns and heavy floor beams only being employed. A priming coat of "Highway Red" paint and a second coat of "Black Carbonizing Coating" protect all steelwork from corrosion, and special pains have been taken to facilitate future painting through the avoidance of all lattice work of any kind and all back-to-back angles

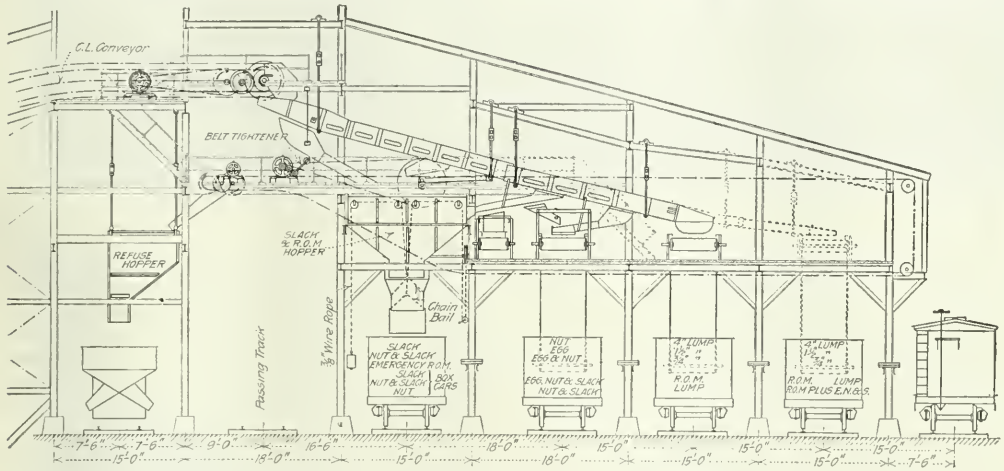


FIG. 8. HOW THE COAL IS DISCHARGED TO THE SHAKER SCREENS

FIG. 9. OPERATOR'S CABIN, IN WHICH STARTING BOXES ARE LOCATED

with an open space between them. The structure is covered with painted galvanized corrugated steel sheeting. All windows are of the steel sash type with ribbed glass panes except the operator's cabin, which has plain glass panes. Skylights have ribbed wire glass, the ribs producing diffused light within the tipple. Special ventilators have been provided at all dusty places. All stairways exposed to the weather are equipped with "subway" steel treads, which are non-slipping in winter.

The Consolidation company has spared no effort to secure a thoroughly modern tipple of large capacity. Efficiency, simplicity and safety were the watchwords of the engineers. This structure was designed, fabricated and erected by the Fairmont Mining Machinery Co., of Fairmont, W. Va.

Handling Miner's Checks at the Tipple

By Ralph W. Mayer
California, Penn.

The Harwick mine of the Equitable Coke Co., at Cheswick, Penn., has in use a simple yet safe method for conveying the miners' checks from the man dumping the cars to the weighman. This is a modification of the means employed in department stores for sending money and sales slips from salesman to cashier.

A tight wire is strung between the dump and weighman's desk, and a small carriage about 6 in. long, made from a block of wood, travels back and forth, carrying the check. Felt bumpers are placed at each end of the wire for the carriage to strike against. An ordinary spring paper clip is fastened to the side of the block, and the check placed in its grip. The ends of the jaws are beveled for about an inch so that the check may be slipped between them without pressing the spring.

A groove is cut through the middle of the block, making it U-shaped, the wire being at the bottom while the trolley wheels are fastened between the sides of the U. The wheels have wide flanges and are so set that the wire cannot get over them. The weighman at one end of the line with one motion of his hand removes the check from the clip and shoots the carriage back to the dumpman. Two dumps are employed, also two wires. One goes to the check weighman and the other to the company weighman, but as the checks are removed from the clip they are placed where both men can see them and get the check number. These two men sit at opposite sides of a desk which has the scale beam over its center.

At the Vesta No. 7 mine a sheet-iron pipe set at a stiff incline extends from the dumpman to the weigher. The end of the pipe nearest the dumpman is provided with a funnel into which the checks are thrown. They then follow the pipe to the weighman. The funneled end of the pipe is placed close to the dumpman, so that he does not have to move to put the checks into it.

At the Pittsburgh Coal Co.'s Crescent mine the weighhouse is close against the track, up which the cars are pulled by a chain haul. Two boys remove the check, which are placed on the outside of the cars, on the opposite side from the weighhouse, and throw them across the track into a large megaphone-shaped horn, or funnel. From this the checks fall onto the weigher's desk.

The cars may be dumped from any one of four or five dumps during a day, as the tipple loads onto river barges as well as into cars on four or five sidetracks. It is desired to know the weight of the coal dumped into each barge or car as weighed by the tipple weighman. To accomplish this the miner is supposed to put two checks on each car he loads. The weigher gets one of the checks, while the second is left on the car for the dumpman.

Each dump at the end of the shift then has the checks for all the cars dumped over it during the shift. By taking the weight credited each car check from the weighman's sheet, the amount of coal dumped in each car or barge easily can be ascertained.

Some miners put only one check on their cars because of a shortage of checks, or for other reasons. In such a case one boy returns this check and gives it to the weighman, while the second boy writes the number on a slip of paper and places it on the car instead of the metal check. The dumpman keeps this slip as a tally of the check number of the car.

OTHER PRACTICES IN USE

At the Vesta No. 4 mine the weigher takes the weight hole in each check, in the order in which he dumps the files the car checks on a spindle passed through the cars, which is of course in the same order as that in which they come over the scales. As many as 2000 cars have been dumped in eight hours over this tipple. One scale and two dumps are employed, although one of the dumps can handle the cars if necessary. The dumps are side by side on the tipple, and the spindle on which the checks are filed is placed between them. The checks from both dumps are filed on the same spindle, so that the checks are in the same order as that in which the cars were weighed on the scales. As the spindles are filled with the checks they are carried to the weigh office, where a clerk coördinates the weights of the cars with the check numbers. This is done continuously throughout the day and not left for the end of the shift.

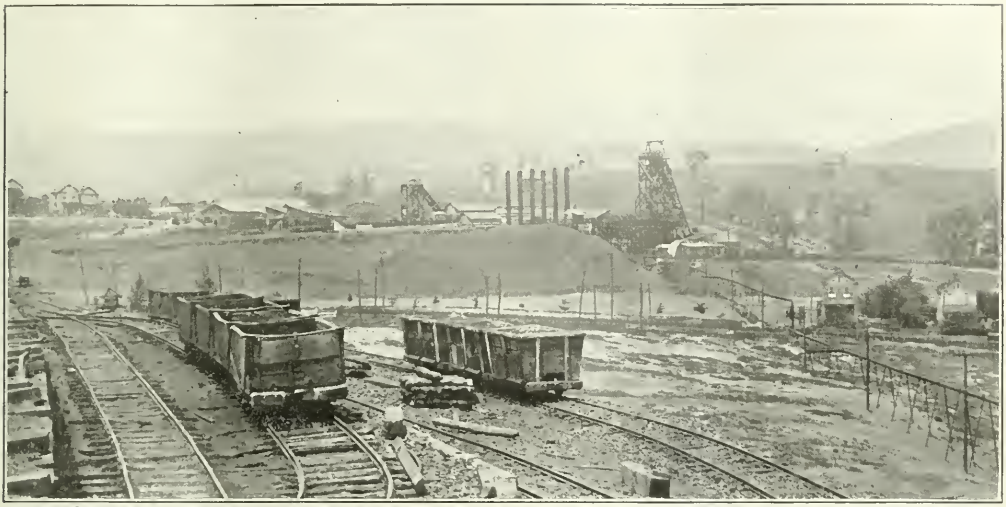
At the mines of the Canadian Collieries Co., Ltd., in British Columbia, the weigh office is beside the dump. The cars are weighed, and the dumpman takes the check and hands it through the window to the clerk. A beam scale is used, and the clerk leaves the weight on the scale until he gets the check, when he places the weight on the weighsheet under the corresponding number.

In the Northwestern Improvement Co.'s plants the checks are hung on the outside of the cars. The weigh office is beside the dump, and the dumpman removes the check and gives it to the weighman, who immediately places the car weight under the miner's check number on the weigh sheet. A dial scale is employed at most of the mines of this company, and the weight has to be read at once, before the car moves off the scale platform.

It is the custom throughout the Roslyn, Wash., coal field in which this company operates to place the car checks on the outside of the car. A loop of twine is passed through the hole in the check and fastened to the handle of the car door. Checks are seldom changed on the cars. One hundred dollars and costs, with expulsion from the miners' union, is what the punishment has been in the isolated cases that have occurred. This may be an effective deterent, although the miners as a rule are honest and habitually ostracize any one who steals tools or powder from a fellow worker in any mine.

Extensive coal measures are reported to have been discovered close to Albertville, Lake Tanganyika, Belgian Kongo, and are now being exploited.

SNAPSHOTS IN COAL MINING



GENERAL VIEW OF THE SURFACE PLANT OF THE GAYLORD MINE OF THE KINGSTON COAL CO., PLYMOUTH, PENN.

COAL FROM ONE OF THE SLOPE MINES GOING TO THE BREAKER, GAYLORD MINE OF THE KINGSTON COAL CO., PLYMOUTH, PENN.

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The Menace That Is Gompers

IT IS generally conceded that Samuel Gompers is a man who has a strong patriotic sense and is one who does not want to make any demands that will upset the industries of this country. His long experience has given him a conservative trend, and during the war there has hardly been a labor leader in whom the public in general has had more confidence. Unfortunately, it is in these characteristics that Mr. Gompers' power for evil lies.

The public does not fear so much what Gompers may do, as that the concessions, which he is managing to wring from the Administration, may prove the undoing of the social fabric. The strength of the unionism

which he is creating he may be intending to use with judgment and a keen sense of obligation. But the provisions for industrial democracy which he is establishing, the labor trusts which he is creating and the court defenses he is breaking down, may be used by such men as Bill Haywood and those of his ilk to paralyze the industries of the nation and to create that anarchy for which they have long been itching.

Gompers is like the small boy who is asked by his taller and longer fingered brother to climb the tree and shinny along the bough till his weight brings within reach the luscious apples that the latter has long desired. It is not likely that Mr. Gompers or other excellent men like him have in mind just what their big and less scrupulous brother, Bill Haywood, intends to do when the limb is lowered. In this the analogy undoubtedly fails. The cartoonist who has in mind the facts and not their causes, has, however, well portrayed what is quite likely to happen.

Prevalent Disorder in the Material Yard

Probably the one thing above all others that impresses most people when they visit a mine for the first time is the careless way in which material of all kinds is scattered about. At by no means a few operations, ties and pit props are seen lying around in riotous profusion, with machinery, of various kinds, pipe, fittings, lumber, wire, poles and other material very ditto. The whole operation presents an appearance of carelessness and disorder well described by the old woman's expression to the effect that "the devil must have had a dance and forgot to clean up afterward."

In these days when sanitation about the miners' homes is almost enforced, and when neatness in and about and around the dwelling-houses is encouraged by all possible means, a surface plant of the slattern type—with which every coal mining man is unfortunately familiar—is anything but a good example for the company employees to pattern after. The housewife who has a strong natural tendency toward neatness, also is quite liable to become disheartened and disgusted with life in general and the mining town in particular if from the window of her spic and span living room she can and often must overlook a plant that represents a distinctly opposite extreme. It is not strange that such a woman seeks to induce her better half—all too often with promptness and complete success—to change the place or even the character of his employment.

Then again in case of emergency when material of a certain kind is wanted, must be had, immediately if the necessities of the hour are to be met or possibly human lives are to be saved, nobody knows just exactly where to lay his hands upon the exact material desired. Everybody about the plant knows that the article or articles necessary are in the supply yard *somewhere* but just where and how they are to be secured is another proposition.

And then perhaps while a gang of men in charge of a loud-voiced and artistically profane foreman are frantically dragging 2 x 4s from under a pile of telephone poles and brattice boards from a heap of pit props, another group of men down underground somewhere shut off from escape by a fire that could easily be brought under control if only the air could be brought along fast enough, are facing death as only miners know how to face it.

This is perhaps an extreme picture but one well within the range of possibility. Some superintendents, some exceptionally rare ones, go to the other extreme and imitate the example of the section boss on the railroad who kept four men hunting five days for a misplaced track spike!

Neatness can be carried to extremes of course, but such extremes are unfortunately seldom encountered around coal mine plants. As a man is known by the company he keeps, so does the average layman form his opinion of the officials of a plant by whether or not, neatness is apparent. He assumes that the engineering and production problems are being met in an efficient manner if the grounds around the surface buildings show that a reasonable amount of care has been bestowed upon them in the matter of the storage of materials.

Maps, Like Books, Should Be Sized.

Today we size everything—coal, loaves, books and catalogues. Many are already sizing maps and the work cannot progress too fast. The practice of making every drawing of a different size, so that, if it is filed in a drawer, it is lost and, if filed in a book, its edge lies within or without the rim of the map above it or below it, is wholly contrary to modern practice. Small maps should be placed in a loose-leaf binder, larger maps in a large shallow drawer, preferably of steel, and all the maps in any file or drawer should be of the same size.

A good plan is to make the demy sheet the standard and divide it into two and into four making two sizes semidemy and demisemideny.

The tracings, larger than demy, if not the maps also, can be made of the same proportions as semidemy so that they can be photostated down to the semidemy size and then can be bound with semidemy blueprints.

Every mine operation, however small, should now be making its mine-map tracings with lettering suited in size to photostatic reduction, for though small concerns cannot have a photostat they can easily have their work done at a near-by studio and so have a record that will be large enough for most purposes, thereby preserving the condition of the larger tracings and making easy many calculations that on a larger map can only be made by using a long straight edge and certain acrobatic stunts common only to the drafting table and the swimming pool.

Varying Standards of Durability.

At some coal mines, particularly those that have been in operation over a considerable term of years, one sometimes sees an interesting combination of new and old equipment. At one plant in Nova Scotia may be seen a motor driven fan and a hoisting engine built in the latter sixties. At a mine in Wyoming a steam hoist almost equally as old is in use. An engine driving one of the breakers in the anthracite region is said to have been built in 1856 and although it has had a new cylinder or two and probably several sets of new packing rings it is still on the job and running as usual.

It goes without saying that any machine that can withstand everyday wear and tear for half or three quarters of a century must have been constructed of good material in the first place. It must also have received good care and attention. Without either or both no device such as a hoisting engine could be expected to last more than a few years at best.

It is in the matter of materials used in construction that certain foreign machine builders appear to excell those of our own land. Thus English engines are notoriously famous on account of their longevity. The same may be said of some machine tools and other devices. While there are exceptions to all rules there is no gainsaying the fact that as a class English machines are of heavier design and more highly finished than American devices built for the same purpose and of the same capacity.

Of this fact the Briton often boasts and believes that he is justified in so doing. In some instances he may be quite right but in others he may be dead wrong.

We in America like to think that we are highly progressive. Certain it is that during the lives of men now living we have forged ahead of other peoples in the use of machinery. Improvements in design have followed each other with dizzying rapidity. For example a big central station in Chicago some years ago purchased a large steam turbine, direct connected to an electric generator. Before this machine had been in operation six months a new design had been perfected so much superior in steam economy that the one in operation was rendered economically obsolete. That is it would have paid the owners to tear out the turbine just installed even though it had run but a short time and replace it with an entirely new machine.

This is of course an unusual case but it well illustrates the point. One large steel company figures on wearing out its machinery every three years because by the end of that time not only would the design of each particular machine have improved but the requirements of the company would also have changed or most likely have increased.

Under such circumstances it is little wonder that American manufacturers have not built their machines to last indefinitely. The maker must furnish what he can sell and if the buyer wants a machine to last not more than ten years he would be foolish to build one that would last 50 or 100 years.

In certain types of machinery many American builders have produced products that for durability would compare favorably with any made anywhere in the world. The widely accepted theory that machinery of American manufacture is inferior so far as durability is concerned may or may not have a foundation in fact. Certain it is that many American machines are built for a definite and usually short life as measured in years. The retention of such machines or the attempt to operate them for much longer periods is in many instances a sign of unprogressiveness on the part of the owner.

Stabilizing the Coal Trade

One of the most prolific sources of difficulty at the mines is non-uniform operation. Not only does an irregular car supply impede production but particularly in the Middle West the demand for coal is seasonal, attaining its maximum in the fall and winter and falling off (in some cases to nothing) in the spring.

Unfortunately this seasonal activity of the mines comes at a time when not only are crops and other commodities moving in large volume but when freight traffic is hindered by winter conditions. No concerted effort appears to have been made to rectify this condition except in the case of anthracite. Here, as is well known, graduated concessions in price are made to the purchaser during the spring and summer months. These have unquestionably been instrumental in increasing demand for fuel at the time when production would otherwise be least.

It would seem that some such arrangement might well be made for bituminous coal. One plan that has been suggested is that freight rates be decreased in the early spring and gradually brought back to normal as the summer advances.

While this would doubtless be highly beneficial from the standpoint of the coal operators it can hardly be considered fair to the railroads. For although the steam carriers would reap the benefits accruing from a more uniform demand and consequently a more uniform distribution, they would nevertheless be saddled with the entire expense of the scheme while the mines would be cobeneficiaries.

Desirability of Standardizing Mine Rescue Training and a Plan Therefor*

By D. J. Parker†
Pittsburgh, Penn.

Thousands of sets of breathing apparatus are in use throughout the United States. Examinations of men trained in the handling of this equipment are held regularly, yet no standard or uniform system of training in the use of this apparatus has been adopted. The establishment of a uniform course of training would be advantageous to all concerned.

THE modern mine-rescue breathing device, the function of which is to permit the wearer to penetrate irrespirable gases formed by mine fires, mine explosions or similar causes. Several types of breathing apparatus are now made. One of these depends on liquid air for the breathing supply, a second depends upon the generation of oxygen from a chemical compound, a third upon normal air under pressure, and a fourth, which is most widely known in America, depends upon more oxygen under high pressure for its air supply .

The history of breathing apparatus dates from the year 1868, when a device was used similar to the submarine diver's helmet. Practically all succeeding forms were built along similar lines until 1896, when the present portable self-contained type was devised and used abroad. The first self-contained apparatus to be employed in the United States were four sets imported in 1907 by the Anaconda Copper Mining Co., of Butte, Mont. In September, 1908, breathing apparatus was purchased by the Technologic Branch of the U. S. Geological Survey, for use in mine rescue and recovery work, which at that time was in charge of that branch.

Today the Bureau of Mines has ten rescue cars, five rescue trucks and eight safety stations distributed throughout the mining regions of the United States, equipped with some 300 complete sets of such apparatus, while several thousand sets are owned by state mining departments and mining companies having rescue crews trained in their use.

Breathing apparatus may be devided into two types as regards the length of time the apparatus will furnish pure air on one charging; these are the half-hour type, principally used on vessels or where men are only exposed to dangerous atmospheres for short periods of time, and the two-hour type, which is the kind used in mines. In mine rescue and recovery work the apparatus wearer may have to travel considerable distances from his base, and two hours has been adopted as the maximum period of service compatible with lightness and convenience of portability. Only the two-hour type is considered in this paper.

In the United States there has been a steady growth in the use of breathing apparatus by the mining industry. As with many other new devices, when they first appeared mine operators and owners were at first decidedly skeptical as to the merits of the apparatus. However, owing to the progressive spirit of numerous operators, both coal and metal, the ingenuity of apparatus manufacturers, and persistent effort of the Bureau of Mines, a more intelligent understanding of the use and limitations of such equipment has been attained.

As a result of the combined efforts of those appreciating the necessity for such a device for safely penetrating noxious atmospheres, a tremendous impetus has been given to its use in the mining industry, especially within the last three or four years.

I believe that it will be agreed that breathing apparatus occupies an essential and permanent position in the mining industry. It does not seem necessary, therefore, to point out instances where lives have been saved directly by the use of such apparatus, or to give even approximately the figures showing the value of the vast amount of property saved to the nation annually.

Today there is not a mining district in the United States that cannot on short notice in time of disaster obtain the services of trained men equipped with apparatus either from state or privately owned rescue stations or from the Bureau of Mines. Also, most of the larger companies have rescue equipment and organized safety crews.

Necessity for Standardized Course of Training

On account of the constantly increasing demand for apparatus training, the Bureau of Mines has for some time appreciated the necessity for a standardized course of such training. Thorough and systematic training are essential to insure the safe and economic use of the apparatus. Such training can best be insured through standardization of training methods. As a result of a standardized course, it is believed that more attention will be paid to the selection of the proper type of men for rescue crews, efficiency will be increased, and higher appreciation of the value of the apparatus will result.

The reasons for standardization are, in fact, so obvious that it hardly seems necessary to dwell further on this phase of the subject. It might be mentioned, however, that there are two essential reasons, in addition to those already mentioned, for such standardization. These are:

1. It is the policy of the Bureau of Mines, upon request, to give a thorough examination to men trained either at privately or state-owned rescue stations, with a view of qualifying them for mine-rescue certificates as issued by the Federal Government. A standard course of training would most assuredly be highly advantageous to both the examiner and the examined.

2. Trained men going from one mine to another would be decidedly at a disadvantage when called upon to wear apparatus, assuming that the men at each mine

*Paper presented before the eighth annual safety congress of the National Safety Council, Cleveland, Ohio, Oct. 1 to 4, 1919.
†Mine safety engineer, U. S. Bureau of Mines Experimental Station, Pittsburgh, Penn.

had received a different course of instruction. This would hold true even though their training had been with the same type of apparatus. As an illustration, it has been known to occur that where one instructor would require the evacuation of the apparatus of all normal air, another would require the inflation of the breathing bag with exhaled air, while still another would permit the wearer to don the same type of apparatus containing normal air. Such diversity of instruction may result in serious difficulty for the wearer.

It is believed that a course similar to that pursued by the Bureau of Mines in the standardization of first-aid instruction should be followed in this case; that is, by the wide dissemination of a publication on the subject. I will now attempt, without going into details, to give a few of the fundamental principles that might form a basis for such a publication.

On account of the extremely hazardous work of wearing rescue apparatus in deadly atmosphere, too much attention can not be given to the selection of an apparatus and the training of the wearer. Many of us are inclined to think of a course in apparatus training as consisting of so many hours under oxygen in an irrespirable atmosphere. In reality, this phase of the course, though essential, is second in importance to a thorough and scientific knowledge of the use and the mechanical and physiological limitations of the apparatus. No one should be accepted for training without first receiving a thorough physical examination by a competent physician or surgeon.

Details of Standardized Course

The length of the course should not be less than five periods of four hours each. At least eight hours should be spent under oxygen and in an irrespirable atmosphere. Wherever possible the apparatus work should be given underground. The course should include standard lectures on each of the several types of apparatus now in use in this country. Such lectures should dwell at length on the various tests of the apparatus, in order that the wearer may know to a certainty that his equipment is functioning properly before entering a zone of poisonous gases. A person to be skilled in the use of breathing apparatus should not only have a thorough knowledge of the use and care of the equipment and oxygen pump, but he must also have a working knowledge of mine gases; that is, he should be familiar with their sources of occurrence, physical properties, effects on man, and methods of testing for their presence, particularly those gases encountered after mine fires and explosions.

Knowledge of at least two types of flame safety lamps is desirable on the part of the apparatus man trained for work in coal mines. This is not so essential in the training of metal miners. The standardized course should specify the purity and method of manufacture of oxygen to be used in the apparatus. Oxygen manufactured by the electrolytic process may contain a certain percentage of hydrogen. The Bureau of Mines has therefore tentatviely specified to manufacturers who supply oxygen for use in mine-rescue apparatus that the oxygen shall not contain more than 2.5 per cent. of nitrogen nor more than 0.2 per cent. of hydrogen. Also the purity of the regenerating material should be specified.

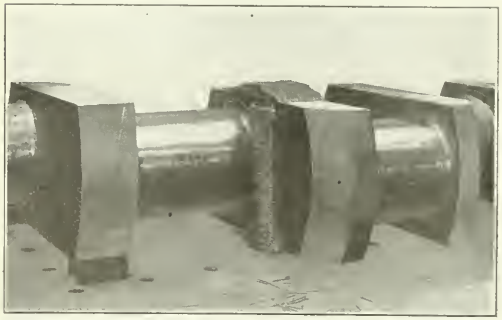
In addition, the course should deal at some length with the method of procedure following mine fires and explosions, including the duties of the captain of the rescue squad.

Publication regarding such course of standardization is now contemplated by the Bureau of Mines. The necessity for such standardization is already, I believe, universally recognized among the manufacturers and users of breathing apparatus. By the wholehearted coöperation of apparatus manufacturers, safety engineers and the mining public such standardized training will be established and oxygen breathing apparatus made a safer and more efficient agent for the help of mine owner and miner in times of trouble and disaster.

An Unusual Welding Repair Job

By J. O. Smith
New York, N. Y.

An unusual welding job that required high engineering ability and skill to successfully handle was that executed upon a broken six-ton crankshaft that was fractured through the web of one of the cranks. This shaft was part of the equipment of a large refrigeration plant, but as repairs could not be made in its immediate vicinity, the broken shaft was shipped to the Jersey City, N. J., plant of the Vulcan Iron Works.



Here it was repaired by the Wilson Welding Repair Co., a plastic-arc welding outfit being used for the purpose.

The greatest difficulty in this repair lay in securing proper alignment of the shaft at the conclusion of the work. The shaft was clamped to a table and lined up, and the welding proceeded after the metal at the break had been chipped out so as to insure a clean surface for the added welding metal to fuse with.

The job as finished is shown in the accompanying illustration. When the welding was completed the shaft was tested in a large lathe and found to be entirely true from end to end.

Good Quality Coal in China

Coal is found in many districts in the Kwangtung Province of China and is mined by the natives in a small way. The many tests made show that the coal is of good quality for steaming or coking. The coal-mining industry requires only the investment of capital and favorable mining regulations to bring it up to a high stage of production. Up the North River there is an abundance of a very fragile semi-anthracite which is easily accessible. The analysis shows volatile matter 13 per cent., fixed carbon 75 per cent., ash 12 per cent. and heat value 12,000 B.t.u. per pound.

Program of Coal Mining Institute of America.

The 33rd annual meeting of the Coal Mining Institute of America will be held in Pittsburgh on Dec. 3 and 4. President E. N. Zern and Secretary H. D. Mason, Jr., have formulated an attractive program for the two-day session.

As a result of the active membership campaign inaugurated by Mr. Mason some time ago, nearly 1,000 members have been enrolled in the institute. The meetings will take place in the auditorium on the second floor of the Chamber of Commerce Building in Pittsburgh. Widespread interest has been manifested over the coming meeting throughout the different coal fields.

As has been the case in the past, one of the features of the proceedings will be the question box discussion. Already questions have been received from points as far distant as Alabama. Inasmuch as the questions are usually the liveliest portion of the program, the president has requested that all members come prepared to take part in the discussions. At the close of the first day a banquet will be held in the William Penn Hotel, at which time addresses will be delivered by men of national reputation. The completed program is as follows:

WEDNESDAY, DEC. 3, 9:30 A. M.

BUSINESS SESSION—E. N. Zern, presiding.

Reports of officers and committees.

Election of officers.

Paper—"Probable Future Developments in the Use of Coal," Henry Kreisinger, Fuel Engineer, Bureau of Mines, Pittsburgh, Penn.

QUESTION BOX SESSION—T. K. Adams, State Mine Inspector, presiding.

Question No. 1—In a room of more than 20 ft. width, should timbers be uniformly spaced between the track and the gob rib? Or should they be set more closely in the center of the room than in the gob?

Question No. 2—What is a fair water gage reading for a mine operating under favorable conditions and circulating 100,000 cu. ft. of air per minute? 200,000 cu. ft.? 300,000 cu. ft.?

WEDNESDAY, DEC. 3, 2 P. M.

Paper—"The Constitution of Coal as Seen With a Microscope," Dr. Reinhardt Thiessen, Research Chemist, Bureau of Mines, Pittsburgh, Penn.

Paper—"The Labor Factor in Coal Mining," Charles L. Fay, Director, Safety and Efficiency Department, Davis Coal and Coke Co., Cumberland, Md.

QUESTION BOX SESSION—Dr. E. S. Moore, Dean Penn State School of Mines, presiding.

Question No. 3—How should amusements and recreation for miners—white and colored—be conducted in isolated mining camps?

Question No. 4—Why do coal companies in Pennsylvania not employ more college-trained men on their staffs?

WEDNESDAY, DEC. 3, 6:30 P. M.

BANQUET—W. E. Fohl, Mining Engineer, Pittsburgh, Penn. Toastmaster.

Speakers—R. Dawson Hall, Managing Editor of "Coal Age," New York City; Dr. G. H. Ashley, State Geologist, Harrisburg; Dr. A. A. Hamerschlag, President, Carnegie Institute of Technology, Pittsburgh; Dr. John A. Brashear, foremost citizen of Pennsylvania, Pittsburgh.

THURSDAY, DEC. 4, 9:30 A. M.

QUESTION BOX SESSION—P. J. Walsh, State Mine Inspector, presiding.

Question No. 5—Has the steel mine car made good?

Paper—"Modern Practices in Coal Washing," Prof. H. C. Ray, School of Mines, University of Pittsburgh, Pittsburgh,

QUESTION BOX SESSION

Question No. 6—Under like conditions, which is superior for attaining a large output—a drift or a shaft mine?

Question No. 7—Can the electric bonding of rails be recommended as an effective and economical method?

THURSDAY, DEC. 4, 2 P. M.

QUESTION BOX SESSION—Richard Maize, State Mine Inspector, presiding.

Question No. 8—Is alternating current more satisfactory than direct current for the operation of coal-cutting machinery?

Paper—"Pillar Drawing," A. W. Hesse, Chief Mining Engineer, Buckeye Coal Co., Nemacolin, Penn.

QUESTION BOX SESSION

Question No. 9—How much coal should a coal-loading machine, employing three men in its operation, produce daily to warrant its use? Should a guarantee of performance be exacted before purchase?

Question No. 10—What are the advantages and disadvantages of the "advance and retreat" method of drawing pillars?

Coal in Spitzbergen

The Scottish Spitzbergen Syndicate (Ltd.) advises the press that news of an important discovery of coal has been received from the leader of the syndicate's expedition which left Leith for Spitzbergen on July 15. A party was landed north of Prince Charles Foreland to continue the work of exploration started by the syndicate before the war, the steamer with the other members of the expedition anchoring at Klaas Bilten Bay, where they joined the advance party that had reached there a month earlier. The work done by the advance party has been confirmed by the geological specialists with the main expedition. It is estimated that the quantity of coal already practically proved, over an arear of only one square mile of this district, is 5,000,000 tons. Working facilities are reported to be excellent; there is deep water close inshore, and the seams can be attacked conveniently at a point near the beach. As an item of interest it is mentioned that even the weathered outcrop coal burns well, and is being used by some of the miners in preference to their oil stoves.

In Bosnia and Herzegovina there are produced about 2,800,000 tons of brown coal and 130,000 tons of high-grade coal. There are many deposits which are still untouched.

New Coal Deposits in Chile

An article published recently in the Chilean newspaper, "Las Ultimas Noticias," gives particulars of several new coal deposits which have been found in southern Chile. The first of these is stated to be near La Union. The quality of the coal is considered to be very good and machinery is being installed for the exploitation of the deposit. It is estimated that 40,000,000 tons can be extracted, and a special railway is being built to Rapallo station.

Another coal deposit has been found in the Department of Castro. The analysis of coal taken from the outcrop showed a residue of 9 to 10 per cent. of ash. The greater part of the coal field is on the beach, in the northern part of Castro Bay, and opposite the town of the same name. There are nine deposits in all. The coal from this region is different from that which comes from other parts of Chile, and is not unlike bog-head or cannel coal. The coal mines on the island of Lemuy (Chiloe) are, the paper adds, being exploited with excellent results, and within a short time exploitation on a large scale will begin.

According to "El Mercurio," coal has been found at a place called Mailef, 6 miles from the Central Railway Station of Valdivia. Its exploitation has been started, but little has been achieved so far because of bad roads and poor means of transport.

New Developments at the School of Mines of Carnegie Institute of Technology.

One of the features of the new co-operative department of Mining Engineering of the Carnegie Institute of Technology at Pittsburgh, Penn., has recently been announced by Captain Edward Steidle, secretary of the department. It will be a four weeks intensive course of instruction in coal mining and has been devised primarily for miners who aspire to hold certified positions. The course will consist of a general study and review of the all-pertinent subjects of mining law, ventilation, mine-gases, methods of mining, mine-rescue and first aid, safety, mine management and compensation insurance.

The course will be inaugurated on or about July 1 next. Upon completion of the studies, the State Department of Mines will hold examinations for fire bosses and mine foremen. This is the first course of study offered by a technical school in the Pittsburgh district that has been planned especially for practical mining men. The Chief of the State Department of Mines, Seward E. Button, has pledged his support to the proposed plan. A member of Mr. Button's inspection force, John I. Pratt, will be a member of the advisory board and will represent Mr. Button on all matters pertaining to the State Department of Mines.

Research work through the awarding of fellowships, will be carried on by Captain Steidle's department in conjunction with the Bureau of Mines. Graduates of approved technical institutions are eligible for fellowships in which work will be devoted to the various problems of coal mining and the utilization of fuel. Upon completion of the investigations, advanced degrees in engineering will be granted. Included in the investigation work will be the submitting of a thesis that may be published by the Bureau of Mines.

SOME OF THE FACULTY ADDITIONS

Among the additions to the faculty are the following: R. Z. Virgin, formerly director of mine extension work of the University of West Virginia. Mr. Virgin has had 35 years' experience in the coal mining industry and has advanced by successive steps from miner to superintendent. W. Z. Price has been engaged for "part time" instruction. Mr. Price is a Lehigh University man and was formerly division engineer for the Berwind White Coal Mining Co. Edward N. Zern, who needs no introduction, will round out one of the best balanced faculties found in any mining school. It will be remembered that Mr. Zern is President of the Coal Mining Institute of America and editor of the Coal Mining Catalogue and Coal Field Directory. He was formerly professor of coal mining at the University of West Virginia and the University of Pittsburgh.

It is planned to limit all of the classes to such size that a close relationship may exist between faculty and students. The present school year finds an enrollment of 44 freshmen in the four-year course and 24 sophomores. In the first year class of the two-year course, there are 23 men enrolled, of which 6 hold state certificates of competency. The type of students desired at Carnegie Tech are those who are sons of mine workers and officials, or boys who have actually been raised in mining communities. At least 80 per cent. of the present enrollment is composed of men who have had practical experience in coal mines.

Under a co-operative agreement with the Bureau of Mines, the new Pittsburgh Experiment Station will be thrown open to the students. Full advantage will be taken of the bureau library, equipment, advice of the technical staff, and the use of the experimental mine near Bruceton, Penn., for demonstration work. The Carnegie Institute of Technology adjoins the bureau buildings in Schenley Park, which gives a location that can be paralled by no other similar school.

American Mining Congress to Hold Annual Meeting.

The National Exposition of Mines and Mining, embracing exhibits of mining machinery, safety devices and labor-saving appliances from practically every State in the Union, will be held in St. Louis, Mo., on Nov. 17-21, in connection with the annual meeting of the American Mining Congress.

It is planned to install the exhibits in what was formerly the old Southern Hotel, immediately after the close of the St. Louis Exposition of Industrial Arts and Crafts which is being held from Oct. 15 to Nov. 11. John T. Burns, of Washington, D. C., assistant secretary of the American Mining Congress, is at present in St. Louis assisting the local committees in making arrangements for the exposition exhibit and congress meeting. It is Mr. Brown's opinion that the exposition will see the largest exhibit from a purely mining standpoint, that has ever been held in the United States.

An unusually attractive program has been arranged for the Mining Congress. This will include open discussion of labor's plan to nationalize industry and the effect of labor control of railroads and mines, upon all national activities. The relation of mining to industrial prosperity and the close connection between the present low output per man and the extraordinarily high cost of all commodities will be discussed. Opportunity will be given through special conferences to those directly interested in bringing about legislative action in connection with the many matters pertaining to the coal mining industry.

Separate programs are being made for national conferences between mining men, state geologists and economists.

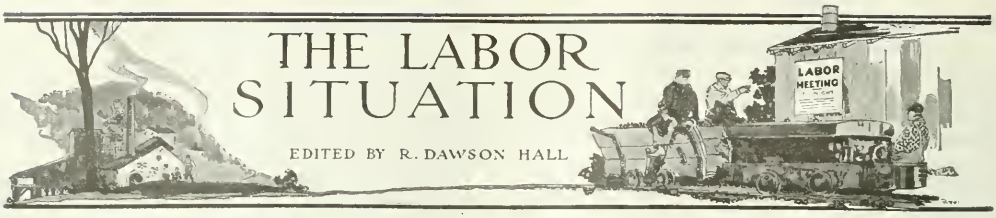
An attempt will be made in the coal mining section to formulate plans for the standardization of all mining equipment, a feat which, if accomplished, should prove of mutual advantage to both manufacturers and operators.

Some Interesting Extracts

Tax exists in the furnace in the form of vapor, an ideal condition for cracking. The small globules present a large surface for absorption of heat from the gases and hot furnace walls, and are quickly heated to a high temperature, which favors the formation of carbon.—*Bureau of Mines Bulletin No. 135.*

When methane is burned with insufficient air supply it burns with a yellow flame and deposits soot. Therefore, natural gas, which consists mostly of methane, should be burned with some excess of air and with provision for obtaining a good burning mixture; otherwise soot will be deposited and gas will be wasted, owing to incomplete combustion. In this respect natural gas differs greatly from producer gas, the latter consisting mostly of carbon monoxide, which does not readily decompose.—*Bureau of Mines Bulletin No. 135.*

The two conditions for smokeless combustion with mechanical stokers could be perhaps applied to gas producers to eliminate soot and tar from the producer gas; that is, to distill the volatile matter at low temperatures and in strongly oxidizing atmospheres so that the hydrocarbons burn to the products of complete combustion, CO_2 and H_2O; then by passing these products through a bed of hot coke to decompose them into CO and H_2. This process of gasification is similar to that which takes place in the under-feed type of mechanical stoker.—*Bureau of Mines Bulletin No. 135.*



THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Not so important is what happens as what the people think of what happens. The attitude of a people, its soul, is as determinative as are the physical conditions. Physically it is questionable whether Russia is not a better country than the United States, but actually we know the vast difference between them. The reaction of the Russian to his physical conditions is such that he cannot hope to wrest from those conditions a living equal to that which the American enjoys as the result of his more logical reactions.

We do not need to worry therefore about what the week has not brought forth as between coal labor and coal capital, nor to concern ourselves much with the ineptitude of the head of the Department of Labor or how he has weakened himself by his alleged dabbling in union politics.

What we need to know is what the great public thinks, for the mine worker is doomed to disappointment if the public—the butcher, the baker and the candlestick maker—cease to hold in approbation the efforts the mine worker is making to raise his wages unduly. Significant, therefore, is the attitude of Congress the members of which have to be elected by workingmen.

Senator Myers, of Montana, on October 14 denounced Congressional investigations of industrial trouble because they operated to encourage strikes. "The only result of these investigations seems to be to encourage strikers and agitators in their violation of the laws," he asserted. Senator Poindexter wanted to know why foreign anarchists and advocates of sedition had not been extradited, while Senator Thomas, of Colorado, asked why men wearing soldiers' uniforms were engaged in the business of preventing men from going to work and in making demonstrations in favor of strikes.

After all is it not strange that men who wish to go to work are prevented from doing so by thugs in the United States uniform? No country is free where the right to work is shut off arbitrarily by a certain body of citizens, or worse yet, noncitizens, who take the law in their own hands and interfere with a man's right to labor for his living.

No Outcome in Negotiations with Miners

On October 17 the conference, foreshadowed in last week's issue, between William B. Wilson, Secretary of Labor; John L. Lewis, acting president of the United Mine Workers, and Thomas T. Brewster, who represents the coal operators of the Central Competitive Region, took place in Washington, D. C., and did not appreciably improve the situation. At the conclusion of the conference it was decided that the mine workers' acting chief should call his scale committee of 32 members to meet the 30 members of the operators' committee.

Mr. Brewster said the operators were willing to debate the issue (1) if the mine workers would recognize the contract had signed as still being binding, (2) if they would rescind the strike order and continue work pending negotiations and (3) if they would further concede that there would be no reduction in hours. A meeting was called, however, for Tuesday, October 21.

On the same day Mr. Lewis issued a statement asserting that the operators were profiteering and were charging in many cases $1 more per ton as a result of the threatened strike. The operators in making their reply to Mr. Wilson's request for a further conference made the following statement explaining the attitude of the coal operators to collective bargaining:

"The operators deem it advisable to say that the coal operators of the Central Competitive Field have adhered to the principles and practices of collective bargaining for 35 years with the largest body of organized labor in the United States, and it is their opinion that the scale negotiations have broken down and that the contract has been abrogated by the miners' union in their call for a strike on Nov. 1, because the present system of collective bargaining does not fix equal responsibility under the law upon the employer and the labor union.

"Our experience teaches us that no set of employers should agree to a system of collective bargaining which does not make both parties to the contracts equally liable and responsible for the observance of the terms of such contract."

Mr. Brewster also sent to each member of the Senate and House a copy of the letter written to Secretary Wilson, in which Mr. Brewster concluded:

"To prevent any misconstruction of our reply, we desire to say that during the 33 years that we have been bargaining collectively with our employees, the miners' union has never carried out the terms of the various contracts as a business man is required to carry out his contract with others under the laws of the United States. This failure to carry out contract obligations is due in part to the inability of the miners' officials to control the members of their organization in the absence of legal responsibility."

When Oct. 21 rolled around, the operators were present at the assembly hall of the Red Cross Building to meet the mine workers, but four hours of conference did nothing to bring them closer together. The operators had no intention of making any concession on the three points which they had presented in the meeting of Oct. 17 and which they regarded as no fit matter for argument. The mine workers' leaders did not give way because they were not given the right by the Cleveland convention to make any concessions. The union leaders were merely devil's advocates to present, argue, and if possible, secure the whole or more of the ridiculous contract.

P. H. Penna, of Indiana, presented the operators' argument, and James L. Lewis that of the mine workers. Secretary Wilson suggested quite casually that the conference be reopened on the next day, to which both sides readily assented.

The folly of the conference lay in the assumption by Mr. Wilson that the operators, rather than the public, were battling with the mine workers and that he, Mr. Wilson, was trying to get them, the operators and the mine workers, together. The fact is that the operators, while not appointed representatives of the general public, are the only representatives the public has in a conference with the mine workers, and a representative of the public, such as Mr. Wilson is, should not be neutral, but support the public in the person of the operators, except insofar as he may believe in the rights of the mine workers to a partial settlement of their claims.

The administration violates its oath to serve the public when it is neutral about a matter of such paramount importance to the interests of its client. No one has yet seemed to visualize the fact that wage increases are injurious to the prosperity of the citizens of the State because they, and they alone, must ultimately pay them. Advances may be essential to the health and well being of the workers receiving them, or may be necessary to meet living costs. In such cases they are justified. If not, they are impositions on the other citizens of the republic and to be condemned as subversive of the public weal.

On the same day the Senate discussed the matter—occasionally, as is usual, with more heat than judgment. True, it took the right side in the controversy—the side of the public—but it misrepresented the facts, for despite what Senators may say, the large demands of the mine workers' leaders do reflect accurately the opinions and demands of the local representatives and probably those of the members of the union, as a whole, though a referendum would reflect the sentiment more completely.

It might be fair to question whether the union and non-union mine workers as a body want to so profiteer on the public, but the Senators reason without their host if they think the mine leaders are the source of the unreason. The local representatives at the convention did not so believe, as was shown by the fact that they removed all right on the part of their advocates to concede a jot of any one of the numerous demands. They required that all or none should be granted.

However, there was exhibited a desire in the Senate that the collective bargaining should be collective and not mere union bargaining, and Senator Knox, of Pennsylvania, suggested the enactment of a law declaring it to be illegal to institute any strike that affected commodities moving through interstate commerce, unless all the men, union and non-union alike, involved in the proposed strike have voted on it.

Senator Pomerene, of Ohio, wanted the Federal Government to take control of the situation, and Senator Warren suggested that the exemptions granted to organized labor in the operation of the anti-trust laws, be removed.

In the meeting of Oct. 22 Secretary Wilson made a proposal:

"That wages be increased at the expiration of the present contract in an amount equal to the difference between the increases in wages received by the mine workers since July, 1914, and the increase in the cost of living since that date, that the increase be effective from the termination of the present agreement until Mar. 31, 1920, that, on these conditions, the strike order be withdrawn and the miners continue at work on these terms, that negotiations be entered into at the usual time for making the new scale effective after March 31, 1920."

John L. Lewis wanted to know when the present contract should be held to expire; whereupon Mr. Wilson said it was a matter of negotiation. Much ill blood arose from a reference made to the speech in the Senate on the previous day in which Senator Frelinghuysen said Mr. Wilson had told the Interstate Commerce Committee that the mine workers' demands were "impossible.

Mr. Wilson said that he had stated that the positions of both mine workers and operators were of that character. Mr. Lewis sharply attacked Senator Freylinghuysen "for deliberate misrepresentation of the facts" and declared that "the mine workers did not want to continue the conference if they were before a packed jury."

Today the leaders of the mine workers' unions voted to reject the proposals of the Secretary of Labor. The delegates met in the American Federation of Labor's headquarters, and John Lewis declared after the meeting that "the offer is inadequate, insufficient and fails to meet the necessities of the situation."

Reversing a Fan

If the violence of an explosion in a mine has not destroyed the ventilating fan or appliances, they should be kept in operation. The matter of the advisability of reversing the ventilating current is of great importance and requires a knowledge of the conditions within the mine and of the course of the ventilating currents prior to the explosion. The ventilating current should not be reversed without good reason, and the desirability of reversing the current depends entirely on local conditions, the plan of ventilation and the direction of the current on the main haulage roads and manways. Most of the men alive within a mine after an explosion attempt to escape by their usual road of travel, irrespective of the intake or return currents of air. However, if an underground official or superintendent is within the mine at the time of the explosion he may assemble the men and divert them to a road or manway that he knows is normally on the intake air current. Prompt reversal of the ventilating current has doubtless saved the lives of many men, generally, however, in mines where the fan prior to and at the time of the explosion was forcing the air, and the main haulage roads and manways were on the return current. Reversal of the ventilating current furnished fresh air to the traveling way, making possible the escape of the men. On the other hand, reversing the current has sometimes resulted in an explosion owing to the explosive gases liberated by the mine or by a fire being moved back over a fire.—*Rescue and Recovery Operations in Mines.*

In an organization effected for the purpose of rescue work in a mine after a disaster supply foremen, brattice foremen and shift bosses are necessary. The supply foremen should be given a sufficient number of workmen to enable them to furnish the brattice men enough material for constructing brattices and stoppings, so that no time may be lost in waiting. The brattice foremen should devote their time to directing the construction of brattices and stoppings for the establishment of ventilation.—*Rescue and Recovery Operations in Mines.*

Stretchers will be needed for removing the injured and the dead in a mine after a disaster. Carpenters should be set to work constructing stretchers, which may be made of brattice cloth or canvas nailed to boards 7 ft. 6 in. long by 4 in. wide by 1 in. thick. Each stretcher should be not less than 22 in. wide. The handles should be cut to 2½ in. wide with smooth edges. For carrying the injured, the stretcher should have spacers at each end of the canvas to hold the sides apart.—*Rescue and Recovery Operations in Mines.*

No feature of the work connected with the exploration of a mine after a disaster is more important than the rescue of persons who may still be alive. This work calls for mature and deliberate judgment on the part of the person in charge. Men who have had experience in exploring exploded mines and men who have been trained in recovery operations and in the use of rescue breathing apparatus should be asked to confer on plans and method of procedure.—*Rescue and Recovery Operations in Mines.*

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Safety in Shotfiring

Letter No. 2—The article describing the Gentry shotfiring device, COAL AGE, Sept. 18, p. 489, will doubtless interest all mining men who have had experience in the handling of explosives and shooting coal. Judging from the account given, it would seem that the device would certainly be a boon to men engaged in driving rock tunnels, sinking shafts, or performing other work where more than one blast must be fired at the same time. It should also fill a long-felt want in the mining of coal, and increase the safety of shotfiring in mines.

This recalls to my mind a letter that appeared some time ago in COAL AGE, drawing attention to the more improved methods in shotfiring (Vol. 15, p. 416). I wonder that this subject has not been further discussed by readers, as it is worthy of careful attention. Many devices have been invented with a view to increasing the safety of shotfiring in mines, but as yet we have been unable to stall the fatalities growing out of this branch of the work.

Allow me, in this connection to cite a sad accident that happened in the use of a small electric battery for firing shots. About three years ago, one of the large companies operating in this locality adopted the plan of every miner firing his own shots by the use of a small portable battery. The plan gained favor rapidly with the men up to the time of the accident, which caused the death of two of the workers.

It happened in this instance that two miners and their laborers were engaged in driving a pair of headings, a gangway and an airway. As their working places were close together, the miners agreed to use the same battery, which they left at a convenient point on the gangway, a safe distance back from the face. In order to expedite the work of firing the shots when prepared, the men used separate wires, a gangway wire and an airway wire, the latter being carried through a crosscut near where the battery was located and thence to the face of the airway.

The day of the accident both miners had prepared their shots and the gangway miner and his laborer went back to the battery, intending to fire the gangway shots, while the airway miner and his laborer waited at the face of the airway, instead of going back to the battery. Perhaps, the latter were gathering up their tools, after coupling up their wires to the primer, in readiness for firing their own shots. By a grievous mistake, however, the gangway miner very carelessly connected the airway wires with the battery and both of these men waiting at the face were killed instantly.

This accident would have been avoided had the men used the precaution of not coupling up the wires to the primer at the face until after the other shots had been fired; or, better still, if they had gone back to the battery at the same time with the gangway men. But miners are prone to take chances and frequently lose out as in this instance.

Following the accident that I have just narrated, the company went back to the old method of firing with squibs and fuse. Speaking of shotfiring devices, it is clear that these must be thoroughly understood by the persons using them.

The device must be simple in construction, foolproof and have a good lock fastening, so that no one can use it except the competent person who has it in charge and holds the key.

Shotfiring at the best is a hazardous operation requiring care and the use of every precaution to avoid accident. In my opinion, all shots should be fired between shifts or by a competent shotfirer. Under no circumstances should a shot be fired in a place worked with safety lamps, except when special permission is given by the fireboss or mine foreman. Notwithstanding this, to watch some miners handling explosives, it would seem that they were engaged in playing some harmless game.

Practical demonstrations and moving pictures designed to show the danger of the careless use of explosives go far, I think, to impress on the miners the risks they assume. But, in addition to this, there should be enacted more strict laws regarding the handling and transporting of explosives in and around mines. Any miner who is permitted to use an electrical device for firing shots should take it with him to the face of his place where he can look after it until he is ready to fire.

A firing battery should be the last thing to be connected, and this should be done only after sufficient warning has been given everyone in danger. Before firing, all wires should be carefully examined to see that there are no short-circuits or breaks in them. It is a good practice to keep the wires on a spool instead of allowing them to lie along the rib where they are liable to injury. It is important, also, to keep an electric-firing device in a dry place, as dampness lowers the voltage and may cause a misfire.

West Pittston, Penn. RICHARD BOWEN.

Bolshevism in America

Letter No. 7—I have been reading with much interest the letters on Bolshevism which have been appearing in *Coal Age*. It is a pleasure to note that the interest aroused on this subject has been spreading. It does seem entirely unfair for the Government to be so slow to take action in deporting undesirable citizens, on the fact of what real Americans suffered and endured during the recent war.

To the the situation seems to be one that has not so much to do with the causes and results of Bolshevism as that prompt action should be taken in ridding the country of those so inclined. I think John L. Lewis, acting president of the United Mine Workers of America, has opened a new field for the arbitration of labor's problems and at the same time closed the doors to anyone with a Bolshevistic inclination, when he stated in calling off the strike that no matter what the justice of their cause seemed to them, they could not go against the statutes of their country.

As far as the high price of commodities is concerned, it is unreasonable to not expect some reaction to follow a war of the size of the one recently concluded. As long as wages keep pace with the high cost of living there should be no complaint. One is rather prone to forget the increase in wages and look at only one side, which is a human characteristic but entirely a selfish one. Much of the present unrest is due not so much to Bolshevism as it is to the inability of one to see the moat in his own eye, a situation that furnishes a fertile field wherein the real seeds of Bolshevism may flourish.

Boswell, Penn. MACHINE MAN.

Lawful Examination of a Mine

Letter No. 6—Referring to the letters that have appeared recently in *Coal Age*, outlining the work of a fireboss and explaining what is required to make a lawful examination of a mine, allow me to state briefly my way of looking at the matter.

In the first place, the fireboss must be able to detect any gas present in the mine air, by observing its effect on the flame of his safety lamp. He should be a certified man that has stood a successful examination before the examining board and gotten his papers. In my opinion he should have had at least three years' experience in gaseous mines, possess a practical working knowledge of the ventilation of mines and be fully acquainted with all ventilating machinery and the means used to conduct the air throughout the mine and distribute it so as to meet the requirements in each section.

I fully agree with the suggestion that the fireboss should enter the mine not more than three hours ahead of the shift, either day or night. He should place a danger board or, better, a red light at the entrance when he goes into the mine, as a warning for no one to enter until he has completed his examination and removed the danger signal.

In the examination of the working places in a mine, it is a good practice, in my opinion, to have a board nailed to a prop near the face of each place, similar to that shown in the accompanying figure. The fireboss should then mark on the board in each room the date and hour he examined the place. He should also mark the date with chalk on the roof close to the face, as evidence that he has been up to the very face.

After completing his rounds and returning to the shaft bottom, or mine entrance, the fireboss should make out his report, in a book kept for that purpose, and state what dangers he may have found in the places examined. He should then remove the danger signal at the entrance and check the men in as they go to work, taking care to hold the checks of these men whose places he has found not safe for work.

Let me say, here, that no examination of a mine is lawful or complete, unless the fireboss has made a thorough inspection of all roads, airways and passageways in his section and knows that the air-courses are not blocked and that all doors are closed and the air traveling properly throughout the entire section. Wherever a place is found to be unsafe for work, it should be fenced off so as to warn men not to enter. Notes should be made, also, where dust has accumulated on the road or in the working places.

In this connection, let me refer to the work of shotfirere and say that where such are employed they should always carry only a safety lamp and test every place for gas, besides charging, tamping and firing each hole. No shots should be fired in a place before making the test for gas to see that it is safe.

Roda, Va. A. T. WADE.

Markers on Mine Trips

Letter No. 5—Referring to the inquiry of J. J. S., *Coal Age*, Aug. 28, p. 397, permit me to offer the following comments:

As a first consideration, the conditions described by J. J. S. are dangerous and should not be tolerated. I am of the opinion that the remedy of these conditions is of more importance than finding a good trip marker.

To insure safety the following conditions should be eliminated: 1. The steam locomotive should not be used underground. 2. Men should not be allowed to travel the main haulage road.

However, if the conditions mentioned must remain, I would suggest that shelter holes be made not over 30 or 40 ft. apart, the same to be whitewashed all around. There should also be good ventilation provided, making this haulage road a separate split of air returning into the main return, so as not to allow this air to circulate in the workings or any other headings that men may have occasion to enter.

If electric current is available an electric light should be installed at each approach to a curve in the road, and the entire curve whitewashed. There should also be provided shelter holes at each approach. In addition to this there should be plenty of clearance on the curve and the same clearance should be maintained the entire distance on roads that men are required to travel.

If the cars, as J. J. S. says, make more noise than a dozen ordinary gongs, I should think his problem is already solved without the additional warning devices. As for using lights as markers I have never found a carbide lamp that was reliable to hang on a car, and I have tried some very good makes. As far as lights are concerned, the oil lamp is superior to any carbide light for that purpose, especially if the trip attains any speed. But I would think that a good strong carbide light could be used on the locomotive to advantage, as there would then be a case to protect it from a strong air current caused by the speed of the trip.

We have had part of this trouble ourselves and have used for a marker, on a trip descending a 13 per cent. grade, an oil lamp, which proved more reliable than several makes of carbide lamps previously tried. We have also used gongs that were actuated by the vibration of the trip, but found that on a fast moving trip they hardly gave any warning in time to allow men to reach a place of safety, unless good clearance is provided at the side of the road.

However, I am of the opinion that the safest means for J. J. S. to adopt would be a manway that would avoid the necessity for men to travel this heading. But where men must travel the haulage road it is important to provide plenty of clearance so that at no time will they be required to walk on the track.

In Pennsylvania the mining law requires that, on all animal and mechanical haulage roads, holes for shelter shall be cut into the strata at least every thirty yards, not less than two and one-half feet deep, four feet wide and level with the road. These refuge holes must be kept whitewashed and clear of obstruction; except in entries where rooms are driven at regular intervals not exceeding ninety feet.

Portage, Penn. JEROME C. WHITE.

A byproduct coke oven has been developed to a high degree of perfection in the United States. Nevertheless, the question has arisen among some engineers as to the prevention of waste heat by radiation. Furthermore, in the coking process the carbonization is carried on by the heat from the gases which must pass through about 6 or 8 in. of firebrick. Is this not another source of waste heat? Does it not take a longer time than necessary to carbonize the coal by this method? Would it not be well to investigate these requirements with an idea of working out details which would do away with some of this waste?

The smaller sizes of anthracite buckwheat—Nos. 3 and 4—are well adapted for raising steam under hand-fired boilers if the buckwheats are clean and a proper mixture with bituminous coal is used. These two conditions are absolutely essential. In using these mixtures it would be well to fire thin, and the green coal should be thrown on the fire when the latter is quite hot. If this method is used, a decided coking effect is secured that will produce a granulated fuel about pea coal size. The fire should be kept loose and high-pressure draft can be used to advantage. A satisfactory feature of this mixture in burning is that it tends to do away with hard clinkers; that is particularly desirable when used with stokers.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Tennessee Foremen's Examination held at Nashville, Sept. 1919

(Selected Questions.)

QUES.—(a) What is firedamp? (b) What is the lowest explosive point of firedamp? (c) What is the highest explosive point?

ANS.—(a) Firedamp is any inflammable or explosive mixture of gas and air. (b) The lower explosive limit of pure methane and air is reached when the proportion of gas to air is 1:13, the mixture then containing 7.14 per cent. of gas. (c) The higher explosive limit of pure methane and air is reached when the proportion of gas to air is 1:5, the mixture then containing 16⅔ per cent. of gas.

QUES. If you were foreman of a mine where 18 in. of drawslate overlaid the coal, what instructions would you give the men in regard to timbering?

ANS.—This is a heavy drawslate and requires to be well timbered at the face, both in entries and rooms. Good posts must be set at the sides of the entries, not more than 4 feet apart, and in rooms at least three rows of posts must be kept standing parallel to the face. The posts in each alternate row should be staggered. Special instructions should be given to the men to reset any posts that are blown out by shots, and this must be done before proceeding to load any coal. Good cap-pieces must be used over the posts. These should be set transversely in the row next the track and longitudinally over the other posts.

As the face of a room is advanced, the rear posts are withdrawn and the slate allowed to fall in the waste and over the road. Permanent timbers must then be set to support the roof over the road. If the coal is cut by machines, it may be necessary to draw and reset each post in the first row as the machine advances along the face. This will depend, however, on the strength of the slate and to what degree it is self-supported.

QUES.—What dangers arise from lack of judgment in locating shots?

ANS.—When a miner uses poor judgment in locating a shot, there will be danger of the charge blowing the tamping and not breaking down the coal, or much of the coal may be blown into small fragments. In the former case, the charge is laid too deep on the solid and, as a result, the line of least resistance is along the axis of the hole, which causes the tamping to yield before the coal is broken down. In the latter case, the charge is laid at too shallow a depth and the force of the blast completely shatters the coal.

It may happen that a shot will seam out instead of breaking down the coal, owing to the charge being located in a soft stratum of the seam. At times, the poor judgment of a miner will locate a charge too close to the roof, breaking the slate and making the top dangerous for future work.

QUES.—What conditions determine the width of rooms and entries?

ANS.—The width of entries is determined chiefly by the character of the roof and coal, thickness of seam, depth of cover, nature of bottom and the intended use of the entry. Airways must have a sectional area sufficient to pass the required volume of air at a suitable velocity. On this account, airways driven in a thin seam will often have a correspondingly greater width to avoid the expense of taking down top or lifting bottom to secure the necesasry area.

The width of haulage roads must be sufficient to give a good clearance on one side of the road, sufficient to permit men to pass the loaded cars where the road is required to be used as a traveling way. Again, a haulage road driven in a thin seam will often require a greater width, in order to give room for stowing the material taken down from the roof or lifted from the bottom to make the necessary headroom on the road.

In driving rooms, the relative width of opening and pillar is determined by the nature of the roof, floor and coal, depth of cover, thickness and inclination of seam and, to some extent, by the presence of gas or water in the strata and the manner in which the coal is to be mined.

QUES.—What percentage of relative humidity would you consider necessary in a dry and dusty mine?

ANS.—The relative humidity of mine air is of more importance in its relation to the human system than in respect to its rendering the dust of a mine less dangerous. Even a hundred per cent. of relative humidity, which represents a saturated condition of the mine air, would not be sufficient to render the fine dust generated in a mine an element of no danger. It has been shown that, to reduce the dust danger in mines, requires the thorough saturation of the dust with water, which would not be possible to accomplish by maintaining a saturated condition of the mine air. On the other hand, a high percentage of moisture in the air weakens the workmen. The best physical condition of mine workers is attained when the relative humidity of the air does not much exceed 60 per cent.

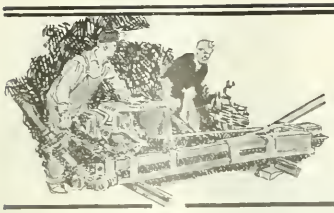
QUES.—What quantity of air will be required to ventilate a mine working 250 men, 12 mules and using 3 gasoline haulage motors?

ANS.—If the mine is generating firedamp, the Tenessee mining law requires 150 cu. ft. of air, per man, per minute, and 600 cu. ft., per mule, per minute, which would mean a total circulation of $250 \times 150 + 12 \times 600 = 44{,}700$ cu. ft. of air per minute .

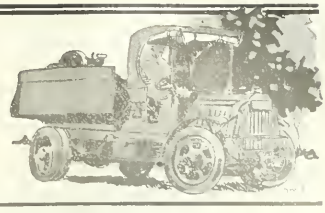
In a dusty mine, only, the law requires 100 cu. ft. per man and 500 cu. ft. per mule, which would mean a total circulation of $250 \times 100 + 12 \times 500 = 31{,}000$ cu. ft. of air per minute.

In mines generating neither gas nor dust in dangerous quantity, the law requires 85 cu. ft. of air, per man, and 500 cu. ft. per mule, which would mean a total circulation of $250 \times 85 + 12 \times 500 = 27{,}250$ cu. ft. per minute.

Nothing is said in the law in respect to the circulation required by the use of gasoline locomotives on haulage roads. In the opinion of many competent mining men, these should never be permitted. There is however a wide difference of opinion upon this subject and the increasing use of these machines will doubtless sooner or later call for some legal provision covering their air requirements.



COAL AND COKE NEWS



Charleston, W. Va.

Best car supply in southern coal fields of the state in recent months. Output 75 per cent. New River field fares well, car supply well maintained all week. About 75 per cent. car supply in Kanawha region.

Favored with a car supply far superior to any furnished in recent months, mines in central southern West Virginia pushed production up several pegs during the week ended Oct. 11. On a general estimate, taking the state as a whole, it may be safely stated that the output was approximately 75 per cent., possibly somewhat in excess of that. When work was begun in some of the fields in this section on Oct. 6 there was more than a 100 per cent. car supply, representing a Sunday accumulation. While the supply was smaller during the other five days of the week, the surplus supply of Monday tended to increase the average for the six-day working period. With mines able to be operated with more regularity, the shortage of men in the various fields made itself somewhat more manifest, though not as yet alarmingly large.

The New River field was one of the districts furnished with more than a 100 per cent. car supply on Monday, Oct. 6. Consequently this district fared better than a good many of the neighboring fields, although there was an increased supply of cars available in such fields. Contrary to the usual state of affairs, the run of cars was well maintained throughout the week, enabling operators to more nearly meet the demand, although no one had any coal to spare or indeed enough to take care of contracts and at the same time supply any free coal in the open market.

Benefits accrued in the Kanawha field during the week ended Oct. 11 when the Chesapeake & Ohio R. R. succeeded in keeping the supply of empties up to a much higher level than usual; the supply averaged in the neighborhood of 75 per cent. throughout the week, production consequently amounting to about 150,000 tons. This represented a gain of about ten per cent. over the previous week, operations as a natural sequence being much more regular.

Fairmont, W. Va.

Coal loading reached top notch in Fairmont region for week ended the eleventh. Despite Curtis Bay embargo and irregular Lake demand, Heavier Inland Western tonnage. Monongahela R. R. furnished 100 per cent. car supply.

Despite the fact that the Fairmont region was threatened with a shortage of cars at one or two points during the week ended Oct. 11, and despite the fact that there was an actual slump about the middle of the week, reports from the entire region indicate that the loading of coal (for the year) reached the top notch during the period ended the eleventh. This was accomplished also in spite of the fact that shippers were laboring under several handicaps. In the first place shipments to Curtis Bay were debarred except under special permit, and in the next place the demand at the Lakes was very irregular. Yet operators managed to meet such conditions and to increase the production for the week without resorting to storage.

Heavy shipments during the first three days of the week ended the eleventh counted in favor of increased production for the week as a whole. For a couple while 115 cars were shipped to the Lakes on the eighth, the number had dwindled to 15 the next day. There appeared to be a heavier tonnage bound for inland western markets, however, than during the earlier months of the year. The tonnage of coal shipped for railroad use was not as large as might have been expected.

Trouble has been experienced in keeping Curtis Bay clear of congestion, but the Baltimore & Ohio has announced that it will put one of its old piers there in commission again. Boats furnished have not been adapted to prompt loading. This will be remedied as far as possible, it is announced.

The improvement in the car supply was not confined to the Fairmont region, other northern West Virginia fields also receiving a larger run of cars. The Monongahela R. R. was able to furnish its mines with nearly a 100 per cent. supply of cars throughout the entire week, and, while cars were not so plentiful in other parts of northern West Virginia, there was a visible improvement over September.

Bluefield, W. Va.

Continued decrease in Pocahontas production. Transportation disabilities increasing while man power losses are being reduced. Output 60 per cent. Production gains in the Williamson field. Kenova-Thacker tonnage now same as mined during the same period of 1918.

Production slipped back again in the Pocahontas district during the week ended Oct. 11, it being the second consecutive week in which decreases in production have been observed; the loss as compared with the week ended the fourth being 11,00 tons or the difference between 316,000 and 305,000 tons. In other words, the loss in production since the week ended Sept. 27 now amounts to 60,000 tons. During the week ended the eleventh, increased railroad disabilities cut deeper into production, the increased loss from such a source being 33,000 tons; car shortage losses having ascended from 82,000 to 115,000 tons, although there was a 3,000-ton increase in the loss from general causes, while man power losses were being reduced.

It is probable that the eastern embargo reduced shipments to some extent, cutting off as it did export tonnage, which has been quite heavy recently, for a period of two days. For a time the output of the Pocahontas region was on the increase but transportation difficulties are now holding it down to approximately 60 per cent. Of course under present conditions it is absolutely impossible for Pocahontas producers to even approximately meet the demand for their coal or to take care of contracts, there being a strong continued demand for that kind of fuel.

While production was on the down grade in the Pocahontas region, the reverse was true in the Williamson field, where there was a gain in the output of 4,000 tons, although the car shortage was still entailing a production loss of 25,000 tons. The increase was achieved also despite the fact that the working time of 2,655 hours was even less than during the week ended Oct. 4. Under such conditions production was maintained at about 72 or 73 per cent., with an excellent demand in evidence for coal from this district, and with prices about on a par with those of previous weeks. About the same tonnage is now being produced in the Kenova-Thacker district as was mined and loaded during the same period of 1918.

Huntington, W. Va.

Decrease in output of Logan field due to greater car shortage. Eastern embargo sends entire Guyan production to the West for two days. Later heavy export shipments resumed. Possible labor trouble multiplies inquiries in Logan field. Coal moved by C. & O. for week ended the eleventh was 689,950 tons.

Slight retrogression of production was witnessed in the Logan mining district during the week ended Oct. 11, the output falling off about 8,000 tons. Such a decrease was attributable altogether to an increase in the car shortage; the weekly output was held down to 65 per cent. of capacity as against 66 per cent. for the previous week. There was an increase in the car shortage loss of about 11,000 tons, and the time lost from the same cause was two hundred hours heavier (to an hour) than the loss during the previous week.

In respect to labor shortage, there was an improvement, but increased mine disability was apparent, the total loss being about 4,000 tons heavier than during the week ended Oct. 4. During the weekly period ended the eleventh, a two-day embargo affected shipments to some exetnt, no coal being permitted to be moved to eastern markets, so that it was necessary to ship, during a third of the week, the entire production of the Guyan field to the West. By Monday, Oct. 13, the embargo on eastern shipments had been lifted and the heavy export shipment of coal had been resumed.

Steam coal was in brisk demand, as were all other grades, present business conditions failing to affect production or shipments. Following the announcement that miners and operators had broken off negotiations at Philadelphia, inquiries in the Logan field were multiplied, it being apparent that many buyers were much perturbed about their future supplies of coal and were endeavoring to make arrangements for a sufficient supply to tide them over an emergency.

The increase in the amount of coal transported by the Chesapeake & Ohio during the week ending Oct. 11, over the previous week, was in excess of 200 cars, coal loading for the latter week being 13,799 cars, while during the week ending Oct. 4 the number of cars handled was only 13,587. Transportation of 13,799 cars meant the handling of 689,950 tons of coal.

Pottsville, Penn.

Plans under way by anthracite operators to secure benefits of daylight-saving next year. Law repealed had proved beneficial. Many cities and industrial sections plan to take action as to daylight saving during next year.

Passage of the repeal of the daylight saving law by Congress was heralded in the anthracite region with chagrin by both operators and miners, and plans are under way to conduct the industrial affairs of this region next summer just as though the law had not been repealed. It is said that the collieries will start to work an hour earlier and all industrial establishments will be asked to do likewise.

An anthracite correspondent states that "the daylight saving law made possible the greatest revival of baseball the region ever witnessed. By the additional hour of sunlight it was possible for the young miners to finish their work, get their evening meal and participate in the games without any

undue difficulty. Much of this pleasure would have to be foregone by this element of the mining population unless an early working hour is fixed upon next summer." The operators are reported to have said that the law had a beneficial effect upon the population in the anthracite region and helped to keep down the spirit of unrest so manifest here as elsewhere. They declare its repeal was a great mistake upon the part of Congress.

In this connection there has been a move on the part of some to have the early hour for commencing work in force the year around. This question has been commented upon editorially in the columns of COAL AGE and objection was raised to getting the employes out to work at an unusually early hour on cold winter mornings. However, during the months in which the daylight-saving law has been operative for the last two years, the satisfaction with its practical working has been general in cities and in most industrial centers. Some urban communities are planning to enact an ordinance to secure daylight saving next year. Possibly many industrial sections will take similar atcion.

Columbus, Ohio

Wash rooms for miners of State of Ohio required by act of General Assembly. Conditions of the measure. Chief Deputy of Mines, Jerome Watson, calls the attention of operators to this act.

An act was passed by the Eighty-third General Assembly of Ohio to supplement Section 934 of the General Code by the enactment of Section 934-1, requiring washrooms to be provided and maintained at coal mines for the use of employes. The act further states: "Every owner, operator, lessee or agent of a coal mine, where five or more persons are employed, shall provide and keep in repair a wash room, convenient to the principal mine entrance, adequate for the accommodation of the employes, for the purpose of washing and changing their clothes when entering and returning from the mine. Such wash room shall be properly lighted and heated, supplied with warm and cold water and adequate and proper facilities for washing purposes." It is further stated, "This act shall take effect and be in force from and after Apr. 30, 1920."

Under date of Oct. 7, 1919, the Chief Deputy and Safety Commisisoner of Mines of Ohio, Jerome Watson, addressed a letter to the operators of the state calling their attention to this act. He comments that "The Mining Department realizes that some time will be required to build and equip wash rooms such as will be necessary to adequately furnish accommodation for the miners at the various mines of this state, and we respectfully call your attention to this act, and earnestly request your co-operation in seeing that this law is complied with."

For some years the more progressive coal companies throughout the principal mining fields of the country have provided wash and change houses for their men convenient to the principal mine openings. This act of the State of Ohio calls to mind a notice which at one time was posted in a certain Norfolk & Western R. R. station near the Pocahontas coal field of West Virginia, which read, "Gentlemen will not smoke here, others must not."

Personals

Charles M. Shinn, heretofore district engineer of the Consolidation Coal Co., with headquarters at Fairmont, W. Va., has been appointed superintendent of mine No. 37 of the company. He succeeds A. D. Woodford, resigned. Mr. Shinn has been connected with the engineering department of the Consolidation company for the last 15 years. He was a lieutenant in the artillery corps during the war.

Henry O'Neill has been named as superintendent of mines Nos. 27 and 48 of the Consolidation Coal Co. at Glen Falls, Harrison County, W. Va. Mr. O'Neill was promoted from the post of assistant superintendent at Berryburg, Barbour County, W. Va.

B. G. Ash, who has been acting as superintendent of mines 27, 48 and 25, has been relieved of the responsibility of supervision over the first two named operations in order to give his entire time to mine No. 25 at Clarksburg, W. Va. He was succeeded at Nos. 27 and 48 by Mr. O'Neill.

R. J. Stegal entered upon the discharge of his duties as auditor, in charge of all accounts of the Geo. M. Jones companies in Logan County, W. Va. Mr. Stegal was, up until Oct. 1, County Clerk of Fayette County, W. Va. He was at one time purchasing agent for the New River Co. with headquarters at Macdonald, of the same state.

George M. Wolfe, heretofore general superintendent in West Virginia of the operations of the Jamison Coal and Coke Co., is now Philadelphia manager of the operations of the Operators' Fuel Agency. Before he left Fairmont he was presented with a handsome gold watch by employees of the Jamison company as a token of their friendship and regard.

James W. Darville, who for the past two years has been sales manager of the Industrial Coal and Coke Corporation, No. 1 Broadway, New York City, has resigned his position with this concern on Oct. 1.

F. R. Wadleigh has become associated with the Dodson interests as consulting and expert engineer. The Weston & Dodson Co., Inc., and the Dodson International Coal Corporation announce that the addition of Mr. Wadleigh to their Industrial Research Department Staff will add to the value and scope of its work; while his wide knowledge of the coal export trade, foreign coals and markets, will be of distinct value in placing the coals of this country in foreign markets.

Obituary

Arthur Havey Storrs died at Pelham Manor, N. Y., on Sept. 22. He had been in poor health and it is supposed that he fell in the water while walking along the shore and was drowned. Mr. Storrs was identified with anthracite mining for many years as an engineer, with headquarters at his home city, Scranton, Penn.

Dr. D. M. Hailey, pioneer coal operator of Oklahoma, who was associated with Col. J. J. McAlester in sinking the first shaft in the McAlester field, died at his home in McAlester, Okla., on Oct. 15. As a mark of respect all coa lmines in Oklahoma, under jurisdiction of the Oklahoma Coal Operators' Association, ceased work for five minutes at 3 o'clock on the afternoon of Oct. 16, at which hour the funeral was held. He had been actively associated with the Oklahoma coal mining business since 1898, being president of several companies at the time of his death.

Industrial News

Zanesville, Ohio—The Ohio Standard Coal Co., of this place, has been incorporated with a capital of $50,000. The incorporators are: Arthur W. Sieglaff, H. A. Taylor, Gus G. Katsampes, H. A. Sharpe, B. S. Goldman and P. H. Tannehill.

Clements, Md.—The Morgantown-Salkelt company, of this place, is making extensive preparations for the development of a large tract of coal. The concern is composed of Pittsburgh interests and Roy Salkelt is one of the chief owners.

Martins Ferry, Ohio—Former Congressman W. B. Francis, of this place, is at the head of a $200,000 coal company, which has purchased the holdings of the Yukon & Pittsburgh Coal Co. in Meigs County of this state.

Charleston, W. Va.—The Castle Falls Coal Co., of Clarksburg, W. Va., was incorporated to operate mines in Taylor County of this state, with capital stock of $50,000. The incorporators are: John A. Washington, H. B. Cooper, C. H. Harris, W. I. Shipplett and P. W. Bailey, all of Clarksburg.

Buffalo, N. Y.—The mine of the J. B. Jenkins Coal Co., at Mable, W. Va., has been sold to the Randolph Coal Co., of Elkins, W. Va. It has an output of about 100,000 tons annually and employs 100 men. The principal owner was F. P. Merrill, of Hornell, N. Y., but the management was in the hands of General Sales Agent Charles A. Storck, with an office in this city, where it has been since the organization of the company.

Lisbon, Ohio—All the holdings of the Canton Akron Coal Co., including coal lands, leases, mining and personal property, were sold by W. O. Wallace and J. E. Morget, the receivers of the company. The new owners are: L. D. Blanchard, N. E. Wise, F. M. Schumaker and W. M. Galley.

Charleston, W. Va.—The Davenport Coal Co., of Charleston, has been incorporated to operate mines in Kanawha County, with a capital stock of $300,000; incorporators, Maurice E. Preisch, Isaac S. Given, Elbert E. Johnston, W. H. Farmsworth, Lewis H. Manley and Ormus Davenport, of Buffalo, N. Y.; Geo. R. Stephens, of Lancaster, N. Y.; Geo. J. Brendel, of Hamburg, N. Y., and Godfrey E. Heizer, of Orchard Park, N. Y.

Louisville, Ky.—A rumor from Madisonville, Ky., originating in "The Hustler," the principal newspaper of that city, is to the effect that Eastern capitalists are planning a merger of some 47 large coal companies in that section, including mines in Webster, Christian, Muhlenburg, Hopkins and Union counties. It is alleged that the deal will involve a capital of $50,000,000. The rumor states that investigation of conditions has been under way for some time past, and that options are thought to have been secured on several mines. Another rumor is to the effect that the men behind this organization have plans for developing southern coal markets by the Ohio River waterway.

Coming Meetings

American Society of Mechaical Engineers will hold its annual meeting Dec. 2-5 in New York. Secretary, Calvin W. Rice, 29 West 29th St., New York City.

Canadian Mining Institute will meet Nov. 26-28, in Vancover, B. C. Canada. Dr. E. T. Hodge, professor of geology at the Univerasity of British Columbia, has been appointed general secretary of this meeting.

Coal Mining Institute of America will hold its 33rd annual meeting Dec. 3 and 4 at Pittsburgh, Penn. Secretary, H. D. Mason, Jr., Mine Safety Appliance Co., Pittsburgh, Penn.

American Mining Congress will hold its annual convention at the Planters' Hotel, St, Louis, Mo. Nov. 17-21. Secretary, J. F. Callbreath, Muncey Building, Washington, D. C.

Trade Catalogs

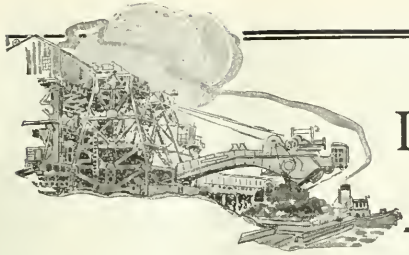
Steam Turbine Blading. Allis-Chalmers Co., Milwaukee, Wis. Pp. 26; 8x10¾ in.; illustrated. Bulletin No. 1104. Details of steam turbine blades, different types and notes on tests.

Harvard Engineering School. Harvard University, Cambridge, Mass. The official register of the University. Unillustrated; pp. 72; 5¼x7½ in.

Sawyer Belt Hooks and Wedges. Sawyer Belt Hook Co., Pawtucket, R. I. Price list No. 9. Pp. 52; 4¾x7¼ in.; illustrated.

Five Hundred Business Books. By Ethel Cleland, librarian Business Branch Indianapolis Public Library American Library Association, Library War Service, Washington, D. C. Unillustrated; pp. 72; 6x9 in.

Bibliography on the Roasting, Leaching, Smelting and Electrometallurgy of Zinc. School of Mines and Metallurgy, University of Missouri, Rolla, Mo. Illustrated; pp. 388; 6x9 in.



MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

The threatened strike of bituminous miners scheduled for Nov. 1 appears to have stimulated the buying of soft coal to a certain extent. While orders have not increased to the volume expected by jobbers and wholesalers, indications are not lacking that consumers who have been lethargic in the matter of their coal purchases are now anxious to obtain a reserve supply in the event that the Government does not intervene in the present situation and prevent the miners from stopping work. The Government, as a large consumer of coal, is vitally interested in the wage controversy, in that practically all of its contracts provide for the addition to existing contracts of any general wage increases that may be granted.

Prices of soft coal are advancing slowly. Of course, consumers who were wise enough to contract for their requirements are not affected by the increases. It is only those buyers who come into the market from time to time and pick up odd lots of "free" coal who are hard hit.

At the New York piers the receipts of soft coal have been somewhat upset by the effects of the longshoremen's strike. Embargoes were placed on coal shipments for days at a time, and some factors were obliged to route their coal in other directions. Boats have accumulated, and dispatch to New England and points on Long Island Sound are much slower the present week. The market in New England, however, is still much restricted, for stocks are ample.

In the Middle West business is booming. Factories that have hitherto been burning coal from their storage piles are now coming into the market and frantically requesting operators to ship them coal. It must be said in all fairness, however, that operators are not taking advantage of the present situation to boost prices or indulge in profiteering.

Though threatening to strike, the bituminous miners are producing more and more coal. The output for the week ended Oct. 11 is estimated at 11,924,000 net tons, which is greater by 311,000 net tons than that of the first week in October, which had hitherto been the highest this year.

All of the domestic sizes of anthracite are being called for urgently. Steam coals continue to drag and the market in these grades shows just the slightest improvement. The production of anthracite during the week ended Oct. 11 is estimated at 1,955,000 net tons, an increase of 34,000 net tons

BOSTON

Prices swing upward. Market still restricted. Sharp demand for transportation. Longshoremen's strike in New York causes embargoes. Impression locally that bituminous mines may suspend, but buyers largely indifferent. Hampton Roads situation unchanged. Anthracite needs urgent.

Bituminous— This week shows a pronounced lift in prices for shipment all-rail. Ordinary grades from Central Pennsylvania are now quoted at $3.20@3.35 per net ton f. o. b. mines, all prices being made subject to prior sale. A few conservative operators are disinclined to ask much if anything over the yearly contract basis on the ground that "profiteering" would not put them in a favorable light with mine-workers who are agitating for an increase in wages. In any case, prices as a whole range distinctly higher than a week ago.

The market in New England, however, is still much restricted. Stocks are ample and what spot demand appears is mostly confined to tide-water consumers who are anxious over the prolonged strike of engineers on the ocean tugs. The trade is therefore confronted by a situation where prices are rising but without any broad market.

The continued strike of the tow-boat engineers has created a shortage in transportation that for the time being is causing a sharp demand for steamers. Several shippers have commitments along the coast that were based upon barge delivery and in some quarters there is enough local anxiety to cause a certain urgency for prompt steamers from Hampton Roads. While a few additional steamers have been allocated the coastwise trade, a number of those already engaged are unfit for winter service and will soon have to be withdrawn. The anthracite situation also has a bearing on the demand for steamers at ports like Boston, Providence and Portland.

At the New York piers the receipts of coal have been somewhat upset by the effects of the longshortmen's strike a week ago. Embargoes were slapped on and for some days shippers were obliged to route their coal in other directions. Boats accumulated and despatch is somewhat slower during the present week.

The trade here is under the impression that there will be some sort of suspension in central Pennsylvania beginning Nov. 1. It is felt that mine workers have been very well treated the last two years especially, and with stocks so ample at most points it may not be a bad thing to have the issue brought to a conclusion. Certainly there are few buyers in this territory who have more than a passing interest in the current market.

No material change is observed at Hampton Roads or in New England with respect to the coal trans-shipped at the Norfolk and Newport News piers. On all but a relatively small portion of the tonnage coming to New England, steamers are used and receipts are about the same as hitherto this season. If there were transportation available it is probable there would be some mild scurrying to get cargoes arranged for prior to Nov. 1, but the agencies seem quite hopeful that there will probably be no suspension in the West Virginia smokeless fields.

Current prices on bituminous at wholesale range about as follows:

	Cambrias and Clearfields	Somersets
F. o. b. mines, net tons.....	$2.85@3.35	$3.15@3.60
F. o. b. Phila., gross tons....	5.05@5.60	5.35@5.90
F. o. b. New York, gross tons	5.40@5.95	5.75@6.25
Alongside Boston (water coal), gross tons ...	7.00@7.75	7.60@8.00

Pocahontas and New River are practically out of the market for coastwise shipment, but $6.25@7.00 is quoted as the range for export.

Anthracite— The hard coal trade is still proceeding under difficulties. Those dealers in position to handle steamers are managing to make up their arrears in that way, but those dependent upon railroad-owned barges are hard put to it to eke out a current supply. Many of the individually-owned barge lines are in operation and such boats together with extra deliveries all-rail are keeping dealers going, but there are certain points on the Maine coast where the needs are urgent.

NEW YORK

Chestnut size the shortest, with egg and stove in good demand. The harbor situation delays deliveries and causes much uneasiness among the dealers. The call for the steam sizes becomes stronger and prices stiffen. Accumulations of bituminous prevented by strikes and embargoes on shipments to tidewaterIt Consumers here well supplied and show no anxiety regarding the outcome of the wage conferences.

Anthracite—All of the domestic coals are in heavy demand. Chestnut, which has been hard to move in this market for the last few months, is now on a parity with egg and stove and nearly as hard to get as either of those two sizes were a few weeks back. This is, however, the usual occurrence in October when because of the small orders placed by consumers the peddler trade picks up and results in heavy buying of chestnut.

Deliveries have been considerably delayed throughout the week by harbor labor troubles, some firms reporting no coal moved from the docks in five days. Other dealers have been more fortunate however, and comparatively few complaints have been heard. Retailers as a rule deplore the tie-up at this time of the year, claiming that with coal moving freely they would have been able to clean up their outstanding orders in a few weeks

Shipments from the lower ports have been delayed considerably more than have those from the upper ports because of the long hauls.

Retail dealers here are depending almost entirely on company coals and for independent coals where they are not required to pay more than the 75c differential. Independent coals are in good demand throughout Canada and premium coal and the trade believes the West. One hears very little about that with production maintained at the preesnt level premium coals will disappear from the market within the next six weeks.

The steam coals are in good demand. Buckwheat is bringing full prices. Rice is not in over supply, while barley is the hardest size to move.

One hears frequently of heating plants being changed to use oil instead of coal, but the tonnage so far affected is comparatively small. However, the trade is watching the situation closely.

Bituminous—Labor troubles have kept the shipments to this market down to actual needs and aided by the delay in having shipping permits renewed accumulations have been kept at a minimum.

The trade here is not showing much anxiety as to the outcome of the wage negotiations. Another factor is that most consumers have large stocks on hand and do not believe that should a strike be called it will last long enough to clean up their supplies.

The lack of tonnage here has caused prices to stiffen and quotations nowadays depend much upon the supply and the urgency of the buyer. Some dealers say that prices have changed several timse during each 24 hours. However, with the local harbor difficulties settled dealers expect a boom in demand which it may be hard to fill. This may also result in a further strengthening of prices.

Exporters of coal have been hard hit during the past week. The present harbor troubles have caused many vessels to go to Philadelphia or Baltimore for their bunker supplies and has also resulted in a considerable loss to this harbor in the number of orders which have been filled at either of the two southern cities.

Dealers in bunker coals have also suffered because of the strike, there being no means for supplying vessels.

The high grade coals are hard to obtain, most of them being consigned on contracts.

Quotations on pool coals at this harbor range about as follows:

Nos. 1, 9 and 71, $5.85 to $6; No. 10, $5.60 to $5.75; No. 11, $5.40 to $5.55, and 18 and 41, $5.10 to $5.25.

The quotations for coals at the mines for spot delivery range about as follows:

So. Forks (best)	$3.25 to $3.50
Cambria (best)	3.00 " 3.25
Cambria (ordinary)	2.60 " 2.90
Clearfield (best)	3.00 " 3.25
Clearfield (ordinary)	2.60 " 2.90
Reynoldsville	2.85 " 2.90
Quemahoning	3.25 " 3.50
Somerset (medium)	3.00 " 3.25
Somerset (poor)	2.50 " 2.75
Western Maryland	2.50 " 2.75
Fairmont	2.25 " 2.50
Fairmont ¾	3.10 " 3.25
Latrobe	2.60 " 2.90
Greensburg	2.75 " 3.00
Westmoreland ¾	3.40 " 3.50
Westmoreland r-m	2.75 " 3.00

PHILADELPHIA

Anthracite moving smoothly. Mild weather causes light consumption. Dealers want egg, stove and nut. Plenty of orders yet unfilled. Premium prices being paid for these sizes. Pea is heavy and steam sizes without real activity. Bituminous unsettled. Strike rumors do not move consumer. Some price increases.

Anthracite—Because of a mild fall to date the demand for coal has not been strong on the part of the consumer. This refers specifically to that class of consumers who have always been accustomed to buy their fuel as they needed it. While the number of persons buying in this manner has decreased, yet it is still considerable.

The call is still for egg, stove and nut, with the greatest pressure on stove and nut. Demand is also heavy for egg. There seems to be almost no limit to the amount of these sizes that the dealers show a willingness to take. While there has been some improvement in the quantity of these sizes received during the last week, the claim is made that it is still under the normal for the time of year. It is known for a fact that New England continues to receive heavy tonnages of these sizes and frequent inquiries are received by local shippers from that point offering premiums of $2 or even more.

It is a fact that locally those concerns buying from brokerage houses at premiums have no difficulty in getting prompt shipment and the higher the premium the quicker the coal comes. Some of the city retailers will not handle coal at premium pres, while others are taking in considerable quantities and simply passing the increased prices on to the consumer. Often in order to get the favorite sizes it is necessary in addition to the premium to take some pea coal.

One reason for the dealers' anxiety to get stove and nut at this time is the fact that they have partially filled many orders and they need additional coal of the same size to complete them before they are in position to render a bill.

The big companies are still experiencing much trouble with pea coal and have their salesmen out urging dealers to take this size. The dealers are also endeavoring to have their customers accept this size and there are reports of considerable success in this direction. There is not the least doubt that with the coming of more seasonable weather this size will move of its own accord.

The steam sizes are still laggard. Even buckwheat fails to exhibit any particular strength. It necessarily follows that rice and barley are even more inactive. There was a little show of activity in the steam sizes this week due to the uncertain conditions in the soft coal market over the labor situation.

Bituminous—The soft coal situation is uncertain. The fact that the operators rejected the proposition of the miners for increased wages, etc., has had a tendency to strengthen the market, but it is merely a tendency, for there has been nothing like a rush to buy coal. Every manufacturing plant of any size has heavily stocked and for this reason is not at all anxious to add to their stock, even with a possible strike in view.

As a matter of fact the consumer refuses to take the strike talk at all seriously. He seems to feel that the miner is well compensated and that the wiser heads among the men will avoid calling a strike. In the spot market the trade has been particularly dull lately, as little coal has been moved in this way. Because of the breaking off of negotiations between the miners and operators there was an inclination to increasing prices, and at this time the prevailing figures were about as follows:

Georges Creek Big Vein	$3.15@3.30
South Fork Miller Vein	3.15@3.30
Clearfield (ordinary)	2.80@3.00
Somerset (ordinary)	2.75@2.90
Faihmont lump	3.25@3.35
Fairmont mine run	3.05@3.15
Fairmont slack	2.45@2.55
Fairmont lump (ordinary)	3.00@3.05
Fairmont mine run(ordinary)	2.75@2.85
Fairmont slack (ordinary)	2.45@2.55

BALTIMORE

Threat of coal strike sends prices upward in bituminous market. Hard coal also becomes more active. Exports booming.

Bituminous—Coal men and consumers are alike awake to the possibilities of a coal strike. With the consumers the hope is entertained that there will be an eleventh-hour settlement of the difficulty. With the coal men there is little feeling that the trouble can be adjusted without a strike in the face of the extortionate demands of the miners, and even were a compromise agreed upon by officials of both sides the feeling is strong here that a number of the miners will walk out under any circumstances. This feeling first sent the larger corporations into the field to urge early shipments on their orders and contracts and to secure additional coal reserve; and the little fellows are now beginning to flock in. Prices have moved up steadily under this impetus and the end is apparently not yet. While there are now sales, in the nervous market that exists at present, both above and below the following list, it nevertheless about marks the average offerings to the trade, mine basis, here:

Best grade steam coals, $3.75 to $4; excellent coals such as run to pool No. 9, $3.00 to $3.60; No. 10, $3.30 to $3.45; fair to good coals, $2.75 to $2.90; mixed coals, $2.40 to $2.50. The best three-quarter gas is running at from $3.40 to $3.60; Fairmont, low sulphur, $3.25 to $3.35; medium sulphur, $3, and run-of-mine about $2.50.

Exports continue to boom. The total loading for the first eighteen days of October on foreign account ran to a total of 336,816 tons, with 41,099 tons of that amount for bunker and the balance on cargo account.

Anthracite—The hard coal situation is more active, afte ra period of inactivity. Fear that the strike may touch the hard coal situation in some way, and cooler weather are both causing new orders. Stove coal continues scarce. The dealers here report but a fair reserve supply in other sizes.

Lake Markets

PITTSBURGH

Strike prospects prepondearte Slightly. Some consumers fairly stocked. Restricted consumption by steel industry continues. Prices higher.

There is nothing but guessing as to whether or not there will be a coal strike Nov. 1. The prospects are not materially cnanged since the actual issuing of the strike orders by headquarters. In local circles there seems to be a slightly predominating view that there will be a strike. There has been more buying of coal of late by consumers desirous of stocking up, and the small and moderate sized consumers are believed to have sufficient stocks to carry them through a strike of a few weeks' duration. The large consumers, however, have no stocks as a rule, it being an expensive thing for the average large consumer to operate on stocks, almost a physical impossibility indeed on account of the scarcity of labor.

Were it not for the large curtailment in coal consumption due to the iron and steel strike the district undoubtedly would be able to supply the demand fully. As it is, the demand has produced a mild advance in prices, the market being now quotable as follows: Slack, $2.20@2.30; steam mine-run, $2.30@2.40; gas mine-run, $2.50@2.70; prepared gas, $2.90@3.10, per net ton at mine, Pittsburgh district.

BUFFALO

Bituminous slow of sale. New York state buys moderately, Canada hardly at all. A general waiting for the steel strike to end. It is about at an end here. Anthracite all to the lakes.

Bituminous—The situation is much the same. Consumers appear to have a pretty good supply and are not anxious to stock up. Somehow they often still have the notion that prices are going to be cheaper. The trade has no such idea. All that the jobbers are trying to do is to keep it from going higher. This is easy now, for the tendency is to slack off. Orders are not plenty anywhere and they are not likely to improve till there are more workers in the steel trade to consume the coal.

As it looks here the steel strike is coming to nothing and will soon be a matter of the past. The furnaces are steadily getting more men and are running stronger from day to day. The ore cargoes that were tied up at the docks are being unloaded. The strikers are making no demonstrations and the indication is that most of them never wanted to strike. Next week ought to see the plants running practically full time. Then the coal trade will resume its normal condition and

things will go forward on a basis that includes no immediate prospect of a strike.

The threat of a bituminous miners' strike does not seem to disturb the coal consumers. They say that the prospect therefor is not good and they do not want to stock up any more in anticipation of it. This means also that the stocks are plentiful. Salesmen say that a better trade is possible in this state than in Canada, though they do not quite know the reason for it. The situation at the mines is not good. The men work in a hap-hazard way, but manage to get out as much coal as is wanted. Present fear of a strike is not general.

Bituminous prices are not strong, but jobbers continue to quote as before, $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for same three-quarter, $4.20 for mine run, $4.10 for slack, $4.60 for smokeless, $5.70 for Pennsylvania smithing, all per net ton, f. o. b. Buffalo.

Anthracite—The local trade appears to be waiting for the Lake season to close, just as it did last year. Last week the supply afforded the city was next to nothing and only enough for three days is promised this week. Consumers are well supplied and it is likely that a week's shipment to the Upper Lakes will be turned in here after winter closes the lakes. It was done last year and the demand was soon satisfied. Through rail shipments are also light, likewise waiting for the lakes to close.

Prices of anthracite in this market continue on the former basis for regular, with independent prices at 75 cents to $3 premium:

	On Cars, Gross Ton.	At Curb, Net Ton.
Grate	$8.55	$10.20
Egg	8.80	10.65
Stove	9.00	10.85
Chestnut	9.10	10.95
Pea	7.45	9.30
Buckwheat	5.70	7.75

TORONTO

Receipts of anthracite light. Striking coal drivers return to work. Plenty of bituminous on hand. Prices advanced.

There is practically no change in the coal situation with the exception of an advance in the price of bituminous. Receipts of anthracite from the mines continue light and dealers are much behind in deliveries. The coal drivers who went on strike returned to work on the 14th, some of the yards having conceded the demands for an increase of $4 per week, each firm dealing with its own employes. There is an ample supply of bituminous, but the demand remains comparatively light. Quotations for short tons are as follows:

Retail

Anthracite—	
Egg, stove, nut and grate	$12.50
Pea	11.00
Bituminous—	
Steam	8.75
Slack	7.75
Domestic lump	10.00
Canel	11.50
Wholesale, f. o. b. cars at destination:	
Three-quarter lump	6.50
Slack	5.50

CLEVELAND

Demand for all grades continues unabated and unsatisfied. Steam-coal prices have shown decided strength and are advancing. Supplies of all grades, especially bituminous, in the past few days have been curtailed because of decreased efficiency at the mines.

Bituminous—This grade, both for domestic and steam use, has come fully into its own. The shortage, which appears quite acute, broke suddenly with the advent of cooler weather a few days ago. Retail dealers could use fully twice as much coal as they are receiving from the mines. Steam-coal users have developed an extraordinary desire to stock, and are prodding operators for better deliveries. Meanwhile, the supply has become limited from another source. Mine workers in the southern and eastern Ohio districts seem to be preparing for the threatened strike, and are not pushing themselves in the least. A fair-sized labor shortage for delivery and yard work is reported by some retail dealers. No. 6 slack has shot up about 50 cents a ton, almost over night. No. 6 mine-run and No. 8 mine-run both have participated in an advance. Some of the retail grades, like Goshen and West Virginia splint, are almost impossible to obtain. All bituminous coal prices are firm.

Pocahontas and Anthracite—Some dealers have advanced shoveled lump, Pocahontas 25c a ton, making the spread $9 to $9.50. It is difficult to get any of this coal at the lower figure. The cool weather the last few days has brought out greater demand for both grades. Recently, with weather exceptionally good, demand fell off just a trifle, giving dealers an opportunity to catch up. Demand for both Pocahontas and anthracite is easily twice the supply.

Lake Trade—September shipment of 2,360,667 net tons of bituminous coal to the Upper Lakes brought the season's total loading to Oct. 1 up to 17,681,223 tons. At Oct. 1 last year shipments stood at 20,778,250 tons. The entire season, it is believed, will not exceed 22,000,000 tons. Vessel fuel to Oct. 1 totaled 832,907 tons, 145,160 tons being loaded in September. At present carriers are more plentiful than cargoes, and daily dumpings at Lake Erie ports range from 1,700 to 2,000 tons, about one-half of normal.

Prices of coal per net ton delivered in Cleveland are:

Anthracite—		
Egg	$11.75 to	$11.90
Chestnut	12.00 "	12.00
Grate	11.75 "	11.90
Stove	11.90 "	12.10
Pocahontas—		
Forked	10.00 "	10.50
Lump	9.00 "	9.50
Mine-run	7.90 "	8.00
Domestic bituminous—		
West Virginia splint		8.50
No. 8 Pittsburgh	6.60 "	6.90
Masillon lump	8.25 "	8.50
Coshocton lump		7.15
Steam Coal—		
No. 6 slack	5.25 "	5.50
No. 8 slack	5.10 "	5.50
Youghiogheny slack	5.25 "	5.50
No. 8 ¾ in.	5.70 "	6.00
No. 6 mine-run	5.25 "	5.50
No. 8 mine-run		5.75

COLUMBUS

Steam trade more active in view of the threatened suspension. The domestic trade is strong. Prices are generally well maintained while production has been increased slightly.

With a suspension believed to be certain, consumers of steam sizes are buying more actively in all sections. This tendency has been noticeable during the past week and is expected to gain as the time for the suspension approaches. While there are some reserve stocks in this territory, large users are nevertheless becoming concerned over the situation and are placing orders for immediate shipment.

Railroads are not taking any large tonnage and are not stocking up to any extent. General manufacturers are the best buyers. Steam prices are fairly strong at previous levels with mine-run from the Hocking field selling at $2.35 and screenings around $2. There is a good demand for West Virginia steam grades.

The domestic trade continues strong. Retailers are buying briskly in view of the threatened strike. Retail stocks are not large and there is an effort being made to increase them before Nov. 1. Dealers are having a good trade as householders are putting in their stocks. The so-called fancy grades are exceptionally strong and prices continue firm. There is also a good demand for Hocking and Pomeroy prepared grades.

Delivered prices are: Pocahontas lump, $8.50@8.75; Pocahontas mine-run, $7; West Virginia lump, $7; Hocking lump, $6; Pomeroy lump, $6.25; Kentucky prepared lump, $7.50.

The lake trade is progressing satisfactorily with a fairly large tonnage still moving to the Northwest. A slight falling off at several of the lower lake ports was noted during the past week. The indications point to a rather early closing of the trade, as a large part of the requirements have already been moved. Lake prices are firm. The vessel movement is generally good.

Production is increasing under the influence of a better car supply. This is most noticeable in the Hocking Valley and Pomeroy Bend districts. Eastern Ohio is still short of cars and the output is about 60 per cent. of normal. In the Cambridge and Crooksville fields the output has been about 65 to 70 per cent and in the Hocking Valley about 75 per cent.

CINCINNATI

City is in good shape and supplies fair. Some prices have advanced while others have declined.

Cincinnati is in good shape to face a strike of bituminous coal miners, Nov. 1, if a walkout is not averted, according to wholesale and retail coal dealers. Only a prolonged strike is likely to have a disastrous effect on the city's industries and the comfort of residents. This condition is the result of Cincinnati's exceptional transportation facilities and the providence of both large and small consumers. Most industrial consumers have good stocks on hand while officials of the city, county and the public schools have enough coal to supply public institutions for some time.

Coal dealers say domestic consumers have shown much foresight in purchases this summer and fall, so that now the average stock in cellars is good. Retail prices on bituminous coal were advanced 25 cents a ton in Cincinnati last week. The lump and egg moved up to $7 and $7.25 a ton, delivered, and the run of mine raised to $6.50 a ton. Coke was also raised from 25 to 50 cents per ton to a prevailing price of $10 to $11. However, the smokeless run of mine droped 25 cents a ton to a range of from $7 to $7.50 a ton.

LOUISVILLE

Railroad Administration falling down on car deliveries. Block coal in good demand, steam slightly weaker. Mines operating three to three and a half days a week, on a 60 to 70 per cent. basis. Kentucky not expecting much labor trouble.

Although the U. S. Railroad Administration recently agreed to turn over about 180 cars daily from car pool territory, through the Pennsylvania, B. & O., and Big Four lines, to the eastern Kentucky, southern Appalachian and eastern Tennessee districts, hardly 50 per cent of the number of cars agreed upon has been turned over so far. The car supply in the districts referred to is somewhat better than it has been, but at that mines are only operating about 60 to 70 per cent, or three to three and a half days a week.

There has been a slightly weaker market on steam coal during the past few days because of better production, and reduced demand from steel mills, and concerns affected by the steel strike. Block coal prices are good and the demand strong.

Kentucky is not expecting much trouble in event of a strike of mine workers in November. Western Kentucky is organized and is under agreement with the operators, with a contract that will cary for some time, while in eastern Kentucky organization is not strong, and operators are feeling hopeful.

Louisville retailers report that every cold day brings a good demand, and that the rainy weather of October has brought a better demand, but that sales as a whole are not active.

Kentucky mine quotations are about as follows:

Eastern Kentucky Block, $4@5, mine run, $2.50@3.25; nut and slack, $2.25@2.75. Western Kentucky Lump, $2.75@3.25; mine run, $2.25@2.65; nut and slack, $1.90@2.05; pea and slack, $1.25@1.50.

DETROIT

Signs of increasing interest in the market for steam coal follow realization by the buyers that the mine labor situation is bad.

Bituminous—While orders have not increased in volume to the extent that jobbers and wholesalers had expected, they find indications of a larger interest in the matter of supply, taking the form of inquiries from some of the consumers of steam coal who have been

hanging back. The threatened strike of bituminous miners set for Nov. 1 appears to have jolted a number of lethargic buyers into somewhat belated realization that continuance of the operation of their plants can best be assured by having a supply of coal at hand.

Although coal is still coming into the city quite freely and in considerable amount, the transportation situation and outlook are not reassuring. Reports coming to the jobbers indicate a shortage of cars is troublesome in a number of producing districts. While some mines report better car supply, others complain that their operations are handicapped by inadequate facilities for shipping. A curtailment as large as 50 per cent is reported from some West Virginia fields.

Free coal on tracks is moderately plentiful, but jobbers say the general local market situation is not unfavorably affected and that few sales are made at prices materially below the regular schedule.

Sales of Hocking domestic lump are reported at a price equivalent to $3.50 to $3.75 a net ton at the mines, with egg size holding about 50 cents less and mine-run ranging around $2.25 to $2.50. Slack is quoted at about $2. Four-inch lump from West Virginia is offered at $4. The price on West Virginia egg is 25 to 50 cents lower. Mine run is quoted at $2.75 and nut-pea and slack at $2.25 to $2.50. Smokeless is almost out of the market with some mine-run quoted at $3.75.

Anthracite — Household consumers are displaying a more active interest in obtaining anthracite for winter needs, following a decided drop in temperature. They are discovering that the situation is unfavorable, that the retailers have only small quantities of anthracite in stock and that shipments ordered are slow in arriving. With some of the retailers already declining orders, numerous consumers probably will have to use bituminous or coke in house heating plants.

Coke

CONNELLSVILLE

Furnace coke advances sharply, foundry being slightly easier. Production closely regulated to requirements.

The furnace coke market has stiffened sharply, now standing fairly steadily on $4.25. Operators were so prompt in reducing output when the iron and steel strike began Sept. 22 that as furnaces have resumed from day to day the market has been steadily recovering from its initial decline and is now higher tha nin June or July, though 25 to 50c lower than the average for a few weeks just before the strike.

There is practically no coke forced on the market, the last lot recorded being a week ago, a half dozen cars going at $3.85 to save demurrage. Foundry coke is a shade easier, supplies being easy with a restriction in furnace coke production, while demand has materially decreased, and to such an extent as to lead some observers to conclude that some of the foundries are going into their stock piles.

We quote furnace coke at $4.25, with the possibility of shading the price a few cents, and foundry coke at $5.50@6.25, depending on brand and whether in box or open-top cars, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Oct. 11 at 152,764 tons, a decrease of 4,836 tons.

Coke—The demand will not be active till the furnaces are running full time. Some of them did not suspend, but there are enough of them idle to affect the consumption. This may not last long, but it affects the movement materially. Prices are still quoted at $9.70 for 72-hr. Connellsville foundry, $7.70 for 48-hr. furnace, $7.20 for off grade, $7.45 for domestic sizes and $5 for breeze. Iron ore is coming in at a rapid rate and though some is held up by the steel workers' strike, enough is unloaded to keep the lake fleet active.

Middle West

GENERAL REVIEW

Strong market with prices steadily advancing. Opinions differ as to possibility of a nation-wide strike of miners. Car shortage keeps many mines idle.

The last wek or so has been very reminiscent of the period shortly before the United States Fuel Administration came into existence back in the summer of 1917. There is not the slightest suspicion of a weak market in any size or any kind of coal, and prices are advancing slowly but surely.

When we say prices are advancing it is rather a broad statement and ought to be qualified to some extent, as the Franklin County operators, as well as some of the operators of Indiana, are maintaining their prices at levels in effect before the present flurry arrived. These operators could sell their domestic coal at a figure far in advance of $3.25; in fact, we know of a case where a jobber was able to get hold of a car of Franklin county coal and took advantage of the situation to peddle the coal around until it was sold at $4 per ton f. o. b. mines. We understand that this coal was egg size. It must be said in all fairness that the operators are not availing themselves of the present situation to boost prices or go on any profiteering spree.

The labor situation continues to be an enigma. Prominent operators are found who confidently expect a strike. There are operators equally prominent in the eyes of the public and the coal trade in general, who believe that a strike at this time is impossible because the coal question is so important to the public that the authorities at Washington will, under no circumstances, allow a stopping of mining. The majority of opinions, however, seems to be that the United Mine Workers and operators will succeed in patching their differences or at least make some arrangements so that the public and the railroads will continue to be supplied with coal.

The car situation continues to occupy a prominent place, almost too prominent a place when one considers how few and rare cars are these days. The situation on the C. B. & Q. is perhaps the best in the Middle West. Some of the other lines, the I. C., C. & E. I. and Big Four are supplying their mines with only about 60 per cent. of full car supply. A number of mines are kept idle every day and loud cries are heard from all sides for more coal and better service. Reassuring bulletins appear from time to time from the "higher-ups" at Washington, but in spite of these optimistic prophecies little relief has been forthcoming.

CHICAGO

Retail dealers kept busy supplying demands. Eastern coal practically out of the market. Steam sizes being absorbed rapidly.

The retail trade in Chicago appears to be doing a rushing business. A glimpse into any of the coal yards shows the greatest amount of activity. Little independent dealers whose stock in trade consists of a motor truck and a list of friends are loading up their automobiles and delivering coal to their customers as fast as possible. Franklin County operators are besieged by dealers requesting prompt shipments. Eastern coal now is practically impossible to get, and when it is procured the price f.o.b. Chicago is so high that it is only from two to three dollars under the cost of anthracite. Eventually eastern operators are going to lose out because they are maintaining prices so high. The average householder is not going to pay from $9 to $10 for soft coal when he can get anthracite of the best grade for $12 and $13.

The weather has been mild, and according to the weather man will continue so; but when it eventually does get cold, interesting times are expected, because none of the dealers have too much coal on hand, and a cold spell will clean them up, as shipments are not being made with any great rapidity.

The steam situation is booming. Factories that have heretofore been laying low and burning up their storage piles are now coming into the market rapidly and frantically requesting operators to ship them coal to replenish their stock piles. Many purchasing agents are paying dearly for their indifference to the coal question during the past spring and summer months, which is just what has been predicted all along.

MILWAUKEE

Coal market quiet and uneventful. Popular sizes of anthracite out of the market. Illinois shippers behind in deliveries.

The only new phase in the coal situation at Milwaukee since the last report is a clean-up of chestnut anthracite, which, together with stove, are now out of sale. Egg, buckwheat and anthracite screenings are still to be had, however.

Prices of both hard and soft coal remain unchanged. The car situation is no better and shippers are seriously handicapped in consequence. Some soft coal is coming by rail, but Illinois shippers are reported to be 10,000 tons behind in deliveries here. Little hard coal is received by rail at present.

Coke is plentiful, but the demand is unsatisfactory. Cargo receipts by Lake thus far aggregate 705,710 tons of anthracite and 2,552,905 tons of soft coal, a gain of 165,839 tons of the former and a loss of 421,491 tons of the latter compared with the receipts during the same period last year. Fires are smoldering in some of the coal yards along the Menomonee River, but thus far no serious damage has been done.

ST. LOUIS

Unusual prices prevailing on account of the expected strike. Some railroads confiscating coal. Practically no coal on the market and a good demand for everything. Car shortage continues. Railroads using cars for storage purposes. Conservatives do not believe there will be a strike.

The local situation is a trying one. Buyers believe there is going to be a strike in the coal industry, but conservative coal men differ with them, thinking that the Government will take a hand at the last minute and order the miners to stay at work pending an adjustment.

In the Carterville field a fairly good supply of cars is furnished, except on the Missouri Pacific, where arbitrary action is curtailing the production of coal. Unless the mines furnish railroad coal they do not get cars, and if by chance they should load out commercial coal it is promptly confiscated.

The Illinois Central furnishes a poor car supply, but is not arbitrary about it. The other roads are doing fairly well and conditions are satisfactory in this field. In the Du Quoin field, where the Illinois Central supplies the equipment, operations work only two or three days a week. There is a good demand for everything produced. In the Mt. Olive field good working time is reported, that is, about four days a week, with a heavy tonnage moving north and west. Screenings in this field are not so active as they might be. The railroad tonnage is heavy. In the Standard field a heavy railroad tonnage is moving, but car supply is about three days per week average on all roads. There is a market for everything produced here.

In St. Louis proper only a few cars of anthracite are moving. No smokeless has arrived and nothing from Arkansas but a plentiful supply of Mt. Olive and Standard is on hand, which will last from one to two weeks in the event of a strike. The tonnage of Carterville is extremely light.

The Carterville and Franklin County prices on domestic sizes are all sizes $3.25@3.40, and screenings are from $2.15@2.35. Mine-run is from $2.45@2.65. Mt. Olive coal is from $2.65@3 for the domestic sizes, and screenings are anywhere from $2@2.25. Standard 6-in. lump is $3.25, the same as 3x6 egg. Two by six egg and 2-in. lump is $3. Mine-run is about $2.50 and screenings are from $2@2.25.

COAL AGE

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Standardizing Mining Equipment

THE standardizing of mining machinery and equipment, a plan that has been recently considered by the American Mining Congress, should prove, provided the details can be satisfactorily arranged, one of the greatest boons to both operators and manufacturers that has yet graced the history of the industry. It is difficult to say, other than to hazard a guess, how much weight any adopted and approved standards of equipment would have, but there is little doubt that any regulations accepted could meet with anything other than instant and hearty approval.

That this idea is a step in the right direction, no one can dispute. While no attempt would be made to even suggest that mines already in operation should change their equipment *en masse* to that conforming with the new standards, yet each succeeding year would see worn-out parts supplanted by regulation types. However it is more with respect to mines of the future that the approved standards would apply.

Coal mining in all its various phases of operation would be simpler and more intensified today, if certain standards of equipment had been established twenty years ago. Take for instance the subject of track gages. At present a variance is found that ranges from 18 to 56½ in., with a large number of ½in. divisions. This variation arose probably more than anything else because of the fact that individual engineers had individual opinions as to what constituted a suitable gage. It was doubtless aggravated also by the fact that many exising mines were opened at a time when mule haulage only was in vogue.

A standard gage as suggested by one of the committees of the American Mining Congress is 42 in. This figure was arrived at after it had been proved that 75 per cent. of all new operations were being equipped with a gage of this width. As the mines of the future will undoubtedly be larger, from the standpoint of production, than anything at present existing, this figure should prove to be a good one. A semi-standard of 36 in. was also suggested. This was to be applied in connection with longwall mining where it is desired to keep the pack-walls close together and to employ a narrow car.

We may take as another example, the design of a mine car that can be used in this field. There has usually, heretofore, existed a concrete ratio between the track gage, length of wheelbase and inside length of car. The width and height of the car, of course, are governed by the conditions encountered and the thickness of the bed in which the car is employed. A standard such as the one suggested should adequately handle any of the operations of the future, no matter how large from the standpoint of production. The ratio suggested as a standard may be stated as being one wherein the inside length of a car is three times the length of the wheelbase, and the wheelbase is 7/9 of the track gage.

Short-radius bumpers are likewise advantageous on mine cars, as this design goes hand in hand with a one-link coupling. Not only are short-radius curves on the track easier to take but much of the jerking and jarring resultant upon taking up of the slack in the trip in starting is thus eliminated.

The adoption of standard dimensions, whether in mine equipment or anything else, is of course at first fraught with many difficulties. Probably no standard was ever adopted that did not receive opposition, usually from several sources. One has, however, only to consider the difficulties under which modern engineering would labor were it not for standard threads, pipe, fittings, and the like, to appreciate what possible benefits may accrue from the adoption of standard mining equipment.

Like present-day railway apparatus, the adoption of uniform sizes of mine equipment will not be attained in a day, a week, or a year. It must in most cases wait upon the obsolescence of the equipment and material now in use. Its ultimate adoption will, however, mark a long stride in advance for the mining industry.

Some Factors That Affect the Washability of a Coal*

Improvement of the quality of coal through washing is a subject of much interest at present. Experimental work thus far conducted would indicate that heavy impurities, or those with a specific gravity exceeding 1.6 may be successfully removed from coal. Those with a specific gravity of less than 1.3 are extremely difficult to remove and those impurities with specific gravities lying between these limits may or may not be removable with facility.

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Urbana, Ill.

Because of the present interest in the subject of sulphur in coal and its removal, such information as is available in coal-washing literature on the various factors that determine the adaptability of a coal for washing has been collected and is presented here, together with some observations based on results of experimental work carried out in the coal-washing laboratory of the mining department of the University of Illinois, and investigative work at Illinois washeries in connection with the work on reduction of the sulphur content of coal, being carried on at the Urbana Station of the U. S. Bureau of Mines. This investigative work consisted of the examination and testing of commercial washeries, the chemical and physical examination of raw and washed coals, and coal-washing tests with jigs and washing tables of one-fourth commercial size. The tables used are shown in Fig. 1. The writers have not had a wide experience in commercial coal washing.

The process of washing a coal consists in the mechanical removal of impure pieces heavier than the pieces of clean coal, and higher in ash and sulphur content. The characteristics of a coal, therefore, that determine the possibility of improving it by washing are the characteristics of these impurities—that is, their physical and chemical form and their specific gravity and behavior in water.

Physical Form of Impurities

The two removable impurities commonly present in coal which are of chief interest in connection with coal washing are shale or slate, and pyrite. Calcite and gypsum are ordinarily present only in insignificant amounts, although in some cases their removal may result in an appreciable improvement.

The reduction in ash content of a coal by the removal of shale or slate is commonly less difficult than the removal of sulphur. In order of their removability, the various forms in which the ash in a coal occurs may be classed as follows:

1. Clean solid pieces of shale or slate ¼ in. or more thick with a natural plane of breakage between shale and coal. This class of impurity includes the definite shale or slate bands occurring in the coal bed, and extraneous matter from the roof and floor introduced during mining.

2. Bands of clean shale "frozen" to the adjacent coal, and thin bands of shale and coal interbedded.

3. Clay, shale dust and friable [illegible] grate in water.

4. Fine ash particles distribut[illegible] coal, forming carbonaceous shale, bone [illegible]sh coal. If ash occurs in this form to an [illegible] degree, it makes impossible the production of [illegible] washing. Two coals of this nature ha[illegible]d. In one case, a washed coal of good appea[illegible]rom visible extraneous impurities, analyzed 2[illegible]nt ash, and in the other case coal lighter than [illegible]4 specific gravity analyzed 13 per cent ash.

Although it is possible to remove some of the ash occurring in any of these forms, a coal to be classed as easily and economically washable should contain most of its excess undesirable ash in the form of separable clean particles of shale or slate of high specific gravity. A painstaking visual examination will reveal much concerning the removability of the ash impurities in a coal. This is true in a lesser degree of the sulphur impurities.

Easily Removable Forms of Sulphur

The easily removable form of sulphur is the lens, ball or band of clean pyrite ⅛ in. or more in thickness. The solid fine-grained band breaks with little sliming and, due to its high specific gravity, it is almost completely removable. A somewhat different form, not uncommon in Illinois, is of a porous cellular structure and usually of a bright yellow color. It is much lighter than the solid pyrite and breaks down easily into thin plates and slime, difficult to remove. Specific-gravity determinations on pieces of these two kinds of pyrite from a Franklin County, Illinois, coal showed 4 for the solid and 2.9 for the porous pieces.

The most troublesome visible forms of sulphur for the washery man are the thin bands, plates and veinlets of pyrite distributed through some coals; this form is very common in the southern Illinois field. Knife-edge plates sometimes fill all the joint fissures in large lumps of coal, the individual plates being in many cases so thin as to resemble spots of gold paint. When the coal is crushed for washing, a large part of this sulphur adheres to the coal and a considerable part of that which breaks free is slimed or broken into extremely thin plates, which have a tendency to float when the coal is washed. The thin bands of pyrite sometimes occur interbedded with thin bands of coal, forming pieces part coal and part pyrite that may be removed in their entirety by jigging at a comparatively large size, whereas if the coal were crushed fine in an effort to free the pyrite, washing would not be successful. A small percentage of this kind of pyrite gives the appearance of a much larger quantity

*Paper presented before the meeting of the American Institute of Mining Engineers, Chicago, September, 1919.
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TABLE I. HAND-PICKED SAMPLES OF A WILLIAMSON COUNTY, ILLINOIS, COAL

Sample No.	Ash, per Cent.	Pyritic Sulphur, per Cent.	Organic Sulphur, per Cent.
1	3.58	1.27	0.79
2	4.82	1.06	0.79
3*	4.27	0.84	0.79

* Float on solution of 1.3 sp.gr.

In all the coals used in the investigations, tests have indicated, also, the presence of pyritic sulphur in a finely divided state. Samples of coal, finer than ¼ in., carefully hand-picked to reject all pieces showing a trace of impurity, contained pyritic sulphur. Analyses of three such samples of a Williamson County, Illinois, coal are given in Table I. It is believed that these samples were crushed to such size as to expose all the natural cleavage faces on which the visible forms of pyrite are commonly found.

The physical form of impurities present not only affects the amenability of a coal to improvement by washing, but determines also the size to which it must be crushed. Now that tables are being commonly used for washing coal, it might be expected that since this material can be crushed finer for washing, a cleaner product might be produced by that method. Actual tests with tables have indicated, however, that this is problematical. It is not safe to assume that any coal that can be successfully washed on coarse jigs can be cleaned more completely by washing at a finer size on tables. The effect of finer crushing upon the completeness with which impurities may be separated from coal depends upon two opposing tendencies. First, the more finely a raw coal is crushed, the more completely will the particles of impurities be detached from those of clean coal. Second, the finer a coal is crushed the more difficult it becomes to separate the pieces of clean refuse from the pieces of clean coal. The proper size for washing the raw coal therefore depends on the proper balance of these two tendencies. Thomas J. Drakely,[1] of Wigan, England, in a paper on coal washing, expresses the opinion that in British practice as a general rule the size at which the most complete separation is secured is 1¼ in. The common American practice would indicate that here the size is considerably smaller. It is difficult to say what is the minimum size of coal that can be improved by washing. The finest coal that has been successfully treated in washing tests at Urbana was an overflow sludge from a washery settling tank. The size is indicated in Table II, showing the results

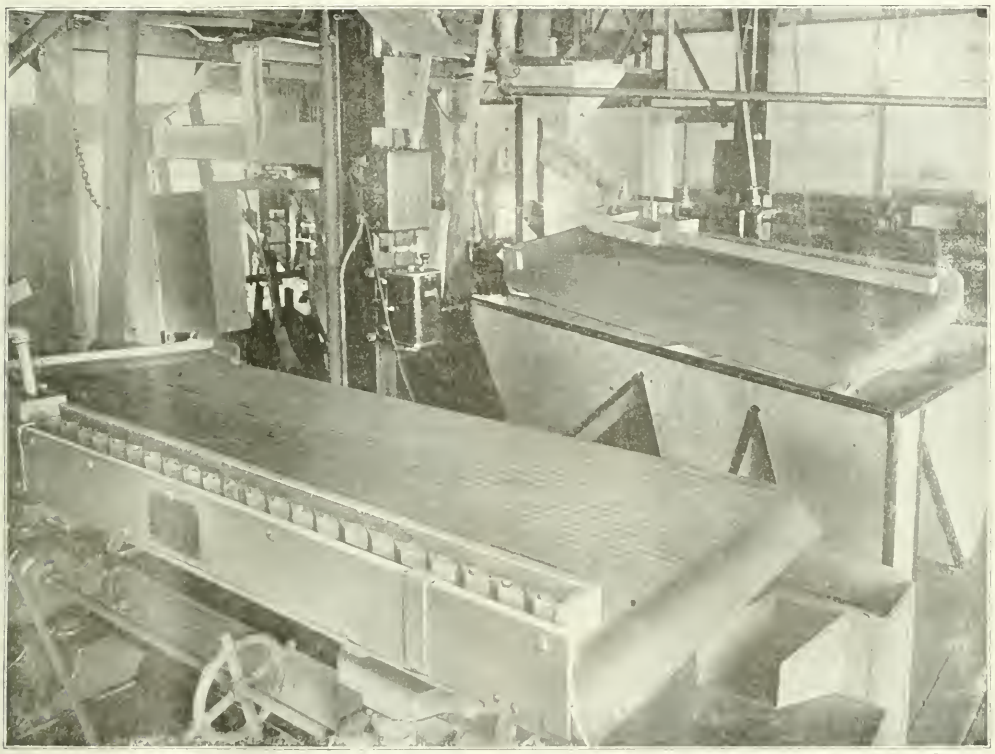

FIG. 1. TABLES IN THE COAL WASHING LABORATORY OF THE UNIVERSITY OF ILLINOIS

TABLE II. RESULTS OF SCREENING TESTS

Size	Cumulative Percentage, per Cent.
On ¼ inch	3.7
On 20 mesh	17.8
On 80 mesh	65.4
Through 80 mesh	34.6

[1]Coal Washing: A Scientific Study, *Transactions* Institute of Mining Engineers (1917-18), vol. 54, p. 419.

of the screening tests. By treating this coal on a washing table, the ash content was reduced from 12.8 per cent to 8.1 per cent and the sulphur from 1.7 to 1.5 per cent, with a recovery of 93.5 per cent of the feed as clean coal.

It is well known that sulphur occurs in coal in three forms, namely, as iron pyrite, as organic sulphur in combination with the coal substance, and as calcium sulphate. Until quite recently little attention has been given to the chemical forms of sulphur in coal. At present the technical men of the iron and steel, coke and gas-making industries are giving more attention to this subject. In the past it has been customary to consider "combined sulphur" as well as total sulphur in determining the improvement to be expected in a coal due to washing, but no accurate methods have been available for the determination of "combined sulphur." The amount of combined or organic sulphur present in coal is frequently underestimated; it has often been considered as constituting a negligible percentage of the total amount present. Powell and Parr[2] have recently published improved methods for determining the chemical forms of sulphur in coal. Their methods have been used in the present work. Table III shows the relative amounts of the different forms of sulphur present in five samples of coal from four states.

The samples given are not necessarily representative of the county or of the local field from which they were obtained. The results are tabulated for the purpose of calling attention to the amounts of the different forms of sulphur present, and especially to point out the high values for organic sulphur. The coals so far examined were all low in sulphate sulphur. It appears that this is true for most of the coals in the United States, with the exception of some occurring in the extreme West. Coal that has been in storage and has weathered, increases in sulphate sulphur, due to the oxidation of pyrite to iron sulphate.

In connection with the work on the forms of sulphur in coal, determinations were made on the original raw

TABLE III. FORMS OF SULPHUR IN RAW COAL VALUES GIVEN IN PERCENTAGE MOISTURE-FREE BASIS

Coal from	Total	Pyritic	Sulphur	Organic
Tennessee, White County	4.87	3.59	0.11	1.17
Per cent. of total sulphur	....	74.0	2.0	24.0
Kentucky, Pike County	0.46	0.3	....	0.33
Per cent. of total sulphur	....	28.0	....	72.0
Illinois, Williamson County	1.83	1.04	trace	0.79
Per cent. of total sulphur	....	57.0	....	43.0
Illinois, Franklin County	3.51	1.84	....	1.67
Per cent. of total sulphur	....	52.0	....	48.0
Indiana, Green County	1.66	0.89	....	0.77
Per cent. of total sulphur	....	54.0	....	46.0

coal samples and on some of the washed products. The reason for determining the different forms of sulphur was to note the effect of washing on the forms and the distribution of sulphur in the products. Analyses are given of two lots of coal. Table IV shows the results for a White County, Tennessee, coal and for samples representing a day's run at a 1200-ton commercial washery in Williamson County, Illinois. The five washed coals given are the various sizes produced at this washery. Sample *A* represents a small sample of the cleanest washed coal taken near the head end of the table during a test run in the laboratory.

[2]Forms In Which Sulphur Occurs In Coal. University of Illinois, Engineering Experiment Station, Bulletin, 111.

These results indicate that only pyritic and sulphate sulphur are removed by washing. Iron sulphate resulting from the oxidation of pyrite is soluble in the wash water. Gypsum occurring in thin plates is difficult to separate with the refuse. From these considerations it is believed that the sulphate sulphur of the White County, Tennessee, raw coal resulted from the oxidation of pyrite, rather than from the presence of calcium sulphate, since it is almost entirely absent in the clean washed coal. The organic sulphur content of the various products obtained by washing the same coal remains fairly constant, as was expected. It appears that by washing a coal high in clean shale a concentration of organic sulphur in the washed coal, and a corresponding reduction of organic sulphur in the refuse, would occur.

TABLE IV. FORMS OF SULPHUR IN RAW AND WASHED COAL PRODUCTS

Values in percentage-moisture-free basis

Product	Total Sulphur	Pyritic Sulphur	Sulphate Sulphur	Organic Sulphur
White County, Tennessee:				
Raw coal	4.87	3.59	0.11	1.17
Table washed coal	3.02	1.84	Less than 0.01	1.18
Jig washed coal	3.80	2.61	....	1.19
Sample A	2.67	1.51	....	1.16
Williamson County, Illinois:				
Raw coal	1.83	1.04	trace	0.79
No. 1 washed coal	1.81	1.05	....	0.76
No. 2 washed coal	1.56	0.78	....	0.78
No. 3 washed coal	1.57	0.82	....	0.75
No. 4 washed coal	1.57	0.81	....	0.76
No. 5 washed coal	2.33	1.57	....	0.76

Attention is directed to the constancy of the values for organic sulphur in Table IV for the same coal. The lot of White County, Tennessee, coal weighed 700 lb. and the samples of Williamson County, Illinois, coal represented altogether about 1200 tons, yet the organic sulphur content of all the products for the same coal is practically the same. This tends to show that organic sulphur is uniformly distributed in the coal substance and that it is in chemical combination with the coal. Certainly the organic sulphur content of coal from the same mine is much more uniform than the pyritic and total sulphur values.

A specific gravity analysis showing the percentages of material of different densities in a raw coal crushed to the size at which it is to be washed is of considerable value for determining in a preliminary way what one may expect to accomplish by washing. Analyses of this kind are described by Pascal,[3] commenting on the methods of testing used by Beers of Liége, Belgium, and by David Hancock,[4] who used anlyses of this nature to determine the efficiency of jigs.

The graphs here presented show the analyses of a washable coal before and after washing, and of this washable coal compared with a raw coal which is difficult to wash. The first graph, Fig. 2, shows clearly what class of material is removed by washing. While particles heavier than 1.6 in specific gravity were practically all removed, particles between 1.3 and 1.6 in specific gravity are not appreciably affected by washing. The analyses given in Table V shows that this material is higher in ash and sulphur than is desirable in the clean coal, but lower than is desirable in the refuse. This represents the class of impurities described under "Physical Forms of Impurities" as difficult to remove, and is the product that appears at the

[3]*Colliery Guardian*, (Aug. 10, 1917), vol. 94, p. 252.

[4]Coal Washing in Alabama. Alabama Geological Survey Bulletin.

washery as "true middling." If the specific gravity analysis of a raw coal shows a large percentage of this material, it is extremely difficult to wash successfully. This condition is illustrated in the second graph, Fig. 3, comparing the raw coal of Fig. 2 with a coal much more difficult to wash. The total percentage between 1.3 and 1.6 specific gravity on the non-washable coal is 40, as compared with only 17 for the washable coal.

The ideal coal for washing would be represented by a graph showing all the material concentrated in the parts heavier than 1.60 and lighter than 1.30. Results of a washing test on the coal represented in Fig. 2 are given in Table VII. Table VIII gives the results of a test on the non-washable coal of Fig. 3. The specific gravity determination on these samples were made by separating the sample at 1.30 specific gravity with the Delameter sink and float machine and treating the sink in a succession of heavier solutions in beakers. The effect of the conditions described on the results attainable by washing is shown by washing tests on some typical coals.

This coal is represented in Fig. 2 and Table V, and is the washable coal of Fig. 3. The visible impurities consisted of pyrite bands and lenses as much as 1 in. in thickness; thin shale bands that hold together well in water; some fireclay; thin plates of pyrite in joint fissures; and an unusually large percentage of calcite and gypsum in the form of thin sheets. This coal was washed at 0 to ¼ in. size on a table. The results are given in Table VII.

The coal from White County, Tennessee, is represented in the graph of Fig. 3 as non-washable. A visual examination showed it to contain little clean shale or slate coarse enough to be liberated by crushing to the size at which coal is ordinarily jigged. Visible pyrite was present both as thin plates and as coarser bands or lenses. The difficulties in washing this coal were, as indicated by the graph, due to an exceptionally high percentage of material of intermediate density, indicating that the impurities are so fine that even when crushed to ⅜ in. size they are not liberated, and the exceptionally high ash and sulphur content of the lightest coal. The ash content of the part of this coal that

TABLE V. ANALYSES OF COAL REPRESENTED IN FIG. 2

Specific Gravity	Per Cent. of Total Sample	Ash, per Cent.	Sulphur, per Cent.	Per Cent. of Total Sample	Ash, per Cent.	Sulphur, per Cent.
1.30	73.35	4.64	1.72	85.50	4.77	1.63
1.30 to 1.35	8.74	11.27	2.14	8.30	11.8	2.06
1.35 to 1.40	4.93	17.78	2.39	3.70	17.9	2.13
1.40 to 1.45	1.82	20.32	2.52	0.88	18.5	2.36
1.45 to 1.50	0.39	24.60	2.62	0.27	23.6	2.55
1.50 to 1.60	1.12	29.90	2.80	0.54	28.3	2.84
1.60 to 1.80	2.13	49.53	3.43	0.34	48.8	3.76
1.80	7.52	84.04	13.63	0.57	80.3	7.07

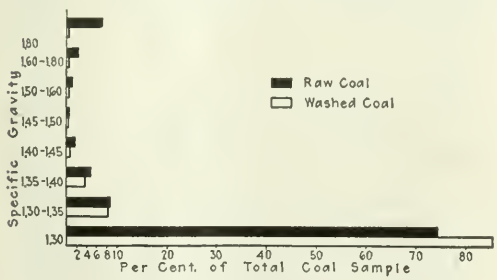

FIG. 2. ANALYSIS OF A COAL BEFORE AND AFTER WASHING

TABLE VI. ANALYSES OF COALS REPRESENTED IN FIG. 3

Specific Gravity	Washable Coal: Per Cent. of Total Sample	Washable Coal: Ash, per Cent.	Washable Coal: Sulphur, per Cent.	Non-washable Coal: Per Cent. of Total Sample	Non-washable Coal: Ash, per Cent.	Non-washable Coal: Sulphur, per Cent.
1.30	73.35	4.64	1.72	55.9	10.1	2.91
1.30 to 1.35	8.74	11.27	2.14	20.5	13.3	3.35
1.35 to 1.40	4.93	17.78	2.39	11.8	15.4	3.45
1.40 to 1.45	1.82	20.32	2.52	3.8	19.1	4.39
1.45 to 1.50	0.39	24.60	2.62	1.8	22.5	6.18
1.50 to 1.60	1.12	29.90	2.80	2.1	27.6	9.29
1.60 to 1.80	2.13	49.53	3.43	1.1	42.7	13.30
1.80—	7.52	84.04	13.63	3.0	60.5	34.12

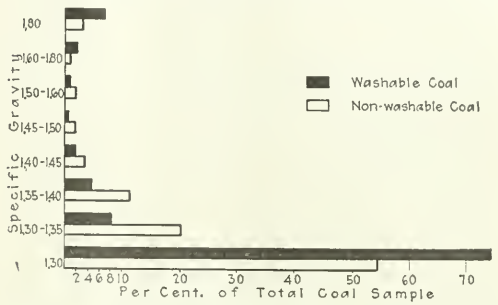

FIG. 3. ANALYSIS OF WASHABLE AND UNWASHABLE COAL

was lighter than 1.3 in specific gravity was 10.1 per cent, while the corresponding increment of the washable Illinois coal analyzed 4.64 per cent ash.

The Tennessee coal was crushed to ⅜ in. maximum size and treated on a washing table. Although a good

TABLE VII. WASHING TEST ON A COAL FROM WILLIAMSON COUNTY, ILL.

	Feed, Per Cent.	Ash, Per Cent.	Reduction in Ash, Per Cent.	Sulphur: Pyritic, Per Cent.	Sulphur: Reduction in Pyritic, Per Cent.	Sulphur: Organic, Per Cent.	Sulphur: Total Sulphur Per Cent.	Sulphur: Reduction in Total Sulphur, Per Cent.
Raw coal	100.0	14.2	..	1.94	..	0.76	2.70	..
Washed coal	85.0	7.2	49	1.09	44	0.76	1.85	32
Middlings	6.6	19.8	.	1.80	..	0.76	2.56	..
Washed coal and middling combined	91.6	8.1	43	1.14	41	0.76	1.90	30
Refuse	7.3	72.12	..	....	..	....	10.75	..
Loss	1.1	.....	..	....	..	....	.....	..

reduction in sulphur in the clean coal was secured, this was made possible only by taking a large middling product and a large refuse low in ash and sulphur. For these reasons the washing of this coal would not be profitable.

To sum up the conditions that characterize an easily washed coal, the excess undesirable sulphur and ash should be present in the form of shale or pyrite particles large enough to be detachable from the coal, without crushing finer than ¼ in. in size. The coal, when crushed to the proper size for washing, should be separable by a sink-and-float test into an increment heavier than 1.6 specific gravity and an increment lower than 1.30 in specific gravity and low in ash and sulphur content with only a small percentage of intermediate density between these increments. The impurities that make a coal difficult to wash are thin bands of friable shale; bony coal; carbonaceous shale; thin filmlike flakes of pyrite, calcite or gypsum in joint fissures; finely

TABLE VIII. WASHINGTEST ON A COAL FROM WHITE COUNTY, TENNESSEE

	Feed, Per Cent.	Ash, Per Cent.	Reduction in Ash, Per Cent.	Sulphur				
				Pyritic, Per Cent.	Reduction in Pyritic, Per Cent.	Organic, Per Cent.	Total, Sulphur, Per Cent.	Reduction in Total Sulphur, Per Cent.
Raw coal.....	100.0	15.15	..	3.60	.....	1.17	4.87	..
Washed coal...	54.6	11.30	25	1.85	51.5	1.17	3.02	38
Middlings.....	32.0	17.90	..	4.04	.....	1.17	5.22	....
Washed coal and middling combined.....	86.6	13.80	9	2.65	29.00	1.17	3.82	21.5
Refuse.....	8.2	36.39	..	....	.....	.	17.74	....
Loss.....	5.2	.....	.	...	.	....	.....	....

divided impurities intimately mixed with the coal, and organic sulphur.

The chief value, in coal-washing investigations, of the determination of organic sulphur by extraction of the sulphate and the pyritic sulphur, lies in finding a value below which there can be no reduction of sulphur content by mechanical processes. For example, if the coal from a given mine contains 3 per cent of total, and 1 per cent of organic sulphur, it would of course be impossible to expect a washed product carrying less than 1 per cent of sulphur. Although this is a self-evident fact, it is of such importance in determining the washability of a coal that attention is directed to it. It would be inadvisable to give here a definite figure for the reduction in pyritic sulphur that can be expected with the best modern coal-washing machinery. The data given indicate that in some coals one-half of the pyritic sulphur may be removed, but the percentage reduction would vary markedly with different coals, depending on the physical form in which the pyritic sulphur occurs. In any case, the minimum sulphur content that may be obtained in the clean coal is well above the organic sulphur content, because some pyrite occurs in a finely divided state intimately mixed with the coal. For practical purposes in coal washing this, in addition to the organic sulphur, may be considered as fixed sulphur.

The experimental work here described was carried out under the general direction of E. A. Holbrook, acting chief mining engineer, U. S. Bureau of Mines.

The Coal Industry in 1917

The inventory of the nation's resources that the war made necessary brought to light many new facts about coal mining which will be of lasting value to the industry and to the public. As long as the war lasted these incidental lessons were lost sight of under the pressure of meeting the emergency created by the shortage of fuels, but with the return of peace the experience gained during the war is being gathered together in a series of reports on the industry, the first of which, "Coal in 1917," by C. E. Lesher, has just been published by the United States Geological Survey, Department of the Interior.

The period from 1914 through 1917 and 1918 and into 1919 may be regarded as a distinct epoch in the coal industry, of which the year 1917 represented only one section, but a section which, if not the most remarkable for its achievements, was at once the most chaotic and the most momentous in the history of the industry.

It is not difficult to marshal the events and factors that mark 1917 as unusual: An extraordinary demand, increasing after April, when this country entered the war, and unsatisfied throughout the year; high prices and speculation in "free" coal; the first effort at regulation of prices through the Committee on Coal Production; the Pomerene amendment to the Lever Act and the fixing of prices and appointment of the Fuel Administrator by the President; labor troubles; priority orders; car shortage and other difficulties in transportation; severe storms in December that blocked the railroads; the withdrawal of ships from the coastwise trade to New England; unequal distribution of coal and constant fear of a fuel famine in many sections; reluctance of many producers and distributors of coal to accept governmental regulations in general, and the program of the Fuel Administration as it was developed in particular.

In response to the unprecedented demand the bituminous mines produced 551,790,563 net tons, or nearly 10 per cent more than the output of the year before. The anthracite output was 99,611,811 net tons, an increase over 1916 of 13.7 per cent. The total output of both hard and soft coal was thus over 650,000,000 tons.

This record output was accomplished by a labor force of 603,143 men in the bituminous and 154,174 in the anthracite mines. In spite of the draft the number of workers in the bituminous industry was greater in 1917 than in 1916.

Material progress was made during the year in the introduction of the eight-hour day. Whereas in 1916 about 41 per cent of the bituminous workers were employed in mines where the standard working day was longer than eight hours, in 1917 the number in such mines had fallen to 21 per cent. The change was largely the result of reduction in working hours in Kentucky, Maryland, Pennsylvania (bituminous), Tennessee, Virginia and West Virginia, particularly in the larger non-union fields.

In response to numerous inquiries statistics were collected regarding the thickness of vein which it is profitable to mine. Many people will be surprised to learn that in 1917 more than 20,000,000 tons of soft coal was mined from beds less than 3 feet thick. The percentages drawn from each thickness of seam are shown in the following table:

Percentage of Total Output of Bituminous Coal and Lignite Produced From Beds of Different Thickness in 1917.

Under 2 feet	0.6
2 to 3 feet	3.2
3 to 4 feet	13.3
4 to 5 feet	17.6
5 to 6 feet	19.9
6 to 7 feet	13.8
7 to 8 feet	8.9
8 to 9 feet	5.3
9 to 10 feet	5.6
10 to 20 feet	2.0
20 feet or more	.3
Thickness not reported	8.5
	100.0

Two other new investigations published in the report will be of special interest to coal men—the use of mechanical devices for loading box cars and the production of coal suitable for manufacturing by-product coke. Copies of the report may be had free of charge upon application to the Director, United States Geological Survey, Washington, D. C.

THERE HAVE BEEN some advantages in the coal operator and the coke manufacturer having their employees start work an hour earlier in the morning and go home an hour earlier in the evening—from March to October. But if the law was revised to become effective throughout the year, it would be quite another matter. Anyone who has wrestled with the problems of thawing out switches, limbering up tipples and getting colored miners out to work on cold dark winter mornings would hesitate about starting such tasks an hour earlier during the season from October to March. It is an entirely different proposition during the remaining six months of the year.

Coals of Ohio and Their Limitations for Byproduct Coke*—II

By Wilbur Stout†
Columbus, Ohio

THE Allegheny is the most important coal-bearing formation. It extends in a belt from Mahoning County, on the north, across Stark, Cuscarawas, Coshocton, Muskingum, Perry, Hocking, Athens, Vinton and Jackson Counties to Lawrence County on the Ohio River. The thickness of the formation varies from 150 to 250 ft. and averages nearly 200 ft. It contains six well-defined coal beds, five of which have been mined in a large way. It begins with the Brookville, or No. 4, coal and ends with the Upper Freeport, or No. 7, member.

Brookville, No. 4, Coal.—The Brookville coal, the basal member of the Allegheny formation, lies directly below the Putnam Hill limestone where this member is present. This coal is locally developed in parts of Vinton, Coshocton, Tuscarawas, Holmes, Wayne and Stark Counties. The bed has been mined at only a few places for railroad shipment, but it has been worked in many localities for small supplies of domestic fuel. The largest field is in Stark and Tuscarawas Counties, where the bed is rather steady and from 3 to 6 ft. thick. The following section is about representative of the Brookville coal in the Canton district of Stark County:[3]

		Feet	Inches
Limestone, Putnam Hill		5	0
Coal		3	0
Clay		0	2
Coal, bony	Brookville	0	8
Coal		2	2

In Coshocton, Holmes, Wayne and Vinton Counties, the best deposits have a thickness of about 4 ft., but they are usually confined to a few square miles in extent. The bed is commonly broken by partings of clay and bone coal, which cause some trouble in keeping the fuel clean; otherwise the mining conditions are good. The quality of the Brookville coal is shown by the following analysis: Moisture, 5.29 per cent.; volatile matter, 39.10 per cent.; fixed carbon, 46.64 per cent.; ash, 8.97 per cent.; sulphur, 3.29 per cent.

The Brookville coal has weak cementing properties but is never low in sulphur or ash. The coal in the lower part of the bed is more impure than that in the upper part but neither is of first-class quality. As the sulphur occurs both in the form of pyrite and in organic sulphide, the fuel is but little improved by washing. Large quantities of Brookville coal are yet available but the quality excludes it from byproduct coke making.

Clarion, No. 4a, Coal.—In ascending order, the second coal bed in the Allegheny formation is the Clarion, or No. 4a, which lies either directly or only a few feet below the Ferriferous or Vanport limestone and from 20 to 35 ft. below the Lower Kittanning coal. It is present in the northeastern and southern parts of the state and is thin or wanting in the central part. Small deposits, varying from 3 to 4 ft. in thickness, have been worked in northern Columbiana County for railroad shipment. The quantity of fuel available in this part of the state is small and the quality poor. The important field of Clarion coal in Ohio is located in southern Vinton, eastern Jackson, eastern Scioto, western Gallia and northern Lawrence Counties. The area is large and the bed persistent. The following section is representative:

		Feet	Inches
Limestone, Ferriferous or Vanport		6	0
Shale		1	0
Coal		1	3
Clay		0	7
Coal	Clarion	1	4
Clay with pyrite		0	1
Coal		1	0
Clay, siliceous		2	0

The average thickness of clean coal is about 3 ft. 6 in. The bed is everywhere broken by the two partings and in places by thin layers of bone coal. The fuel produced by the ordinary methods of mining is dirty. An analysis of the coal is:[4] Moisture, 5.34 per cent.; volatile matter, 38.94 per cent.; fixed carbon, 44.92 per cent.; ash, 10.80 per cent.; sulphur, 4.33 per cent.

The Clarion coal cokes readily and yields a product of excellent structure, as shown by the results obtained at Vinton Furnace, Vinton County, in Welsh ovens. The ash and sulphur, however, are far above the limits demanded for coals for byproduct practice. Washing lowers the ash considerably but it is not particularly effective in reducing the sulphur, for about half of this is present in organic combination and the remainder in disseminated pyrite. Moreover, the yield of coke from such a coal is low. Although present in large quantities and coking freely, the Clarion coal is thus excluded from the field of byproduct coke on account of its high ash and sulphur.

Lower Kittanning, No. 5, Coal.—The position of the Lower Kittanning coal is normally 20 to 35 ft. above the Ferriferous limestone and 25 to 45 ft. below the Middle Kittanning coal. Although locally wanting, the member may be traced readily from the Ohio-Pennsylvania line in Columbiana County across Stark, Carroll, Tuscarawas, Coshocton, Muskingum, Perry, Hocking, Vinton and Jackson Counties to the Ohio River in Lawrence County. This member is an important source of fuel in a number of districts in the state, but the horizon is better known on account of the great bed of plastic clay associated with the coal. The Lower Kittanning is one of the few Ohio coals that cokes freely, but it has limitations due to detrimental impurities. It was coked in a small way for many years in the Leetonia field of Columbiana County. The product was somewhat brittle but otherwise had fair properties. The area is now largely exhausted hence it need not be considered further. In parts of Stark County, the bed is rather steady and from 3 to 4 ft.

*Concluding installment of a paper presented before the Chicago meeting of the A. I. M. E., September, 1919. First part appeared in *Coal Age*, , October 23, 1919.

†Assistant State Geologist.

[3]Ohio Geological Survey, 5, 232.

[4]Ohio Geological Survey *Bulletin* 9, 291.

thick. The following measurement is about representative of the best deposits:

		Feet	Inches
Shale		10	0
Coal	Lower Kittanning	1	10
Shale		0	2
Coal		2	0
Clay		6	0

In this county the analysis of the coal is, approximately, as follows: Moisture, 3.83 per cent.; volatile matter, 42.10 per cent.; fixed carbon, 50.22 per cent.; ash, 3.85 per cent.; sulphur, 2.25 per cent. The sulphur occurs largely as pyrite in concretionary form and hence the coal would be improved by washing. The quantities yet available, however, are not large.

The Lower Kittanning coal holds its thickness well and extends over a wide area in Tuscarawas County. The thickness varies from 2 ft. 6 in. to 5 ft. but averages somewhat over 3 ft. The quantities of fuel yet available are large. In parts of the fields, the bed contains considerable pyrite in large nodules or sheets, which are usually bedded along definite zones; washing would remove most of this. The following measurement is about an average for the field:

		Feet	Inches
Shale		10	0
Coal	Lower Kittanning	2	6
Shale with pyrite		0	2
Coal		0	6
Clay		9	0

The analysis follows: Moisture, 4.3 per cent.; volatile matter, 40.83 per cent.; fixed carbon, 46.67 per cent.; ash, 8.20 per cent.; sulphur, 3.43 per cent.

In a small field north of Newcomerstown, Tuscarawas County, the Lower Kittanning coal is quite pure, being low in both sulphur and ash. By choosing the best deposits of coal in the county, a fair grade of coke could be made, but the yield would be low, approximately 56 per cent. The byproducts, however, would be high and find a ready sale.

In Guernsey, Coshocton and Muskingum Counties, the Lower Kittanning coal is unsteady and generally of poor quality. The continuity of the bed is much better in Perry County, where large acreages are present in the northeastern and southern portions. The thickness of the bed varies from 3 to 5 ft. but averages nearly 4 ft. The section given below was obtained in Pike Township:[6]

		Feet	Inches
Shale		0	7
Coal	Lower Kittanning	0	6
Horn coal		0	1
Coal		1	0
Parting		0	½
Coal		1	9
Clay		1	0

The approximate analysis of the coal in Perry County is: Moisture, 6.9 per cent.; volatile matter, 38.53 per cent.; fixed carbon, 47.32 per cent.; ash, 7.25 per cent.; sulphur, 2.9 per cent.

Everywhere in the field the sulphur is high, seldom being below 2 per cent.; the improvement by washing would not be sufficient to give a first-class product. The ash in the coke, however, could be kept below 10 per cent.

In its extension southward, the Lower Kittanning coal is not important until Jackson and Lawrence Counties are reached; here the bed holds fair thickness over rather large areas, expanding from 2 ft. 6 in. to 5 ft. The average measurement and structure are shown in the following section:

		Feet	Inches
Shale		20	0
Coal	Lower Kittanning	2	4
Clay		0	2
Coal		0	6
Clay		6	0

The mining conditions are fair and with a little care the coal may be kept free from extraneous materials. The approximate composition is: Moisture, 6.43 per cent.; volatile matter, 38.34 per cent.; fixed carbon, 47.22 per cent.; ash, 8.01 per cent.; sulphur, 2.29 per cent. Carload samples of this coal washed and then coked in beehive ovens gave products with the following analysis:[6]

Volatile matter	2.95	2.60
Fixed carbon	86.60	88.85
Ash	10.45	8.55
Total	100.00	100.00
Sulphur	1.004	1.35

The Lower Kittanning coal was coked for years by the Ashland Coal and Iron Co. at Ashland, Ky. The coke produced was of fair quality but the yield was low. By mixing this coal with Pocahontas or other good grades of West Virginia coal, the yield would be increased and the quality of the product could be considerably improved. The Lower Kittanning member offers the best possibilities for coke making in the byproduct oven of any coal in southern Ohio.

Middle Kittanning, No. 6, Coal.[7]—Bownocker says:[6] "The Middle Kittanning coal, on account of its quantity and quality, is the most valuable in Ohio. It is found along the state line in Columbiana County and can not only be followed with ease across the state to Lawrence County, on the Ohio River, but it is worked in every county where it should appear above drainage and in most of them on a large scale." It has its maximum development in the Hocking Valley field in Perry, Hocking and Athens Counties. The bed lies from 25 to 45 ft. above the Lower Kittanning coal and from 80 to 100 ft. below the Upper Freeport member.

The Middle Kittanning coal is regularly present in the eastern and southern parts of Columbiana County, but it has an average thickness of less than 3 ft. The quality of the fuel, however, is good. It was coked for a number of years near Hammondsville, but as the cost of mining was high the operations were finally abandoned. The thickness and quality of this coal are also much the same in Stark County, where the best deposits are found in the eastern and southern parts. The Middle Kittanning coal is present above drainage over much of Tuscarawas County and is largely mined both for local purposes and for railroad shipment. The bed varies from 3 to 5 ft. in thickness. The average measurement is about as follows:

		Feet	Inches
Shale		10	0
Coal	Middle Kittanning	2	4
Shale		0	2
Coal		1	3
Clay, siliceous		3	0

[6] Ohio Geological Survey *Bulletin* 9, 187.

[6] Ohio Geological Survey *Bulletin* 20, 386.

[7] U. S. Geological Survey, *Professional Paper* 100-B, 49.

In places, a few inches of bony coal appears above the main bed. Thin partings are also present in both the upper and lower benches of coal in some mines. The average composition of the fuel is: Moisture, 3.76 per cent.; volatile matter, 41.31 per cent.; fixed carbon, 48.16 per cent.; ash, 6.77 per cent.; sulphur, 3.85 per cent. This analysis shows that the sulphur is far too high for byproduct coke. Washing improves the coal considerably but not to the extent necessary for good results. The thickness and composition of the Middle Kittanning coal in Coshocton and Muskingum Counties are much the same as in Tuscarawas. The quantities of fuel available in both counties are large and the mining conditions excellent. In the Hocking Valley district of Perry, Hocking and Athens Counties, the bed has excellent continuity and swells to 5 ft. or more in thickness. It is regularly present in three benches, which in places are further separated by irregular bony layers. On the average, the Middle Kittanning coal in this district is lower in sulphur than it is elsewhere in the state. The structure of the coal in the main part of the field follows:

		Feet	Inches
Shale		10	0
Coal	Middle Kittanning	1	8
Shale and bone coal		0	6
Coal		2	0
Shale		0	4
Coal		1	6
Shale		0	1
Coal		1	6
Clay, siliceous		3	0

The average composition is: Moisture, 7 per cent.; volatile matter, 34.91 per cent.; fixed carbon, 51.38 per cent.; ash, 6.71 per cent.; sulphur, 1.32 per cent. In part of this field, the sulphur in the coal is less than 1 per cent. and the ash less than 6 per cent.; these could be considerably lowered also by washing. From clean coal, the yield of coke would be nearly 60 per cent. and the sulphur not above the standard of 1 per cent. The limitation, however, in the main Hocking field is that, as a whole, the Middle Kittanning coal has little coking power. The lower bench cements fairly well but the two above are lacking in this property. Satisfactory results could be obtained only by mixing it with some standard coking coal such as Pocahontas. Using a mixture of one-half Hocking Valley and one-half Pocahontas No. 3, the yield in coke would be approximately 71.28 per cent.,* the composition of the coke is: Volatile matter, 1.4 per cent.; fixed carbon, 90.59 per cent.; ash, 8.01 per cent.; sulphur, 0.67.

By washing the Middle Kittanning coal, the ash could be lowered somewhat and the sulphur kept safely within the limits required. The byproducts, especially the excess gas, would have a ready market. Under such conditions, the Middle Kitanning coal in the Hocking Valley field has more favorable prospects for coke making than it has elsewhere in Ohio. The quantities of coal yet available are large and a constant supply assured. South of this field, in Vinton, Jackson, Gallia and Lawrence Counties, the Middle Kitanning coal is thin and patchy, the best areas being only a few square miles in extent. Further, the quality of the fuel is generally poor.

Lower Freeport, No. 6a, Coal.—The Lower Freeport coal, lying about midway in the interval between the Middle Kittanning and Upper Freeport members, is unsteady in Ohio. The only two areas worthy of consideration are near Steubenville and Amsterdam, Jefferson County, where it is mined in a large way. The average thickness of the bed in the Steubenville region is nearly 4 ft. The quality of the coal is shown in the following analysis: Moisture, 2.06 per cent.; volatile matter, 39.06 per cent.; fixed carbon, 53.96 per cent.; ash, 4.92 per cent.; sulphur, 1.79 per cent.

In this district, the Lower Freeport coal was formerly coked quite extensively for the local furnaces but at present is not so used. The product was not up to the present standard as the coke was rather brittle and dense and high in sulphur and ash. The composition is approximately as follows: Volatile matter, 1.34 per cent.; fixer carbon, 91.28 per cent.; ash, 7.38 per cent.; sulphur, 1.97 per cent. The area of coal in the Amsterdam field is large and the thickness of the bed from 3 to 6 ft. The sulphur content, however, is more than 2.50 per cent. too high for coke making.

Upper Freeport, No. 6, Coal—The Upper Freeport coal, the youngest member in the Allegheny formation, extends from the Ohio-Pennsylvania line, in Columbiana County, southwesterly across the state to the Ohio River, in Lawrence County. The bed lacks persistency but at that it ranks third in importance. In general the fields are not large and are more or less disconnected. In Columbiana County, the Upper Freeport coal has been mined for many years near East Palestine and Salineville and the fields are yet far from exhaustion. The normal thickness of the bed is between 5 and 6 ft. The structure is shown by the following section:

		Feet	Inches
Sandstone, Mahoning		0	0
Shale		3	0
Shale, black		1	0
Coal	Upper Freeport	4	4
Shale		0	2
Coal		1	0
Clay		4	0
Limestone		2	0

The coal in the upper bench contains less sulphur and ash than that in the lower bench, which in places is not removed from the mine. It cokes freely but the product is of poor quality owing largely to the percentage of sulphur. The composition of the fuel is: Moisture, 2.32 per cent.; volatile matter, 39.08 per cent.; fixed carbon, 52.78 per cent.; ash, 5.82 per cent.; sulphur, 2.88 per cent.

The Upper Freeport coal has excellent thickness in the southwestern part of Carroll County but the best of the field is now exhausted. But little coal of value is found on this horizon in Tuscarawas County. The most important field, in Ohio, is the Cambridge, Guernsey County area, where the bed has been extensively mined for many years. Large quantities of coal, however, are yet available. The structure follows:

		Feet	Inches
Shale		3	0
Coal	Upper Freeport	4	1
Shale		0	2
Coal		1	7
Clay		3	0

The quality of the coal is shown by the analysis: Moisture, 4.11 per cent.; volatile matter, 36.5 per cent.; fixed carbon, 54.39 per cent.; ash, 5 per cent.; sulphur, 1.30 per cent.

*The average composition of 38 analyses of Pocahontas No. 3 coal given in West Virginia Geological Survey, Vol. II, 1903, pp. 595-6 is as follows: Moisture, 0.26 per cent.; volatile matter, 17.27 per cent.; fixed carbon, 77.77 per cent.; ash, 4.7 per cent.; sulphur, 0.62 per cent. These figures are used in the foregoing calculation.

This coal has been successfully used in the byproduct oven, but the structure of the coke is not up to the standard. By mixing it with other coals, more satisfactory results should be obtained. When coked alone, the yield is about 60 per cent. and the sulphur not above 1.25, which may be considerably lowered by careful selection and preparation. This field has possibilities for byproduct coke plants that are worthy of investigation.

The Upper Freeport coal is also present in Muskingum, Perry, Hocking, Athens, Vinton, Jackson, Gallia and Lawrence Counties, but the areas are usually small and the best of the fuel largely exhausted. The most productive regions are in central Muskingum and northern Athens Counties. The thickness of the bed is from 2 to 6 feet.

The Conemaugh formation in Ohio contains at least six well-defined coal beds, some of which are remarkably persistent. They are everywhere thin, seldom expanding to as much as 3 ft. and usually measuring about 1 ft. With few exceptions, these coals are dense and highly volatile and contain a large percentage of sulphur, which is combined largely with the organic matter. On the whole, they offer no possibilities for coke making.

The Monongahela formation outcrops in a broad belt extending along the Ohio River from Jefferson County to Lawrence County. The total area both above and below drainage is approximately 3000 square miles, and the average thickness more than 200 ft. The formation is of interest chiefly for its coal beds, which in ascending order are Pittsburgh, Pomeroy, Meigs Creek, Uniontown and Waynesburg.

Pittsburgh, No. 8, Coal.—The Pittsburgh coal, lying at the base of the Monongahela formation, outcrops over a wide area in Ohio, but the member has workable thickness only in three fields, which are widely separated. In its extension from the great districts in Pennsylvania into eastern Ohio, this coal increases in sulphur and ash, loses in coking and heating qualities, and shrinks in thickness. In importance, however, the Pittsburgh coal ranks second in this state, being surpassed only by the Middle Kittanning member.

The most important field is the Belmont, where the bed has excellent thickness and continuity over nearly the whole area. Although coal has been mined here since 1825, the quantities yet available are sufficient to last for many years. At present this county is the largest producer in the state. The thickness of the bed is from 2 to 6 ft., while the typical structure is as given below:

		Feet	Inches
Shale		8	0
Coal		1	0
Shale		0	10
Coal		2	3
Shale		0	1/4
Coal	Pittsburgh...	0	2
Shale		0	1
Coal		1	5
Shale with pyrite		0	1 1/2
Coal		1	3
Clay		3	0

The structure varies somewhat from place to place but the bed always has a few thin partings, which are not especially troublesome in mining. The coal is bright and solid. The general character is shown by the following analysis: Moisture, 3.74 per cent.; volatile matter, 36.94 per cent.; fixed carbon, 50.08 per cent.; ash, 9.24 per cent.; sulphur, 4.29 per cent. Taking the bed as a whole, this analysis shows that both the sulphur and the ash are entirely too high for byproduct coke. Some parts of the deposit are purer than others, but even by careful selection and working this coal will make only a low-grade coke. The structure of the product, however, is very good.

In the Federal Creek field, which lies in the southwest corner of Morgan County, and in the northeast part of Athens County, the Pittsburgh coal is mined for railroad shipment. The bed varies from 3 to 6 ft. in thickness and, besides thin partings, is regularly divided by a structure of clay about 1 ft. thick. Attempts were made to coke this coal for the general market, but owing to mining troubles and to the poor quality of the product the result was a failure. In this field, the sulphur is seldom below 2.50 per cent. or the ash below 6 per cent.

The third field of Pittsburgh coal lies in southern Gallia County, but the area is small and the coal of poor quality. It is not mined except for local use.

In summarizing the points in reference to the Pittsburgh coal, the main facts are: The quantities of coal available are large; the mining conditions are good; and the coal cokes freely. But, the sulphur and ash are too high to yield a suitable coke for metallurgical use.

Pomeroy, No. 8a, Coal.—The second coal bed in the Monongahela formation is the Pomeroy, which lies from 25 to 50 ft. above the Pittsburgh coal and about the same distance below the Meigs Creek member. The only field of importance is in Meigs County, where this coal has been mined for shipment by rail and water for many years. The area yet available is not large. The bed contains some shaly coal in the upper part but otherwise is free from partings. The general thickness is between 4 and 5 ft., and the mining conditions are good. The composition is: Moisture, 6.79 per cent.; volatile matter, 34.91 per cent.; fixed carbon, 47.72 per cent.; ash, 10.58 per cent.; sulphur, 2.42 per cent. The minimum in sulphur is about 1.50 per cent. and in ash about 7 per cent. On account of the high ash and sulphur, the poor structure of the coke, and the low yield attained, the Pomeroy coal is outside the field of byproduct work. Moreover, careful selection and thorough washing will scarcely improve the quality sufficiently for satisfactory results.

Meigs Creek, Sewickley, No. 9, Coal.—The Meigs Creek coal, which is correlative with the Sewickley of Pennsylvania, lies from 60 to 100 ft. above the Pittsburgh bed and is of workable thickness in parts of Belmont, Harrison, Monroe, Washington, Noble, Morgan, Muskingum, and Guernsey Counties. This coal is variable in thickness, structure, and composition. It swells from 2 to as much as 6 ft. in height but averages about 4 ft. The bed is usually divided by one or more partings of bone coal, shale or clay, and also contains thin, closely spaced, papery layers of shaly material. The average composition, shown by nineteen analyses, is as follows:[9] Moisture, 4.11 per cent.; volatile matter, 36.03 per cent.; fixed carbon, 48.26 per ceit.; ash, 11.60 per cent.; sulphur, 4.28 per cent. As about half the sulphur is in organic combination and as much of the ash is uniformly distributed through the coal, the improvement by washing is not large. Although the field is large, the Meigs Creek coal gives no promises for coke production.

Uniontown, No. 10, Coal.—The Uniontown coal is present over a wide area in southeastern Ohio but is

[9]Ohio Geological Survey, (4), *Bulletin* 9, 301.

best represented in Belmont and Monroe Counties. The best deposits are from 3 to 5 ft. thick, but they are confined to rather small areas. The coal is generally high in ash and sulphur, and therefore not fitted for coke making.

Waynesburg, No. 11, Coal.—The Waynesburg coal, although found in several counties in southeastern Ohio, is of little importance as the bed is thin and uncertain and the fuel poor in quality. It is mined chiefly by the farmers for domestic purposes.

Rocks laid down during Dunkard time are found in a narrow belt extending along the Ohio River from Belmont County to Meigs County. The maximum thickness of the series is more than 600 ft. Several coal beds are present but these have little or no value. The Waynesburg "A" and Washington members are best developed and have been mined in places for local supplies of fuel.

Summary

Owing to the importance of the iron and steel industry in this state and to the number of byproduct ovens well distributed over the area, the needs for local coking coals are great but are not satisfactorily supplied. The quantity of coal available is sufficient to last for many years, but the general quality is below the standard demanded for making metallurgical coke. The best possibilities lie with the Lower Kittanning, Middle Kittanning and Upper Freeport members in certain fields in which the impurities are below the average. Refined methods of picking and working will also add to the supply. If the local coals are used alone, the yield of coke is rather low and the structure at best only fair; but if mixed with high-grade coals from Pennsylvania or from West Virginia, the resulting product will be safely within the limits of usefulness. The limitations are such that the many failures to make coke in beehive ovens were not without cause.

Mining Methods in Great Britain

Published statements with regard to the coal industry in Great Britain which reflect on mining methods employed there have called forth the following comment from George S. Rice, the chief mining engineer of the Bureau of Mines:

Those who either do not visit the mines, or are not mining men, do not understand that undercutting machinery is not so generally applicable under European conditions as it is in the United States. The coal beds there are generally pitching, are faulted and are so deep that (a) in a large proportion of the working places these are too irregular and the pitch so great as to make it difficult if not impossible to use undercutting machines effectively or at all. (b) There is no more labor in picking from the face than there is in breaking the large lumps of the comparatively hard coal in the majority of the mines in the United States; in fact, in many cases machines would be "buried" by the spalling off of coal under the roof pressure. (c) Generally, the European coal mines use the very commendable system of longwall mining, which recovers practically all of the coal and fills the excavation with packing, instead of the practice which prevails in the United States of using the room-and-pillar system, in many places without attempted recovery of pillars. It is estimated that on the average, at least 25 per cent. of the coal is lost in the mining in this country. But room-and-pillar work does permit freer use of undercutting machines and cheap mining.

I do not mean to say that the equipment cannot be improved, just as it can be improved in most mines in the United States, but it is a mistake to compare the percentage of coal undercut in the United States with that in England or other European countries as a reflection on European methods.

As regards the alleged cutting of piece rates by the owners whenever the miners tried to see how much they could produce, I very much question this as a general fact; it is not common sense that they would do so.

Poorer seams—"It is undeniably true that mine owners have been working the poorest seams in order to escape the excess profits tax,"—this from my observation is not so, and it does not seem reasonable. The fact that poor seams are worked at all should be commendable instead of the practice which prevails in the United States, and regretted by mine operators, that on account of competitive conditions, only the best seams are worked, and which frequently sacrifices or leaves thinner or poorer areas of the coal.

I have observed in mines in the Midddle West areas with coal of from 4 to 5 ft. thick permanently left in a mine because there was 7 to 9 ft. of coal elsewhere, and the miners would not take the thinner coal without such an increased rate that the coal could not be produced at a competitive figure.

Mr. Rice analyzes the causes of shortage and presents them as follows in the order of their importance: (a) Strikes. (b) Letting-up of the miners in the amount of work they have been doing in a shift, on the ground that their day has come and they are no longer going to work as hard as they did in the past. (c) Voluntary absenteeism as shown by the official statistics. (d) Shortening of the hours of labor.

And on top of this came (July 16) the Sankey award, reducing by one hour the hours of labor, and which according to the best mining authorities in Great Britain is going to make a most serious reduction in the output.

British Fuel Experiments

The fuel research station at East Greenwich is expected to be completed immediately, states Trade Commissioner Henry F. Grady, London, in a recent Commerce Report, and operations will be commenced without delay. The central tower, a steel structure, which forms the starting point of the coal's treatment, is being placed in position. The offices and laboratories are complete, and gas holders are all ready. To supplement the power plant, electrical throughout, the Admiralty has supplied a Diesel engine taken from a British submarine.

The station is stated to embody a unique system for accurately determining the fuel value of coal and its products. Exact tests are to be carried out with special boilers of the comparative efficiency of coal, gas and oil in the furnaces. Experiment will be particularly directed to ascertain the maximum capacity of coal to yield motor spirit. It is not intended to deal at once with colliery refuse, but to confine work for the moment to standard coal. The station is an experimental one established by the British Government to ascertain the extent to which low-grade coal and colliery waste can be utilized to increase the country's supply of domestic and industrial fuel.

In many mine explosions all of the local officials have either been lost or imprisoned within the mine, leaving no official outside with authority to direct affairs. The senior official in authority on the outside of the mine following an explosion, or in his absence some employee who has previously been instructed as to the proper procedure in case of disaster, should assume charge in order to effect a preliminary organization for the rescue work.—*Rescue and Recovery Operations in Mines.*

Outdoor Substations in Connection with Coal-Mining Installations*

By H. W. Young
Chicago, Ill.

DEVELOPMENT of high-tension outdoor stations during the past few years has been due primarily to economic reasons. The demand for power in small communities could not be met with the conventional and comparatively expensive indoor types unless the rate for service was materially increased. That the various problems incident to development have been solved successfully, it is only necessary to point to the wide adoption of outdoor substations by utility companies. Passing at once to the question as to whether outdoor substations are applicable to the power requirements of coal mines, it is well to consider first the elements entering into their construction.

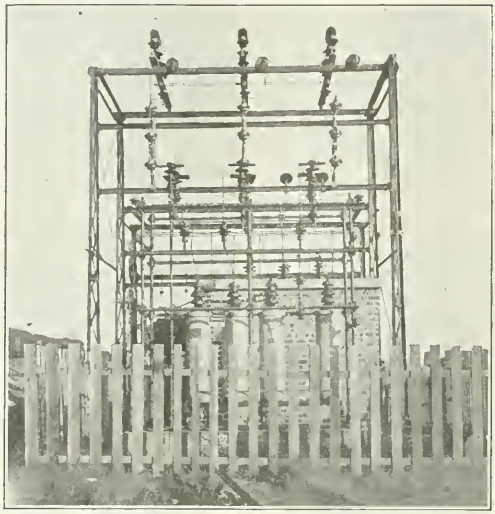

FIG. 1. SUBSTATION TAPPING POWER LINE GIVING SERVICE TO A COAL MINE

Self-cooled outdoor transformers are no longer an experiment. The chief difference between an indoor and an outdoor transformer lies in the type of bushings and cover. The outdoor type is commercially available in any desired capacity or voltage.

There are two distinct types of high-tension switches, the oil-break and the air-break forms. The oil-break switches are simply a development of the indoor types, the principal difference being in housings and terminals. They are thoroughly developed and in successful operation. Air-break switches are an accepted standard for transmission systems and are available in several forms. When provided with arcing horns or discharge horns, they can be used to open loaded circuits.

Outdoor types of electrolytic, oxide film and horn-gap arresters with or without limiting resistance are fully developed and have good service records. Outdoor choke coils are of the same general design as the indoor type with the exception of the insulating supports. The modern high-tension fuses can be used equally well indoors or outdoors, the only difference being that the outdoor mountings have petticoat instead of pillar-type insulators. High-tension wiring supports are standard commercial devices. Like the indoor types, they are made in many forms and assembled to meet the various wiring conditions.

If indoor equipment is to be used, a building must be erected with wall or roof bushings for the high tension incoming lines. This building must first be designed for the particular location, hence the services of an architect and a contractor are required. In other words, to properly protect equipment, a very considerable expense must necessarily be incurred that does not materially add to the operation of the electrical equipment. If outdoor equipment is selected, it is necessary to provide a supporting structure for only part of the electrical equipment; the transformers and oil switches simply require a foundation slab. The supporting structure is composed of steel sections fabricated in a factory and shipped with the equipment, thus eliminating the expense of the architect and contractor, necessary with the indoor station.

The outdoor substation steel structures are of simple design and can be erected by common labor under the direction of a foreman connected with the electrical department of the mine. The steel-tower outdoor substation does not require much foundation preparation but can be erected on small concrete pillars on the side of a hill, on a piece of waste ground, or the like.

The general design of outdoor substations has been thoroughly standardized, the actual assembly of elements depending upon local conditions to be met. Where two sources of power, such as a double-circuit transmission line, are available proper switching arrangements must be provided. A standard design for connecting transformers to either or both of two parallel and synchronous lines is shown in Fig. 4.

At the top of the tower are mounted two sets of three-pole, double-break-per-phase, air-break switches provided with separate interlocked operating mechanisms. Each switch has its own operating shaft and a handle so located that opening and closing the switch can be accomplished from ground level. In the high-tension side of the transformer wiring are located three single-pole combination choke coil and fuse units. On the opposite side of the tower are mounted three fused disconnecting switches connected to the separately mounted three-phase lighting arresters. From the one-line diagram, the connections can be easily traced. The choke coils are so located that incoming high voltage surges or lightning disturbances are reflected to the arresters, where they will be discharged in the usual manner.

*Paper presented before the Chicago meeting of the American Institute of Mining Engineers, September, 1919.

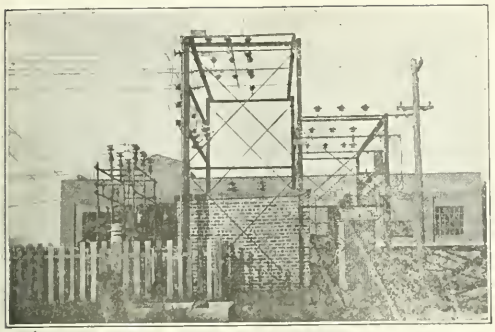

FIG. 2. VIEW OF AN OUTDOOR SUBSTATION

An important feature of this design is in the elimination of an expensive automatic oil circuit breaker on the high-tension side. That this saving can be made without jeopardizing the transformers is not generally understood by purchasers who often needlessly specify their use. It is essential that the expense be kept to the lowest possible value consistent with safety and good operation. As there is quite a difference in the cost of substations using automatic circuit breakers and air-break switches with fuses, the question immediately arises as to whether we can afford to use this lower-cost equipment.

It is conceded as a fact that the severity of damage done to transformers during short-circuit conditions is in direct proportion to the amount of energy flowing into the circuit before the transformers are disconnected. Whether an automatic oil switch or a fuse will clear the short circuit in the least time can be answered as follows: High-tension automatic oil switches of good design will open in approximately 0.16 sec. under short-circuit conditions. High-tension fuses of good design will clear short circuits in approximately 0.013 sec. or from ten to twelve times as rapidly as the automatic oil switches.

High-tension fuses will, under short-circuit conditions, permit a current flow many times the full load rating. Assuming that the current flow with automatic oil switches will be no greater and by comparing the time elements of the fuses (0.013 sec.) and the time element of the automatic oil switches (0.16 sec.), it follows that the slower operating switch will allow approximately twelve times more energy to flow into a short circuit than will flow with the faster operating high-tension fuse. In considering the foregoing values, it should be borne in mind that the amount of reactance in the circuit including that of the transformers will limit the actual current flow with either device.

The oscillogram record, Fig. 5. illustrates this point. This particular test was made by connecting two 9000-kva. in parallel, short-circuiting one phase to ground on a 63,500/110,000-volt star-connected system. The total reactance approximated 20 per cent. and the current flow with this 5-amp. fuse was 240 amperes.

The exceptionally rapid action of fuses will therefore permit overfusing the transformers theoretically twelve times the normal current and still secure protection equal to that of an automatic oil switch. In actual practice overfusing from three to ten times normal is used depending upon local conditions. For power circuits subject to wide fluctuations, such as mining loads, the high-tension circuit-opening devices should be so rated or adjusted that they will not operate except in case of actual trouble, such as transformer failure. Such cases are rare with modern transformer designs.

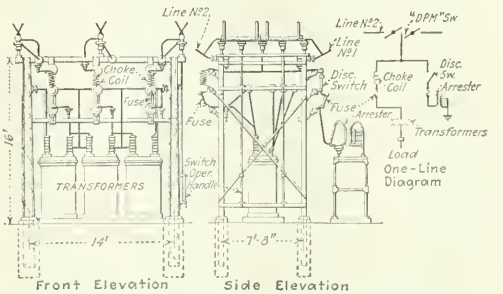

FIG. 4. STEEL TOWER SUBSTATION WITH TRANSFORMER TYPE SWITCHES FOR CONNECTING TRANSFORMERS TO EITHER OR BOTH OF TWO PARALLEL AND SYNCHRONOUS LINES

Such [illegible] protection as is desired can be secured easily and cheaply by means of a low-tension automatic oil switch installed on the secondary side of the transformer bank. In substation practice, this combination of heavy high-tension fuses on the primary side, which will only open in case of transformer failure, and a properly adjusted oil circuit breaker on the secondary side of the transformer bank is an excellent protective system of which advantage is often taken.

The high-tension automatic oil switch has the advantage that it can be used for switching in addition to the overload feature. When fuses are used, it is necessary to install an air-break switch to disconnect the transformers from the line. In actual practice, however, it is often advisable and is considered good engineering practice to install disconnecting switches between the oil switch and the line. The reason for this is that the oil-switch contacts are necessarily concealed in the tanks and to be absolutely sure that a line is clear the disconnecting switches should be opened, thus giving the operator ocular evidence of disconnection.

Should the oil switch open frequently or under severe load conditions, it is advisable to inspect the contacts, oil levels and condition of the mechanism. To enable

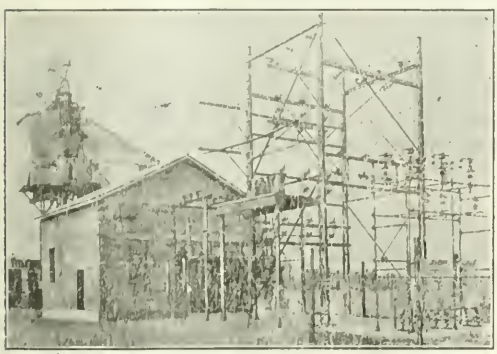

FIG. 3. VIEW OF THE SCHOLZ SUBSTATION

inspection adjustments or repairs, it is often advisable to install auxiliary disconnecting switches so connected that the oil switches can be shunted and entirely disconnected from the circuit, power being temporarily delivered through the auxiliary switches.

Another point in favor of the oil switch is that after interruption it can, if in good condition, be immediately closed, thus reducing the time of service interruption. It will naturally require more time to open an air-break

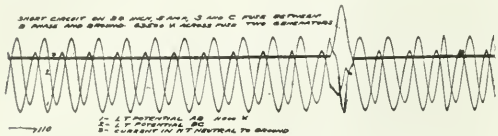

FIG. 5. OSCILLOGRAM RECORD OF 66,000-VOLT SHORT CIRCUIT

switch and replace fuses than it will to close the oil switch. The saving of a moment's time may in some instances warrant the additional expense of the oil switch. However, the average high-tension substation attendant, especially if not "hardened" by long experience, will after an interruption be inclined to go slow in closing the switch until he can actually view every possible part of the switch mechanism, assuring himself that it is in condition to resume service.

Primary Voltage	Transformer Capacity, Kva.	Full-Load Current per Phase, Amperes	Rated Capacity of Fuses
13,200	1,000	43.7	200
22,000	1,000	26.2	130
33,000	1,000	17.5	90
44,000	1,000	13.1	65
66,000	1,000	8.75	45

The fuse and air-break switch combination has, therefore, a certain advantage in that every part of the units, including contacts and condition of fuses, are in plain view of the attendant. The average man working on high-tension equipment has considerably more confidence if he can, without the shadow of a doubt, determine its condition at all times. The choice of equipment must finally rest with the purchaser but as a guide in determining in a general way the dividing line be-

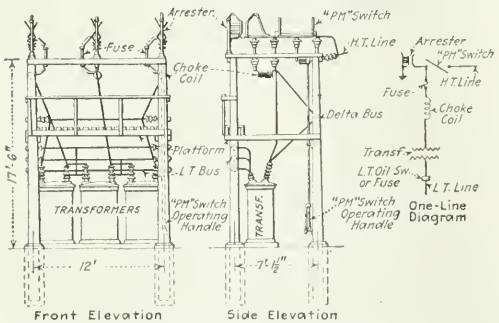

FIG. 6. TYPICAL SINGLE-CIRCUIT OUTDOOR SUBSTATION WITH LARGE CAPACITY TRANSFORMERS AT GROUND LEVEL

tween the use of high-tension fuses and oil breakers, the above tabulation of substation capacities on which fuses can be advantageously used when automatic oil breakers are installed on the low tension side, is given.

When but a single source of power is used, the substation is simplified by omitting one of the three-pole air-break switches shown in Fig. 4. A typical design having but one source of power is shown in Fig. 6.

A recent coal-mine installation made by Carl Scholz, consulting engineer, for the Valier Coal Co., Chicago, and installed at Valier, Ill., shown in Fig. 3, is of interest in that it is a complete electrical installation using transmitted power furnished by the Central Illinois Public Service Co., which operates an extensive interconnected system. The incoming power line is deadended to the steel tower, and by means of an overhead bus, taps are made to the arrester and load circuits. Three choke coils are so located that they offer a barrier to incoming lightning disturbances reflecting abnormal potentials to the arrester where they can be discharged. In the arrester circuit is a three-pole remote-control disconnecting switch operated by means of a handle at ground level. Below the choke coils is installed a three-pole disconnecting switch of the same type used in the

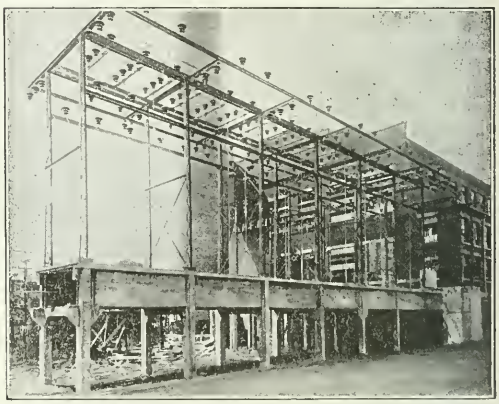

FIG. 7. SUBSTATION INSTALLATION OUTSIDE A POWER HOUSE

Twenty-one coal mines are supplied from lines leading from this installation

lightning-arrester circuit. Below this switch are three single-pole fuse mountings with fuses so rated that they will not blow except in case of transformer failure. The 33,000-volt primary metering equipment is located below the fuses, the current and potential transformers together with the watthour meter and demand indicator being a self-contained unit.

Just back of the main switching tower is located a second steel structure affording space for three 667-kva., 33,000/2,300-volt, 60-cycle, single-phase transformers connected in closed delta. Above the transformers are the high-tension buses with their supports. The 2300-volt circuit is carried into the building by means of lead-covered cables and connected to a five-panel switchboard.

Panel 1 is equipped with a 2300-volt check meter and an automatic main oil circuit breaker. From this panel extends a 2300-volt bus located back of the other panels permitting connections to the various loads. Panel 2 controls the main underground feeder; panel 3 controls the 1350-hp. main hoist motor; panel 4 controls a 250-hp. air-shaft motor; and panel 5 controls the machine-shop and yard-lighting line. Each panel is equipped with automatic oil switches and the necessary instruments.

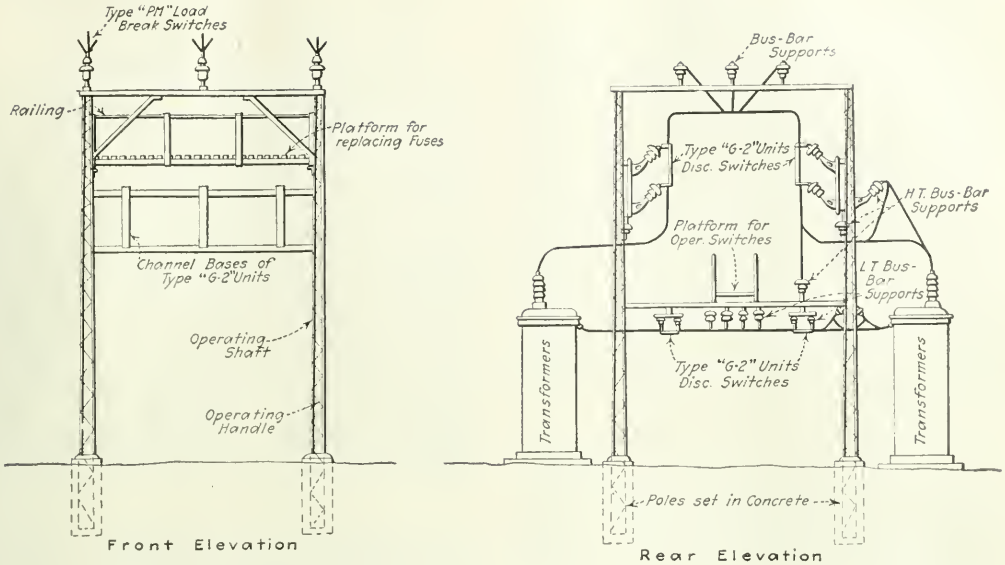

FIG. 8. TYPICAL COAL-MINE TRANSFORMER SUBSTATION

The underground cable from panel 2 terminates at a panel on which is mounted two automatic oil switches. The cable from one switch has a tap line to which is connected 20 underground substations, each station being equipped with three 25-kva. transformers and an oil switch. The feeder voltage of 2300 is transformed to 220 for use with alternating-current coal-cutting machines. On the same feeder cable is connected a 300-kw., 2300/220-volt motor-generator set supplying direct current for the main haulage trolley. This motor-generator set also supplies current to twelve stations for charging the storage-battery locomotives. The other switch and cable supplies power to a 100-kw., 2300/220-volt motor-generator set for the main haulage direct-current trolley and also connects to 20 underground substations for supplying current to the undercutters.

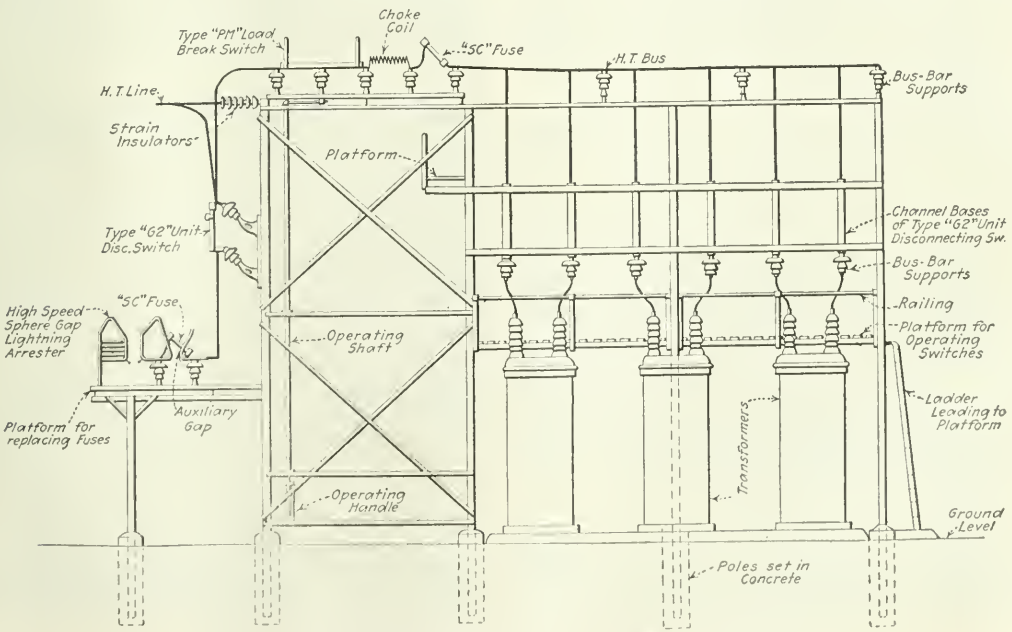

FIG. 9. ANOTHER TYPICAL COAL-MINE TRANSFORMER SUBSTATION

The 75-kw. underground substations are at more or less temporary locations so that equipment can be moved as the work progresses, thus avoiding long secondary runs and giving full voltage to the motors. Control of the 1350-hp. hoist motor will be secured from the underground substation located near the base of the shaft. The operator, by means of switches and indicating devices, has positive control of and always knows the exact position of the hoist. During March 25,000 tons of coal were mined at a power cost of approximately 6.5c. per ton, the load factor on the station being 41.5 per cent. During this month, power was also used for construction work then in progress so that the total cost of power for coal mined was 8.1c. per ton. When the mine is in full operation and construction completed, the cost per ton will probably approximate 4c. or less.

The tendency toward higher transmission voltages has developed a need for 66,000-volt outdoor substations and the type shown in Figs. 8 and 9 is a good example of an arrangement for coal-mining serivce.

ARRANGEMENT OF TRANSFORMERS

A feature of this type lies in the use of three transformers in closed delta on one side of the station and a spare transformer at the opposite side. In case one transformer fails the spare can by means of disconnecting switches be immediately placed in service and in the correct electrical relation to the other transformers.

The high tension side is controlled by means of a three pole air break switch operated from ground level. On the switch bases are also mounted choke coils and fuses for the load circuit.

The lighning arresters are of the high-speed, sphere-gap, graded-resistance type with auxiliary gaps shunted with limit fuses. In case of excessive flow of current to ground the limit fuses will operate in the usual manner. The arrester, however, is still connected to the line across the small auxiliary gap. This arrangement eliminates the possibility of entirely disconnecting the arresters after operation of the limit fuses.

Legal Department

HEIRS' RIGHTS TO ROYALTIES—A married woman owned a tract of coal lands in Kentucky and leased them to a mining company on a royalty basis. Operations were commenced in her lifetime, and at her death her husband became vested with a life estate in the real estate. Held, that the husband became entitled to all the royalty during his lifetime, to the exclusion of children entitled to the property at his death. Therefore, by purchasing the interests of the children, the lessee could not avoid liability for the payment of royalties to the husband so long as he lived. But where his rights were litigated and, by agreement, a judgment was entered allotting only one-third of the royalties to him, he could claim no more. (Kentucky Court of Appeals, Wagoner vs. Caudil, 212 Southwestern Reporter, 422.)

DRIVING MINE MULES WITHOUT REINS—A mine employee was not necessarily negligent in driving a mule in a mine without reins, debarring recovery for injury sustained through the mule knocking down a mine prop and thereby causing a rock fall injuring such employee, if it was customary in the mine to drive without reins and if none were furnished this employee. (Alabama Supreme Court, Barton vs. Brilliant Coal Co., 81 Southern Reporter, 828.)

PROVING NEGLIGENCE IN MINE ACCIDENT CASES—The fact that the state mine inspector had inspected an Alabama mine and made no objection to the proximity of a post to a tram track is not a circumstance disproving negligence on the part of the operator, as affecting liability for injury to a driver employed in the mine and injured through being caught betwen the post and a car, in the absence of a statute authorizing the inspector to prescribe or approve the location of such posts, and proof that he did so in this instance. Nor is the operator's freedom from negligence conclusively established by the fact that no employee had ever before, throughout many years of operation, been injured by contact with the post, although this circumstance may be considered as a strong indication of freedom from negligence. Persons experienced in mining operations are qualified to give expert testimony as to whether a miner's place of work has been rendered unduly dangerous by reason of too close proximity between a post and a track. When an employee is suddenly placed in a position of peril and must act quickly to extricate himself, he will not be charged with contributory negligence in hurriedly choosing a way leading to injury, although it afterwad appears that a safe avenue of escape was open to him. (Alabama Supreme Court, Taylor vs. Birmingham Fuel Co., 81 Southern Reporter, 630.)

FAILURE TO FURNISH PROPS AS CAUSE OF MINER'S INJURY—A miner's demand upon an employing operator for props and non-compliance therewith will not render the operator liable for injury to the miner unless the accident is fairly attributable to the nonsupply of props. But where the miner, after failure of the employer to comply with the request, mistakenly satisfies himself that he can proceed safely, with reasonable ground for such belief, he can still recover by showing that he would have used props had they been furnished as requested. The statutory duty of operators to furnish props, under the Arkansas law, falls within the statute of that state, providing that, where an employee sues for injury contributed to by the employer's violation of a safety statute, recovery shall not be defeated on the ground of assumption of risk by or contributory negligence of the employer. (Arkansas Supreme Court, Watts vs. Western Coal and Mining Co., 199 Southwestern Reporter, 921.)

DISREGARD OF ORDERS AS CONTRIBUTORY NEGLIGENCE—An explosion occurred in an Illinois mine one afternoon, but all of the mine employes, about 235, escaped injury, as they were on their way out of the mine, excepting two shotfirers, who were killed. An assistant mine manager returned with a miner to investigate the cause of the explosion, but finding bad air caused by the fact that the ventilating apparatus had been put out of commission by the explosion, they left the mine by way of the escapement shaft, leaving a plainly marked warning on a board across the entry, "Danger—Stay Back." In the meantime, one of the mine stockholders directed one Krummel to enter the mine and bring back the assistant mine manager and his companion. When these two men appeared on the surface, Krummel was reached by telephone in the mine and commanded to return, but he disregarded this order and proceeded to search for the unfortunate shotfirers. He was overcome by gas and died in the mine. In a suit brought by his administrator it was claimed that the coal company was liable for Krummel's death, because of violation of the Illinois Mining Act in ordering him to reënter the mine while the ventilating apparatus was out of operation, but the Illinois Supreme Court decided that there could be no recovery, because Krummel's own act in disregarding warnings given him to return to the surface intervened to cause his death after he had wrongfully been directed to enter the mine, although the operator would have been liable had it not appeared that decedent's life would have been spared had he obeyed the order to come out. (Randall vs. Crescent Coal Co., 117 Northeastern Reporter, 773.)

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Who is Chargeable for the Short Time?

THE public is quite ready to lay on the shoulders of the coal producer the blame for the short time in the coal industry, despite the fact that the idle time is entirely due to the irregular and seasonal demand of the public.

There are many seasonal industries. Some are necessarily seasonal as regards production, others in the matter of consumption and still others are seasonal as to both. The coal industry is of the second class in seasonal in the matter of consumption. It can produce as well in the summer as in the winter if the public will only buy, but it doesn't. Hence the industry becomes seasonal because of the action of the public.

The cereal-growing and tobacco-raising industries are of the first class in seasonal in the matter of production. Production in the farming industry is confined to a few months of the year, and consumption is distributed the year over. The natural-ice industry, of course, illustrates the third class, for maximum consumption and maximum production are found at the extremes of the calendar, and the seasonal character of the industry is so marked that no one realizes what hardships it entails. The men who are engaged in it are obliged to make all the arrangements involved in transferring their labor from one industry to another as soon as the season changes. Whereas in the coal industry, the necessity for a transfer is less severe, the wrong only appears greater. The workingman tries his hardest to make steady what is in its nature seasonal, and the operator also uses his utmost endeavor to the same end.

The relatively small quantities to be handled and the short period during which the storage of coal is advantageous, make the overhead charge for the machinery for handling coal around a manufacturing plant quite large. One is not always surprised that corporations hesitate to put in large storage plants under the difficulties which confront the making of such provisions.

Then again, the extremely small consumer, who is usually merely a tenant at will, hesitates to load up his cellar when he does not know how long he is going to stay in the house. With rents continually rising and properties fast changing hands, no householder is disposed to lay in coal for fear that he may be compelled to move.

On the other hand the mining industry has many reasons for not storing coal. It costs some money to make the requisite storage provision, though the cost is not so much in proportion to the amount of coal stored as it is to the industry which is storing coal simply for its own use.

Another reason for not storing coal at the mines is that it involves two handlings, which the coal would not otherwise have to undergo, and the outcome of every handling and of every month of storage is degradation of size. To this must be added the cost of such storage and the slight loss in heating value, the latter being so small that it would, in general, be entirely overlooked except where coal is sold by exact calorimetric determinations.

Then again, there is the difficulty that stored coal will freeze in the winter and may take on a large percentage of ice and water. But all these causes together do not seem as vital as the possibility of slow or rapid combustion of the fuel in the pile and the certainty that if there were a large amount of storage in the summer, it would be impossible to get cars to transfer it to the points of consumption during the winter. In fact, it is often the case that in the winter there are not only not enough cars for the running of the mines, but certainly no cars for the hauling of stored coal. Moreover there are many points which are embargoed during certain periods of the winter months.

In the Central States storage for larger amounts could be provided without so much difficulty, but, there, the dangers of spontaneous combustion are greater. It is not uncommon for an operator to take out a quarter acre of coal a day, and it is often unsafe to pile that coal any deeper on the ground than 5 ft. Consequently it is readily seen that a large area would soon be covered where a mine worked full time in the summer and only shipped out half its product.

The difficulties of the public have been sufficiently enumerated, but perhaps its duties have not been adequately stressed. It is the custom of the purchaser in industries like farming to carry in many cases the load of the producer. Very few farmers carry their wheat for any length of time. In like manner it would seem that the public should endeavor to provide in every possible way to purchase coal early in the year. If it cannot do that with advantage, it does ill to complain of the miner receiving only short time. It is not just for those who will not buy coal in the summer to condemn the operator for not meeting all the many difficulties described in order to assist his employee, because in the long run the purchaser is the real employer of labor and should feel his responsibility as such.

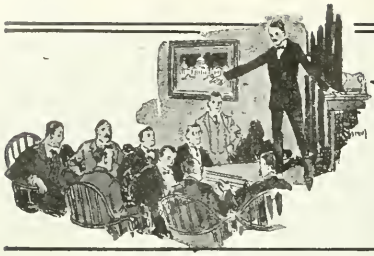
Statistics of Destruction

From survey data collected in the Pittsburgh district, over $25,000,000 worth of time has been lost by men on strike in the steel mills at that place since the strike order went into effect on September 22. The number of workers in the district is 228,430 of which 109,455 have already returned to work. Seven persons have been killed in riots and 173 injured. Over $150,000 worth of damage has been done as a direct result of the strike.

Surely may one pause in reviewing the results of the strike, and ask, "What has it profited?" Not only from the standpoint of production, has the country suffered but the number of people dependent upon charity has materially increased. The strike in its entirety has been a failure and was a failure from the day of its origin.

During the war, the casuality lists were perused daily with the greatest concern. Everything possible was done on this side of the water to prove to the boys in France that the country was behind them to a unit. Those who have their final resting place in the fields of Flanders died with the thought uppermost in their minds that America as they knew it was well worth the privilege of fighting for, even though that duty included death itself.

Is unionized labor keeping faith with those who sleep on the other side when the balance sheets show returns such as those that come from Pittsburgh?



WHAT THE ENGINEERING SOCIETIES ARE DOING

A National Department of Public Works Versus the Corps of Engineers, U. S. A.

By Isham Randolph

The United States Engineer Corps is a body of men justly proud of its record, but hostile to any movement which threatens its authority or reduces its field of action. It has on its roster the names of many men who deserve credit for high attainments. Their country had educated them and made them a class apart, invested with authority and clothed with dignity. They have been entrusted with vast responsibilities and for the most part have discharged those responsibilities worthily, but not without the advice and help of untitled civilian engineers, who have paid for their education and got their experience without the aid of a paternal Government. It is these men who have done the vast proportion of the work for which men who wear insignia of military rank have been accorded, and have graciously accepted, the credit.

A statement of the vast area of the field of operation of the Corps of Engineers is a fitting preface to what I am about to say. Continental United States has an area of 3,742,583 square miles, within which are 26,410 miles of navigable rivers, 1,200,000 square miles of arid lands and 75,000 square miles of swamp lands. Our continental and insular coast line is 48,881 miles long, not including our water front on the Great Lakes. We have between 35 and 40 continental ports, besides all those in our insular possessions. There are 517 West Point engineers to care for this vast array of work, as shown by the "Statement showing rank, duties, and addresses of the officers of the Corps of Engineers," issued by the War Department Jan. 1, 1919. They are divided as follows:

	Active	Retired
Major General	1	2
Brigadier Generals	..	2
Colonels	23	6
Lieutenant Colonels	30	3
Majors	74	..
Captains	151	1
First Lieutenants	148	..
Second Lieutenants	76	..

A large proportion of these captains and lieutenants were rushed through West Point without completing the course of study. We have then, old and young, experienced and novices, 517 officers to do the vast work suggested by the citations previously made. There are in the United States over 100,000 engineers in the various lines coming within the term Engineering. Thousands of these men responded to War's compelling need; the American Society of Engineers supplied more than 1500. The Western Society of Engineers 148. The American Society of Mechanical Engineers sent 1497. The American Institute of Mining Engineers 739. The American Society of Electrical Engineers supplied 1412. The American Society for Testing Materials supplied 575. The architects sent hundreds. These were not novices, but men who, when the need was presented, were able to meet it, and their record of achievement is a proud one. They know that they have earned recognition from the Government. They are so self-respecting that they are not willing, now that the piping days of peace have returned, to do the planning and the work which must be done along their several lines, and submit their work to a military engineer who, as a matter of form, will attach his name to the plans and as a matter of course accept the credit which goes with the work.

Military engineers are educated to meet the constructive and destructive needs of war, and war has demonstrated to the United States its need for them. They do not fit into the everyday life of a democracy. Their training makes them autocratic. Most of them have the instincts of gentlemen and they deport themselves as such, but the officer is a rare exception who can wholly divest himself of a superior attitude toward the civilian. The feeling may be successfully camouflaged, but it is only in concealment.

Civilian Engineers Aid in Military Work

We think that no record will disclose a structure designed for the uses of peace and erected under military direction which has been designed, supervised and completed wholly by the military engineer without aid or counsel from some civilian engineer. In support of this statement the Sault Ste. Marie locks and the Panama Canal are in evidence. Are not the skill and brains of Alfred Noble, Joseph Ripley, L. C. Sabin, David Molitor, Isaac De Young and many other civilians built into the Sault structure? Then take the Panama Canal. It is to the glory of the Corps of Engineers, U. S. A., that they were in charge of that tremendous project, and the names of Goethals, Sibert, the beloved Gaillard and Hodges will always flash upon the screen of memory when that work is thought of, and *they* have had recognition and reward; but we, who know, will also remember Williamson, Goldmark, Schildhaur, Cornish, Zinn, Nichols and their civil associates. Alfred Noble, too, left his impress upon that great work. The Pacific Division had as its chief. S. B. Williamson, civilian, all of whose aids were civilian engineers.

An examination of the chief engineer's report for 1913 (Vol. 6, Statement of Construction Expenditures to June 30, 1913) shows that the military on the Atlantic Division built 2,265,415 cu.yd. of masonry for $16,993,254.33, or an average of $7.50111 per cubic yard; and that the civilians on the Pacific Division built 2,453,320 cu.yd. for $13,646,113.96, or an average

of $5.5627 per cubic yard; showing a civil economy of $1.9384 per cubic yard over the cost of the Military Division, or a saving of $4,745,515.49 on the job. Did Williamson ever receive any recognition from Congress? He did receive it from a business organization to which his achievement recommended him. Did any one of his civil associates receive commendation or reward from Congress? If so, when, and what was it?

And furthermore, we know that these engineer officers did not plan the Panama Canal. The type and salient features of the canal were worked out by a minority of the International Commission for the Isthmaian Canal. To the project thus prepared the army engineers fell heir—a project changed, except as to dimensions, in only one particular. The lake which the minority planned on the Panama side of the Culebra Cut, with dam across the Rio Grande and locks between Sosa and Ancon, was abandoned because locks in that location would be within range of gunfire from warships. The locks were moved back to Miraflores and a large item of cost was added to the work. The wisdom of this move from the military standpoint could not be questioned then, but the World War has shown such advance in the power of modern artillery and indirect fire has reached such precision of aim that the interposition of a hill and the withdrawal for a few miles counts for but little as a means of defense.

I have grown old in engineering service and I have been in touch with military engineers for forty odd years. I have admired, valued and still value the friendship of many of them. But I have not learned to admire the system which environs them, and I believe that the injection of that system into the activities of our civil life is a harm so great that it needs to be abated, as it will be by the passage of the bills introduced June 25, in Senate by Hon. Wesley L. Jones, and House by Hon. Frank G. Reavis, and the 100,000 or more engineers of our country should use every honorable influence and means to secure that legislation.

Coke and Its Byproducts

The manufacture of coke has always been considered a basic industry, but the immense value of coke and its byproducts was not generally realized in this country until we entered the world war, when our byproduct coke ovens were called on to supply the raw material required for making dyes and explosives. These ovens also supplied most of the ammonia used for refrigerating meats and other perishable articles sent abroad, as well as the larger part of the coal-tar products used in building roads and cantonments and in other military construction, besides furnishing artificial gas for illumination and for heating and oils for the flotation of ore. The direct product of these ovens—the coke itself—is required for use not only in metallurgy and other manufactures but for domestic heating and cooking.

By the fall of 1915 it had become evident that the war must be won not only by the mobilization of armies but by the mobilization of industries—that it would be won by the nation that could produce steel, other metals and explosives in greatest quantities, and as coke is essential to steel making and its byproducts are essential to the manufacture of explosives the coke-making industry at once came to the front and became a center of intense interest. The foreign demand for munitions had become so great at the beginning of 1916 that the quantity of coke produced made a new record, but during the fall of that year the output was considerably restrained by the congestion of traffic on the railroads. The difficulties that had to be overcome in producing and marketing fuels after the United States entered the war and the means adopted to overcome them have now become matters of history.

Though the output of coke in 1916 had exceeded that in 1915 by 31 per cent., reaching 54,000,000 tons, the output in 1917 went still higher, amounting to more than 55,000,000 tons, valued at the ovens at $298,000,000. More than half of this coke was made in Pennsylvania, and more than half the remainder was made in Alabama, Ohio, Indiana, West Virginia and Illinois.

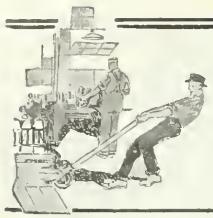
The prices of coke in the Connellsville region of Pennsylvania, the most active coke market in the United States, reached top figures in 1916 and went higher in 1917, the price of spot furnace coke reaching $16 a ton in July and that of spot foundry coke reaching $14. A Presidential order of Sept. 24 established a price of $6 a net ton for both grades.

The United States Geological Survey, Department of the Interior, has just published an advance chapter of its volume "Mineral Resources of the United States," entitled Coke and Byproducts in 1916 and 1917, by C. E. Lesher and W. T. Thom, Jr., which contains a review of the coke industry in the United States during those years, statistics of production, distribution and consumption, and other information concerning the coke-making industry. A free copy of the pamphlet can be obtained from the Director of the Geological Survey at Washington, D. C.

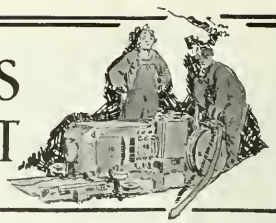
The rescue crews at a mine disaster work in close coöperation with the recovery crews and make explorations in advance of the ventilation for purpose of finding live men, locating bodies, testing the mine air and looking for fire. In the conduct of the work the members of the recovery crews should not allow themselves to get ahead of the air, so that they breathe the afterdamp, as it will have a bad effect on them and reduce their efficiency. Especially should the foremen of the recovery crew guard against unnecessary breathing of the afterdamp in order to prevent their usefulness and judgment in directing the crews being impaired and the work delayed. The rescue crews should act in accordance with their previous training and instruction, at all times having regard for their own personal safety. Common sense and good judgment coupled with experience at mine disasters are prerequisites for the efficient conduct of rescue operations.—*Rescue and Recovery Operations in Mines.*

On account of the complex nature of tar a great many reactions are involved in its decomposition. In general, the cracking is similar to that of hydrocarbon gases, but many more compounds are involved and the result is a very complicated equilibrium among a large number of hydrocarbons. Very little experimental data are available on equilibrium and the velocity of these reactions; however, the high temperature in the furnace and the fact that the tar is in a state of fine subdivision favor rapid cracking and the formation of large amounts of carbon.—*Bureau of Mines Bulletin No. 135.*

The United States has under contract or construction 819 shipbuilding ways, which is twice as many as there were in all the other shipyards of the world before the war began.



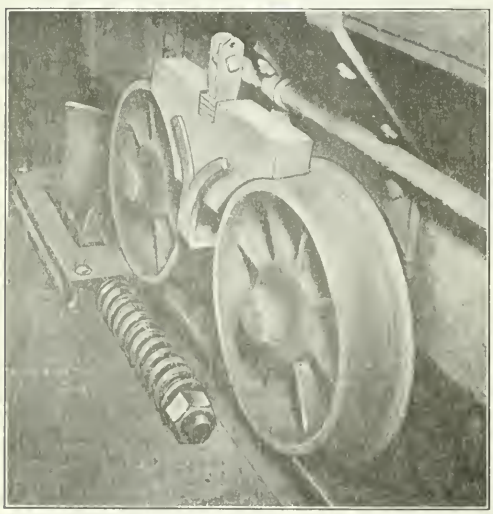
NEW APPARATUS AND EQUIPMENT



New Type of Safety Horn

What is termed an oscillating, cushioned, non-adhering safety horn has been patented by G. M. Johnson, of the G. M. J. Manufacturing Co., of Pittsburgh, Penn. The device presents many interesting features of design and construction that make its operation different from other similar devices. It is intended for use at top, intermediate and bottom landings of shaft mines, on mine slopes and grades, elevations near tipples and on inclines where chain or rope haulage is used.

A wing-shaped steel horn is arranged in a bearing plate having an elongated slot. A 2-in. shaft is inserted in the bearing plate passing through the horn and being bolted to it. A longitudinal movement of 2 in. is given the horn in the slot by its being longer by that much than the horn collar. A compression spring is fitted upon the protruding end of the shaft and against the bearing plate. This permits the horn and shaft to move longitudinally in the bearing plate when pressure is brought to bear on the face of the horn by the backward movement of a car. The tension of the spring is made adjustable by tightening or loosening a nut on the end of the shaft against the spring.



VIEW OF HORN IN UPRIGHT POSITION

A recoil spring located in the bearing plate holds the horn in a vertical position and pulls it back into place after the wheel of an entering car has given it a lateral movement. The side of the horn lying toward the tension spring is curved, but this is not apparent in the illustration. The point of curvature starts above the inner bolts on the bearing plate, whence a slight bend is made away from the tension spring. This design allows for a firm hold on a wheel on which the tread has been somewhat worn, as is often the case with cars that have been used for any length of time.

In operation, the front wheels of an entering car push against the curved faces of the horn, forcing them outward. As soon as the wheels are beyond the horns these are returned to their vertical positions by the recoil springs. The same operation, of course, occurs for the rear wheels. The car may then be said to be in position with the rear wheels lying against the inner sides of the horns and the tread practically flush with the top of the bearing plate.

New Stucco Applying Machine

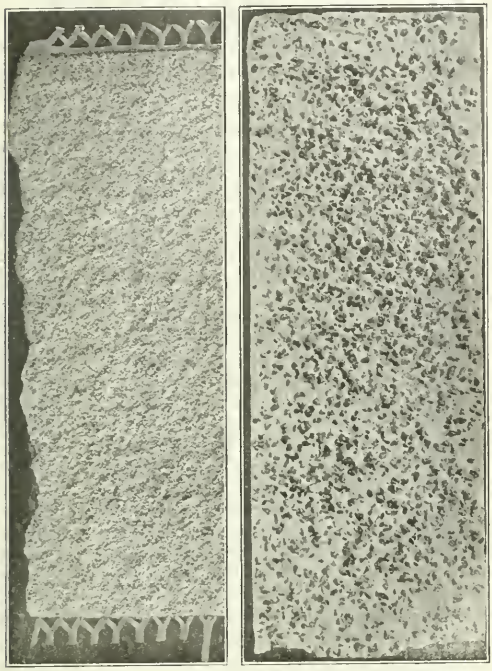
The Hodges Stucco Machine Works of Cincinnati, Ohio, has recently placed upon the market what is known as the Hodges electric stucco machine. This device consists of an electrically driven fan or impeller wheel, which receives mixed stucco from a feed hopper and projects it with considerable force against the surface to be coated. The entire machine weighs only about 30 lb., and in use is slung over the operator's shoulder exactly as a musician carries a drum. A spring in the support however enables the operator to easily change the elevation of the machine through small distances to suit the requirements of the work in hand.

The feed hopper and casing of the machine, and in general all parts except the driving motor and those members requiring great strength, are built of aluminum. The shafts are supported either in Swedish ball bearings or in bronze sleeves. All gears are of cut steel and run in grease. The motor is of the universal type—that is, one that will operate upon either direct or alternating current. The machines may be wound for either approximately 110 or 220 volts, but one and the same machine will not operate upon both of these voltages.

This machine is particularly useful in applying stucco to either new or old frame buildings, putting a protective coat upon brick or stone walls or buildings, coating brattices with cement and thus rendering them air-tight, waterproofing the surface of dams or reservoir walls, and similar operations requiring a dense covering of stucco or cement. In such work filling and finishing coats, also pebble-dash coats, may be applied with equal ease. If smooth surfaces are desired, the rough coats given by the machine may be troweled as in ordinary practice. From 300 to 450 sq.ft. of surface should be covered per hour with stucco from ¼ to ⅜ in. thick with one of these machines.

The small size and easy portability of this machine adapt it admirably for use underground. Here it will find a place in erecting or repairing brattices, rendering overcasts or undercasts air-tight, as well as in seal-

ing off incipient mine fires. Particularly in the last-named operation are its lightness and rapidity of action strong considerations in its favor.



SECTIONS OF STUCCO TREATED SURFACES

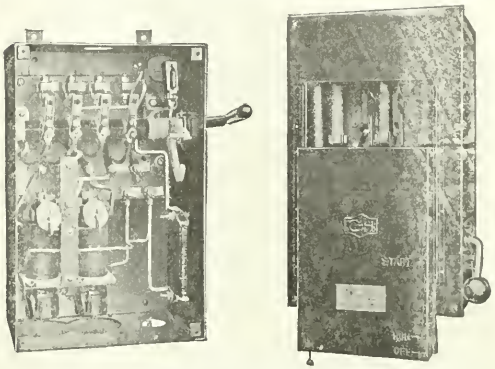
The number of men required to run one of these machines is usually three—the operator, who directs and controls the machine; the helper, who feeds the stucco to the machine hopper; and the mixer, who prepares the stucco.

Motor Starters with Protection Features

Many collieries and mines are installing fully inclosed motor starters in locations where exposure of operating parts is undesirable. The inclosed starter is not only an insurance against injury to workmen, but also protects the working parts from outside mechanical injury such as might be caused by flying particles of coal or other material, or through leaning an object against it. Two new motor starters manufactured and recently placed on the market by The Cutler-Hammer Manufacturing Co., of Milwaukee, Wis., have their parts fully inclosed and are easy of installation and simple in operation.

All live parts of these switches are completely incased. They may be readily inspected, however, by lowering a sliding panel. This opens the switch, and the starter cannot be operated until the panel is again in the closed position. All danger from live parts is thereby eliminated. The most unskilled person can manipulate either type, operation merely requiring a short radial movement of a lever projecting from the side of the inclosing case. The handles may be locked to prevent unauthorized operation. The contact posts and fingers are of standard C-H drum construction, easily inspected and renewed, while their vertical position prevents the accumulation of dirt and grease. The cases are arranged for conduit wiring.

A duplex overload relay and low-voltage release coil are provided with one of the starters. These are both inclosed with the switch. The overload unit has an inverse time element which permits a large initial starting current or a temporary overload, but protects the motor from a continuous heavy input. The switch is made with either three or four poles.



OPEN AND CLOSED VIEWS OF THE STARTERS SHOWING GENERAL ARRANGEMENT

The other starter, which is fused, is especially adapted for those motors that cannot be connected directly to the line when starting. A resistor, inclosed in the same casing with the switch, decreases the initial voltage to 60 or 75 per cent. as desired, and maintains the balance of all three phases while starting. The fuses are out of the motor circuit until the rotor has reached normal sped; therefore they do not carry the heavy starting current and need be of no greater capacity than proper protection requires. This starter contains a low-voltage release coil. Both starters are made in various capacities for operating squirrel-cage motors on potentials not exceeding 550 volts.

Temperature and heat are not synonymous. Temperature is shown in the arbitrary divisions of the thermometer; the Fahrenheit scale has 212 deg. between zero and the boiling point of water. The zero point is 32 deg. below the freezing point of water. On the other hand, heat is a measurable quantity—it is measured by the thermometer. As a unit—*e.g.*, the British thermal unit (B.t.u.)—it is the amount of heat necessary to raise one pound of distilled water 1 deg. F.

A mixture has been worked out in which 10 bags of cement and 23 bags of crushed granite screenings are used in the making of grindstones. *Concrete* states that the stones are cast in a three-piece cast-iron mold and that no reinforcing is used. The stones are cured six months before they are used. The grinders are made in two styles—those for edge grinding are 60-in. in diameter and those for side grinding are 16-in. thick. It is understood that the idea is patented.

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Problem in Coal Extraction

Letter No. 6—In *Coal Age* Aug. 7, p. 234, a writer has outlined a method of mining a thick bituminous coal seam lying at a fairly good depth. Owing to the friable nature of the coal and the thickness of seam and overburden, coupled with a soft bottom that yields easily to the action of air and moisture, and bad labor conditions, the desire to get a large percentage of extraction with the least possible change in prevailing practices makes this a very complex problem.

The depth of the coal is given as ranging from 450 to 600 ft. This in itself shows that generous pillars must be provided at all points where long life of pillar support is necessary. In mining this seam of coal, having a height of 8½ to 11 ft., the present practice of leaving up 1½ ft. of top coal to protect the soft roof shale is good. It not only gives a larger percentage of extraction by affording a good roof support, but prevents many accidents from roof falls and conserves the mine timber.

THE PANEL SYSTEM IS ADVANTAGEOUS

The panel system with its numerous modifications, so prevalent in the Illinois fields, offers numerous advantages, affording as it does separate air splits for each section of the mine, whereby the gas is carried into the return by the shortest route, localizing explosions of gas or dust, localizing squeezes or creeps, and making it easier to handle a mine fire in case of necessity.

From the plan presented, it appears that the rooms are not holed through from one panel to another. This greatly assists in localizing the air current, fires and explosions. In some sections of the country the coal so left is called a "firewall." This coal, varying from 10 ft. to 25 ft. in thickness, is lost, or at least no attempt is made toward its recovery.

From the description of the methods of attacking the panels, I would suggest forming the main divisions in blocks of about 1,500 ft., and driving triple entries instead of the double entries shown in the figure. A barrier pillar of 100 ft. should be left to protect each entry. Driving triple entries will permit greater quantities of air to be circulated at a lower velocity and reduce the cost of ventilating by the double-entry system, providing the sectional areas of all entries are the same.

I wish, especially, to call attention here to the condition that will result from this double-entry system wherever large locomotive trips are hauled on each entry, the empty trips going in on one entry, while the loaded trips are hauled out on the other. For instance, in the mine shown, the clear height on the roads will vary from 5½ to 8 ft., the width being 12 ft. Hauling trips of 50 loaded cars, each car approximating an overall length of 10 ft., would make a plug about 500 ft. long inserted in the airway. Now, if we stop to figure the available space left for the passage of air and the increase in velocity and rubbing surface where the air must rush past this train of cars, we will soon see that the increased cost of ventilating power will more than pay the extra cost of driving a third entry.

Driving the room entries 520 ft. apart as shown, would seem to be good practice, judging from the results of experience in regions with similar conditions. I would suggest, however, that the room entries be driven up to the boundary of the firewall, and the rooms then turned off on the retreating plan. Also, I would recommend that the two room-entries driven toward each other be attacked about the same time, both reaching the 25-ft. barrier or firewall together, when the retreating plan of attacking the coal can be commenced simultaneously on all the entries.

The mining law, in Illinois, requires that all crosscuts be driven not more than 60 ft. apart. I would drive the rooms on about 70-ft. centers, with roomnecks about 12 ft. wide for 25 ft., and then widen out square to a width of 18 ft., so as to prevent further yardage expense. This would allow about a 60-ft. pillar. While keeping within the law of crosscut or breakthrough requirements, the method of cutting through the pillars should, of course, be governed by local conditions, which must determine whether the crosscuts should be 12 ft. with yardage expense, or 18 ft. wide without yardage, in each individual mine.

This system of leaving the largest percentage of coal in the pillars, for later recovery, has been and is now successfully carried on in the Fairmont, West Virginia, region, where the geological conditions are very similar to the conditions described in the article to which I have referred. Where the work is done on the retreating plan there is never any need to return over the extracted portion. Therefore, rails, props and all other materials are brought back as the extraction progresses.

WHY THE RETREAT METHOD IS PREFERRED

I take it that the term "squeeze" as used in this article has not the same meaning as in Pennsylvania or West Virginia regions, but refers to the closing in of the space after extraction. In the states just mentioned, mining men understand a squeeze to mean a settlement or closing in before extraction or after a partial extraction. I take it, also, that the action described by this term is desirable in the Illinois fields, but that the subsidence of the surface is not desirable, owing to the value of the land's surface overlying the coal, and it is the preservation of the surface that makes it the local practice to recover only from 40 to 50 per cent. of the seam.

From a financial standpoint, this problem resolves itself into a simple question of which is the most valuable, the surface land or the loss of 50 per cent. of the mineral? If the surface is the most valuable, then this loss of 50 per cent. of the coal is not rightfully

chargeable to the present or local mining conditions or practice. I fear a very large number of mining men and students of mining become astounded at the assertion of a 50 per cent. recovery, before ascertaining all the reasons for such a practice. Later, they express the opinion that mining methods employed where such a recovery is obtained are surely defective, which may not always be the case.

I see no difference in respect to the detailed analysis given of labor conditions, methods of lighting the mines, the working of a certain number of men after one machine, the undesirability of changing present methods, the delivery of powder and mine cars to the men, the laying of the tracks, the cosmopolitan makeup of the employees and the duties and work of the shot-firers, between the region described in this article and most other regions where coal mining is carried on extensively.

R. Z. VIRGIN,
Assistant Professor Coal Mining,
Carnegie Institute of Technology.

Pittsburgh, Penn.

Lawful Examination of a Mine

Letter No. 7—My previous experience as a fireboss has interested me deeply in the discussion relating to the lawful examination of a mine. I understand this term to refer to an examination that complies in every respect with the state mining laws.

It will not be denied by those familiar with the operation of coal mines that, while the mining laws in some states are too stringent in many respects, there are instances where the simple fulfillment of the requirements of the law, on the part of the fireboss or mine examiner, will not give the operator a just return for the expense he is under to have the mine examined.

For that reason, an honest fireboss who performs his work conscientiously will frequently feel called upon to do more than what is required in the law. Not only will he examine the working places for gas, but he will not be satisfied without looking for other dangers that may be present and make the place unsafe for work. The performance of this extra work will frequently require more time than what is generally allotted for the examination.

Right here, I want to emphasize what has already been said by others, that firebosses quite generally have too much territory under their supervision to enable them to give the highest efficiency in respect to economy and safety. Also, I want to endorse the statement that the examination of a mine should not be begun more than three hours before the men go to work in the mine. This is particularly necessary where there is any liability for gas to accumulate in the working places. The same is true where booster fans are used to assist the circulation of air in certain sections of the mine. The steady operation of a booster fan is very uncertain, requiring that such a fan be constantly watched to make certain that it is kept running. It is quite clear that, should a booster fan cease running a short time after the fireboss has made his rounds, there would quickly result a very dangerous condition in that section of the mine.

In order to overcome these difficulties, let me suggest that firebosses should be given less territory to look after, which would allow them to perform the work of a roomboss or safety examiner. After making out his report as to the condition of the section of mine in his charge, the fireboss should enter the mine with his men and continue to look after their safety, acting either as an assistant foreman (roomboss), or a safety mine examiner. This would give him an opportunity of more faithfully performing the work for which he is held responsible.

W. H. LUXTON.

Linton, Ind.

Letter No. 8—It is not surprising that this subject would create much discussion among mining men, especially those who are employed as firebosses or mine examiners. One of the chief requisites of a lawful examination is that it shall be entrusted to a sober, reliable man who is competent to perform the work, conscientious in the discharge of his duties and awake to his responsibilities.

A reliable fireboss will not omit to examine every working place in his section, whether or not he has found gas there on previous occasions. He will not, as is sometimes the case, content himself with thinking that a place contains no gas because none has ever been found there before. Conditions in mining are constantly changing, and in gaseous mines dangerous atmospheres often exist where least expected.

It is important that the fireboss should realize to what extent the miner depends on his work. When entering his place in the morning and finding the mark the fireboss made there a short time previous, the miner assumes that all is well and begins work without making a further examination on his own account. In other words, he trusts his safety to the honesty and judgment of the fireboss, which makes the latter, in a large measure, his "brother's keeper."

Not only should each working place be examined for gas and the condition of the ventilation carefully noted, but the fireboss must look for bad top or loose overhanging coal and observe the amount and kind of timber on hand and any undue accumulations of fine coal and dust that would make the place unsafe for work.

GAS MAY BE PRESENT

Nor is the examination of a mine completed when all these things that I have mentioned have been done. A careful watch must be kept over old abandoned workings, and any accumulation of gas that might be dangerous to the workmen must be prevented as far as practicable. Where such an accumulation of gas is found it must be carefully removed and steps taken to prevent the same occurring again. When this is not practicable, the workings must be sealed off with substantial air-tight stoppings.

It often happens that, while a good fireboss realizes his duties and responsibilities, the section of the mine in his charge is not so large that he cannot make the necessary examination in the time allotted him. He must hurry along, having barely time to look for gas in those places where he has reason to believe danger may exist. He is compelled to take chances and give the most careful attention to those places where he has found gas before. Our West Virginia mining law requires the examination of a mine to begin within three hours of the time for men to begin work; but many sections of these mines require much more than three hours for a man to make a thorough and proper examination of each place.

Mention is made, in a letter by a Pennsylvania fireboss, COAL AGE, Sept. 18, p. 503, of the employment of two firebosses, which appeals to me as being a great advantage. It is my belief that the examination of a mine is not finished until the day's work is completed.

An incident that occurred only a short time ago will serve to illustrate my point. The nightshift in a certain mine, assuming that everything was in a safe condition, went to their work with perhaps less caution than should have been used. It so happened that, on this particular occasion, the nightboss was busy in another part of the mine. The machinemen leaving their machines, in violation of the law entered a working place that had not been examined for that shift, with the result that gas was ignited by their lamps and the men lost their lives. A night fireboss on duty would have prevented this accident, and the same can be said in many other like instances.

FIREBOSS.

——, W. Va.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Design of Ventilating Fan

I am sending to COAL AGE a rough sketch showing an elevation of a mine fan and want to ask for information on one or two points. This is an exhaust fan having a diameter of about 20 ft. and an expanding casing that terminates in a funnel or chimney.

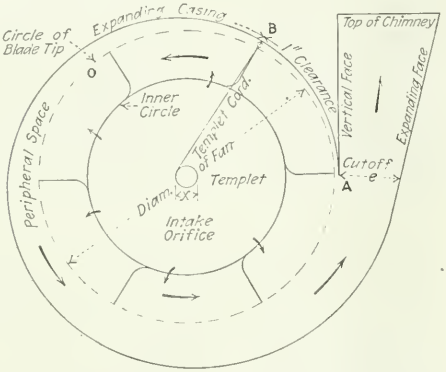


DIAGRAM OF VENTILATING FAN

First, I want to ask, should the cutoff be located at A or, as I am told, at B further back on the casing? Second, is the exhaust funnel or chimney necessary, and why? I hope that this question will be answered fully and that readers will give their experience.

Savanna, Okla. I. N. K.

In the operation of a centrifugal mine-ventilator, whether exhausting or blowing, the air enters at the center or intake orifice of the fan and, as indicated by the arrows in the accompanying figure, passes outward between the blades, until it reaches the circumference of the circle described by the blade tips, where it is deflected and passes around the circumference in the direction in which the blades are revolving. It is important that the fanwheel shall be set in such a position in the casing that the air flowing outward between the blades will be forced to travel around the circumference of the fan in the direction the wheel is turning. Otherwise, the movement of the blades will oppose the flow of air about the circumference. It is also important that the peripheral space between the blade tips and the casing expand uniformly in volume so as to provide a constant velocity of the air flowing through this space. Also, the fan must be so proportioned that the velocity of the air shall slightly exceed that of the blade tips, in order to prevent the eddying, which would result if the air traveled slower than the tips of the blades.

Again, in order to accomplish a constantly uniform flow of air about the fan in the direction in which the blades revolve, it is further necessary to so arrange the casing as to practically close one end of the peripheral space and shut off the flow of air for a distance AB, equal to the distance between two consecutive blade tips. As shown in the figure, therefore, this portion of the casing is made a circle concentric with the fanwheel and leaving a clearance of 1 inch between the tips of the blades and the casing. The point A is termed the "cutoff," and the expansion of the spiral casing begins at the point B.

The proper proportionment of a centrifugal fan is a difficult problem. The dimensions of the fanwheel, the inner and outer diameters, width of blades and the expansion of the casing at the cutoff, as indicated by e in the figure, depends on a number of factors, but chiefly the volume of air to be circulated and the unit pressure or water gage that will result from forcing this volume of air through a given airway or mine.

MINE POTENTIAL IS IMPORTANT FACTOR

Every airway or mine has a certain resisting power opposed to the circulation of air and determined by the cube root of the ratio of the square of the quantity to the unit pressure. This resisting power is called the "mine potential" and enters into the calculation of the proper dimensions of a fan designed to give the required circulation of air, under a specified unit pressure or water gage.

The question is too large a one to admit of its full explanation here. It can be stated, however, that the line of the expanding casing can be laid out, in practice, by describing a curve starting from B in the figure and using as a radius a chord that unwinds from a circular templet fixed at the center of the fanwheel. The diameter of this templet should be three-eighths of the total expansion desired at the cutoff. Thus, in the figure, x equals $\frac{3}{8}$ e.

The expanding chimney is an essential feature of every exhaust fan, and is required in order to reduce the velocity of the air discharged into the atmosphere and save power.

Automatic Starter for Booster Fan

In seeking a little information, I turn to *Coal Age*. In one section of our mine we are operating an electrically driven booster fan. In this connection, some discussion has arisen as to the best means of overcoming the difficulty presented by the motor failing to start itself after being stopped by reason of a brief interruption of the current, which is liable to occur at almost any time in the operation of a mine.

In order to avoid the necessity of sending a man to start the motor again at such a time, it was suggested to equip the machine with a self-starter. Objection was offered to this plan, however, on the ground that the disadvantages of the scheme would outweigh the advantage gained by installing the device.

While I have no great desire for the use of boosters, I believe that when the necessity arises for their installation in a mine, they should be kept running as constantly as the main fan. Otherwise, it is my opinion that they are dangerous and should never be installed in a mine. I am interested particularly in knowing what are the disadvantages of an automatic starter on a motor operating a booster fan. W. H. LUXTON.

Linton, Ind.

In a properly arranged system of ventilation, and where proper precautions are taken to insure safety and avoid accidents resulting from a possible cessation or derangement of the circulation in the section of the mine where the booster is installed, there should be no disadvantage worthy of consideration due to equipping the motor with an automatic or self-starter. In the operation of a mine electrically equipped, it will frequently happen that the power will fail for a time and then suddenly be renewed. As we say, the power will "go off the line" and after a short time "come on again." When that occurs a booster fan or a mine pump driven by the current must stop and, if not equipped with a self-starting device, will remain idle until someone is sent to start it again.

In order to avoid this annoyance and possible trouble from the accumulation of gas or water, which requires the continued operation of the fan or pump to remove, it is important that these machines be able to start automatically whenever power is turned on the line. Practically, the only conceivable disadvantage that might result from equipping a booster fan with a self-starter is the possibility that a body of gas might have accumulated, at some point, while the fan was idle, and be swept from its lodgment onto the open lights of workmen when the circulation is restored.

In a well regulated mine, booster fans are seldom required, and when installed, as this correspondent has stated, they should be kept running continuously. All things considered, there would seem to be greater advantage in the automatic equipment of fans and pumps when operated underground than where constant attention is necessary to keep them running.

WHEN POWER FAILS, SELF-STARTING DEVICE THROWS IN A RESISTANCE

An automatic or self-starting device is an arrangement such that when the power goes off, or fails, a resistance is automatically cut in, which enables the motor to pick up its load gradually when the power again comes on the line. Without that resistance being present in the circuit, the motor would be unable to start, and remain dead. The armature of a motor has but a small resistance and, there being no counter electromotive force generated when the machine is not running, it is necessary to introduce a starting resistance that will prevent the large rush of current that would otherwise flow. As the speed of the motor increases, this starting resistance is gradually cut out and the counter electromotive force generated takes its place.

Change in Magnetic Declination

Kindly publish, in *Coal Age*, a rule or explain the method of determining the proper needle bearing of a line when the description of the survey, as taken from the county records, gives the magnetic bearing and date when the survey was made. In attempting to return such a survey from the old notes, we failed to find the corner, because we did not know how much the direction of the needle had changed since the survey was made. The date of this survey is 1881, and the notes give the bearing of the line, at that time, as N. 32° 28′ E. What I want to know is the present needle bearing of this line and the rule for calculating the same.

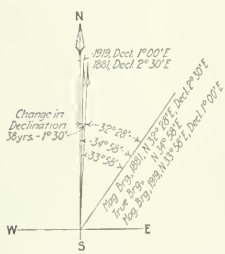
Orme, Tenn. GEORGE CAIN, Supt.,
Battle Creek Coal & Coke Co.

Owing to the fact that the north magnetic pole does not correspond to the geographic pole, and is not even known to have a fixed relative position therete, the direction of the magnetic needle, whose north end points more or less constantly to the magnetic pole, only corresponds to a meridian line passing through the geographic pole when the magnetic pole lies in that meridian, except at certain long periods or intervals of time.

ECCENTRICITY OF THE MAGNETIC POLE CAUSES A VARIATION IN THE DECLINATION OF THE NEEDLE

As a result of this eccentricity of the magnetic pole, there is a constant change taking place in the declination of the needle, by which is meant the angle that the needle makes with the true meridian passing through the place of observation. Thus, the magnetic meridian as indicated by the needle is continually oscillating from east to west and from west to east. For a time, the angle of declination will increase to the east, attain a maximum and then decrease to zero, after which it increases to the west and, attaining a similar maximum, again decreases to zero. These variations in the direction of the magnetic needle take place very slowly, the change from zero declination to a maximum and back again to zero requiring a hundred years or more.

A little study of the situation will make it clear that, for any given time, the declination of the needle will be different in different places. It will appear also that, on a certain line extending from the magnetic north to the magnetic south pole and passing through the geographic poles of the earth, the needle will have a zero declination, ignoring possible local attractions, which would naturally affect its direction. In other words, the magnetic north will correspond to the geographic north at all places on this line of no declination, which is called an "agonic line."



SKETCH SHOWING VARIATION OF THE NEEDLE

It is quite clear that all places lying east of the agonic line will have a west declination and all places on the west of the line an east declination. Also, from what has been explained, it will be evident that the agonic line oscillates from east to west and from west to east through long periods of time. Speaking generally, at the present time, the agonic line appears to be moving slowly to the west, causing a gradual increase in west declinations and a corresponding decrease in east declinations.

The best published information on this subject is an extended article in the Encyclopedia Britannica, eleventh edition, on "Terrestrial Magnetism," by Charles Chree, Superintendent Kew Observatory. Also, the report (1906) of the United States Coast and Geodetic Survey gives the change in declination, as observed at Chattanooga, Tenn. From the data there given, it appears that the declination in southeastern Tennessee, 1881, was practically 2° 30′E and that this easterly declination has decreased, to the present time, 1° 30′, which would make the present declination in that locality 1 deg. east.

Therefore, replying to the question asked and basing the answer on this information, it would appear that a magnetic bearing of N 32° 28′E, decl. 2° 30′E would correspond to a true bearing of N34° 58′E. Then, taking the present declination as 1° 00′ E, the magnetic bearing of the line now would be N33° 58′E, all of which we have illustrated in the accompanying figure.

COAL AND COKE NEWS

Charleston, W. Va.

Strikes at tide cause embargo on eastern shipments from smokeless and high volatile fields. Vessels plentiful but dumping facilities inadequate. Car supply 70 per cent. for week ended Oct. 18. Production in New River and Kanawha fields equal to car supply. Output goes west.

With everybody concentrating on tidewater shipments, terminals in the East have been literally inundated with coal from this section, and when to such a condition was added first the longshoremen's strike and then the tug boat strike, coal piled up at tidewater to such an extent during the week ended Oct. 18, that eastern coal shipments were embargoed entirely insofar as shipments from the high volatile and the smokeless fields of this section were concerned. There had previously been an embargo which was lifted for a few days, only to be imposed again. Vessels were plentiful but dumping facilities for the reasons just stated were inadequate and consequently export shipments of coal were retarded.

While up to Oct. 18 the car supply had been materially in excess of that for the same period of September, it was not over 70 per cent. for the weekly working period just alluded to, and consequently there was still a general production loss of 70 per cent. in all fields in this section. Congestion in the East has had the effect of increasing Western shipments just at a time when the prospects of a strike have increased the Western demand; although up until the eighteenth there had been no special flurry in the West.

West Virginia operators were sanguine that there would be no strike of bituminous miners, although every effort was being made to get out as much coal as possible before Nov. 1, in the event that there should be a strike. There has been no such sharp increase in price as has been charged by John L. Lewis, producers in West Virginia, on the other hand, discouraging insofar as possible any price advance. Of course, with the car supply so limited it has not been possible to produce much coal over and above that called for under contracts entered into earlier in the year.

While there was a steady demand for steam coal in evidence in this section during the week ended the eighteenth, there was no influx of inquiries growing out of the prospects of a strike until the beginning of the following week, when many consumers seemed to be seeking cover.

The large flow of smokeless coal to tidewater from the New River field was materially checked during the week ended Oct. 18, when another embargo was clamped down on eastbound coal shipments, and once again the tide of smokeless was turned to the West where it was readily absorbed as it had been during a part of the previous week. The embargo, of course, had no influence on production since there has been a demand for smokeless coal which it has long been impossible to meet.

While export markets now afford the main avenues of outlet for the product of New River, nevertheless there is a general demand for that kind of coal in other markets; the fact that the car supply is still averaging only about 70 per cent. preventing producers from mining much more than enough fuel to take care of contract requirements. While the supply of cars at the outset of the week ended the eighteenth reached almost 90 per cent. it soon dropped to 70 per cent. At the beginning of the following week assurances were given that empties returned from the Lakes would make for a good supply. More or less labor unrest was apparent in the New River field where operators were hopeful that miners would not be affected by the general strike call, although it is believed that the miners will strike in that field if a general strike call is issued.

There was no apparent abatement in the demand for steam coal as well as for other grades of coal in the Kanawha district during the weekly working period ended Oct. 18. Just about the time mines in this field had begun to resume shipments on the usual scale to the seaboard, another embargo erected a temporary barrier, and the Lakes and inland West markets began to receive large consignments.

As there was a fair demand in that part of the country, it did not discourage production in the Kanawha field which averaged about 70 per cent of capacity throughout the week; the output was confined to that figure owing to the limited supply of cars available, large at the beginning of the week but perceptibly smaller before its close. It was not until the week beginning the twentieth that there was any material flurry apparent in the demand for coal; consumers, as the danger of a strike became more apparent, seeking to provide for an additional supply of coal.

Charleston—The number of fatal accidents in the state of West Virginia reached a total of 31 in September, according to figures just completed by the West Virginia Department of Mines; nearly all of such accidents being due to falling coal, rock and slate, the number of fatalities from such a cause being 18. Motors, however, killed four mine workers and mine cars, two. Two men were fatally hurt by mining machines, one man being electrocuted and one being fatally injured through a cause not given. There were only three deaths on the exterior of the mines, two of them resulting from mine car accidents. Of the 31 mine workers killed, 23 were Americans and the remaining eight foreigners. McDowell County led with the largest number of deaths—10. The next largest number of deaths was in Logan and Wyoming counties, where there were three each. There were two fatal accidents in each of the counties of Fayette and Harrison and one death in each of the following counties: Barbour, Boone, Braxton, Clay, Marion, Mercer, Mingo, Ohio, Raleigh, Tucker and Upshur.

Fairmont, W. Va.

Prospects of strike causes sudden demand for Fairmont coal with consequent increase in price. Railroads begging for fuel. Production for week ended Oct. 18, not so large as for previous week. Cars not so plentiful.

By Oct. 18 the gravity of a strike seemed to have impressed itself on buyers to the extent that much anxiety was manifested in providing for future needs, and, consequently, there was a greatly accentuated demand for coal in the Fairmont and other northern West Virginia regions. Buyers holding contracts sought to secure tonnages in excess of that specified in contracts, but were unable to do so in large part owing to the widespread demand and the inability of Fairmont and other operators to meet such demand. Of course the sudden increase in demand raised prices to a higher level, the increase being fully 50c a ton over the rate ruling the latter part of September.

Another development of the week was an S. O. S. call from the Baltimore & Ohio and a few other railroads for more coal. The B. & O. has run short in its supply and needs, it is said, in the neighborhood of 200,000 tons. It is understood that that road has only a small reserve stock and is almost begging for coal. Some satisfaction is derived by producers from the fact that the B. & O., in order to secure any fuel, is obliged to pay the current price for coal—from $2.50 to $2.65 a ton. Earlier in the year when coal was plentiful, the B. & O., (in common with other roads) was trying to lower the price of coal; so now little sympathy exists among operators, and the road is finding it difficult to secure an adequate supply, even though expressing a willingness to accept coal loaded in box cars.

While production was not so large as it had been during the previous week, owing to the fact that cars were not quite so plentiful, nevertheless production was fairly well maintained, though toward the end of the week the car supply became somewhat short and placements were rather tardy. However, Curtis Bay shipments were almost 100 per cent. larger than during the previous week when all records in coal loading were broken. There was a fairly large tonnage of coal moving to the Lakes and to inland West markets. Certain points on the Monongahela R. R., were embargoed so that tidewater shipments of coal were shut off from Port Reading and one or two other ports.

Huntington, W. Va.

Logan mines producing 67 per cent. of normal. Car supply somewhat improved. Threatened strike stimulates demand and raises prices. Embargo on shipments to tide. Output goes West. C. & O. handles 645,350 tons for week ended Oct. 18.

There was an upward trend to production in the Guyan field during the week ended Oct. 18 owing to a somewhat improved car supply, the output advancing from 65 to about 67 per cent. or from 219,000 to 223,000 tons. This, as just stated, became possible owing to the fact that the time lost from car shortage was reduced by about 200 hours or from 100,000 to 87,0000 tons, so that the loss from transportation disabilities now amounts to only about 26 per cent. There was a two per cent. loss only from labor shortage. The total production loss was 109,000 tons as against 118,000 for the previous week. Despite the fact that Logan mines are producing only 67 per cent of their possible output, the output is in the neighborhood of 50,000 in excess of that for the same period of 1918.

In common with other districts in West Virginia, the producers of the Logan field observed a sharp difference in demand beginning on Oct. 20, when a threatened strike in all bituminous fields had the effect of stimulating the demand to quite a marked extent; this was true of all coals produced in the Logan fields. With the increase in demand there also came a rise in prices the pace being set by the prospective customers rather than by the producers. However, it was impossible to

accommodate buyers desiring a surplus supply owing to the inability of operators to much more than fill contract needs. Gas and splint were cut off from tidewater during nearly all of the week ended the eighteenth, through an embargo giving Logan producers an opportunity to take care of western trade where there was a stiffening demand in evidence.

While the loading of coal in some districts reached by the Chesapeake & Ohio was heavier than during the previous week, yet a less amount of coal was handled by the C. & O. system during the week ended Oct. 18 than was the case during the week ended the eleventh; only 12,907 cars, or a total of 645,350 tons, being handled by the road during the period ended the eighteenth.

Victoria, B. C.

The collieries of Vancouver Island are working steadily, there being no signs at the moment of anything but the best of feeling between the employed and the employer. Generally speaking the miners are working on the understanding that, with further increases in the cost of living, their wages advance. This applies to most with the exception of the Canadian Western Fuel Co., and the relationship between the latter and its men, as a result of the recent adjustment of the wage question, is of the best. The product, for the most part, is being used to care for the domestic demand which now is heavy because of the approach of the winter. From North Vancouver and other districts comes the report that difficulty is being experienced in obtaining sufficient to take care of current orders. For this reason there is a belief that a shortage of coal may be experienced before the spring. This, however, is speculation. Responsible opinion appears to be that the collieries can be depended upon to take care of the local situation and, in any event, there is no serious shortage as yet.

At the annual meeting of the Mine Rescue and Ambulance Association of the Canadian Western Fuel Co., which was held recently at Nanaimo, J. Thompson was elected president; E. V. Paterson, secretary-treasurer, with J. W. Jensen as assistant; and to the Executive Committee, in addition to the chairmen of the various committees, were appointed W. H. Moore, George Yarrow and George Moore. A feature of the proceedings was the presentation of $100 to the winners of competitions held at the Labor Day Meet in Nanaimo under the auspices of the Mine Safety Association of Vancouver Island. Mr. Moore explained that these prizes were not in the nature of payment but were provided by the Company in recognition of the hard work to which the men had been subjected in preparation. The recipients were members of teams captained by J. W. Jensen, George Carson, J. Barton, J. Brown, A. McNeill, R. Channock, J. McCourt, and M. Gunniss. It was decided that a paper on first aid work would be delivered monthly before the members of the Association. This is only one of the arrangements made to sustain interest during the ensuing few months and to promote the object of the Association, namely, the equipping of every miner for practical help in case of need.

The Coalmont Coal Mining Co. is producing about 150 tons a day. The coal is shipped to the Kettle Valley Ry., by truck. Negotiations are in progress for the construction of a railway spur to the property which has turned out well under development.

The recent litigation with reference to the title to coal rights within the foreshore lands of the Eastern Coast of Vancouver Island, which now is declared to lie with the Province, and the report that steps may be expected towards the opening up of the coal deposits of Suquash and vicinity on an extensive scale, have made the reports of Dr. Charles H. Clapp and Dr. B. D. Dowling, the two principal geologists to investigate this area, of special interest. Dr. Clapp in his report on the industry in Memoir 51 of the Geological Survey Series, says:

"The future of the coal industry is very promising, although thinner and deeper coals will have to be mined in the near future. As already state, two new shaft mines have reached the Douglas seam in area of 181 square miles."

In his estimate of coal resources Dr. Clapp places the production at 24,500,000 tons up to 1912 and it recently estimated that the figure now would stand at about 30,000,000 tons. Dr. Dowling places the probable resources of the Nanaimo field at 1,340,000,000 tons.

The coal occurs chiefly in the lower part of the Nanaimo series in three seams, the Wellington, the Newcastle and the Douglas. The lowest seam, the Wellington, lies at the base of the Extension formation and rests on the East Wellington sandstone, and is about 700 feet above the base of the Nanaimo series. The Newcastle seam occurs at the base of the Newcastle formation, and overlies the Wellington seam by about 800 to 1,000 feet. The Douglas seam is contained in the Newcastle formation and from 25 to 100 feet above the Newcastle seam.

The coals of the various seams are as a whole much alike, and are high volatile bituminous coals of fair quality. The amount of fixed carbon in the best quality ranges from 45 to 60 per cent. and the ash from 5 to 10 per cent. The coal, especially that from the Wellington seam, cokes readily.

Some interesting evidence was given recently at Edmonton, Alberta, before the Coal Commission appointed to investigate conditions with reference to the available supply of this fuel, cost of production, etc. C. G. Sheldon, of the Humberstone Coal Co.; W. S. Cuples, of the Great West Coal Co.; H. C. Anderson, of the Twin City Coal Co.; L. E. Drummond, of the Mountain Park Coal Co.; and W. C. MacKay, of the MacKay Coal Co., were among those heard. All the operators were agreed that there was a great over-development of the mines in the district; the fact that they only work five or six months in the year was a big factor in the cost, for the upkeep during the remainder of the year had to be borne by the coal produced during the short producing period of the year

Pennsylvania

Bituminous

Washington—A contract for sinking a new coal shaft in Tylerdale, a part of this place, has been awarded by the Washington Gas Coal Co., to the R. G. Johnson Co., of Pittsburgh, Pa. Work is expected to be pushed and the shaft to be completed in six months. The shaft will be 260 feet deep and be timber-lined. The Washington company owns a block of several hundred acres of coal in Canton Township, which will be developed by means of this new shaft. The Johnson company recently completed three new shafts between Washington and Wheeling. Early in the spring the company turned over a concrete-lined shaft to the Lincoln Gas Coal Co.

Pittsburgh—The Republic Iron and Steel Co. is remodeling its Russelton No. 1 coal mine at Russelton, Pa., in what is known as the Freeport district. This company is replacing the wooden shaft lining with concrete and a frame tipple with steel. Steam driven power units are to be supplanted by machinery utilizing power purchased from the West Penn Power Co. The improvements are expected to bring the plant up to a high state of efficiency.

Anthracite

Scranton—Three tracts of coal lands in Fell Township have been sold by the Salem Mountain Coal Co. (of which Mr. and Mrs. J. R. Dainty are principle stockholders), to David M. Rosser, acting for the Cranston Coal Co., of Kingston. The consideration was $5,000.

Hazelton—Campion & Co., of Mahanoy City, which recently acquired the culm banks at the abandoned operations of the old Silver Brook colliery, is erecting a washery and expects to have the plant going by January.

Shamokin—One man was instantly killed, another probably fatally injured and two others badly cut and bruised at the Pennsylvania colliery of the Susquehanna Collieries Co., near this place. A tremendous fall of coal in old workings, created a rush of air of great force, which swept through a gangway, hurling Irving Bitterman, a driver, against timber and causing instant death. A loaded mine car was also set in motion and ran over John Fracol, a laborer, causing very serious injuries. Two miners, Charles Priski and Steven Delamel, were thrown from a chute and badly cut and bruised. It is said that the fall of coal was the most extensive that has occurred in this section in recent years.

Pottsville—The ancient grievance of anthracite miners—"docking"—was heard by the Conciliation Board at this place. Those making complaint were the following: Miners of the Corbin colliery, near Shamokin, employed by the Excelsior Coal Co.; Contract miners at the Primrose colliery of the Lehigh Valley Coal Co. Employees of the Buck Ridge Coal Co., asked that the company be ordered to pay them 40 per cent. increase in wages under the war scale, instead of $2 a day as at present. The Board also gave time to the consideration of the rates being paid by the Susquehanna Collieries Co., for pillar work at Williamstown. Grievances of employees at the Cameron colliery at Shamokin, also were considered.

Tamaqua—It is reported that the Hudson Coal Co., is drilling its property at a site about a half mile east of Middleport, near here. A half century ago some of the seams in this section were mined to a very limited extent above the water level. Now the proposition is to prove the coal at depth preparatory to opening up a modern plant on the property. It is stated that the Hudson Company controls a considerable acreage in this section.

Industrial News

Sydney Mines, N. S.—The miners of the Jubilee colliery, here, are to be given steady work in future, and the bottom seam is to continue in operation. This statement is reported to have been made by T. J. Brown, general superintendent at the Nova Scotia Steel and Coal Co. This company recently completed arrangements with the Canadian railroads to supply them with coal. This is a shaft mine, long-wall mining machines will be installed at once and active mining operations will commence, insuring steady work. It was stated that the lower seam would not be developed for large production for some time. At present mining in this seam is more or less of an experiment, but if conditions prove favorable it will be developed to greater capacity.

Dover, Del.—The Pocohontas & Sewanee Coal and Coke Co., has been incorporated with a capital of $2,500,000. R. A. Norton, Batavia, Ohio; J. T. Simmons and G. W. McClellow, of Cincinnati, are the incorporators.

Charleston, W. Va.—For developing coal land in the Big Sandy district, the Barren Creek Colliery Co. has been incorporated here with $2,000,000 capital. J. B. Hart, Fred O. Blue, R. E. McCabe, Edward Hart and John Hart, al of Charleston, are the incorporators. They have engineers now engaged in preparing plans for opening mines, installing machinery building houses and providing the other necessaries for a large coal output.

Morgantown, W. Va.—It is generally accepted as a fact that all the coal holdings, mines and assets of the Elkins Coal and Coke Co. in northern West Virginia, are about to be purchased by the Bethlehem Steel Corporation for the sum of $4,000,000. Negotiations were well under way, it is said, when the steel strike was declared, interfering with negotiations to some extent but the understanding now is that the sale is about to be consum-

mated. While most of the mines of the Elkins company are in Preston County, W. Va., yet the company also has three mines in Monongalia County. Should the Bethlehem company take over the Elkins properties, it would presage further development in Preston County. It is probable that Reedsville, W. Va., would be established as the headquarters of the coal and coke department of the steel company in the event of a sale. The Elkins Coal and Coke Co. is one of the few remaining large coal holdings of the estate of the late Stephen B. Elkins. It is believed that the acquisition provides the Bethlehem corporation with coal reserves estimated at 150,000,000 tons, meeting full requirements for coking, heating and steam coal.

Charleston, W. Va.—The Lima Coal Co. had expected to begin operations at its new plant in Clay County, W. Va., by the middle of October, but delay in the delivery of material has prevented completion of the plant, and it will be Dec. 1 before the company is able to begin mining and shipping coal.

Huntington, W. Va.—Louisville business men are behind the movement to further develop coal lands in Floyd County, Ky., having organized under the laws of West Virginia, the Huntington Cannel Coal Co. with a capital of $350,000. Chiefly interested in the new concern are: W. W. Smith, of Huntington; Judith D. Field, Prestonburg; William J. Bray, E. H. Callahan, and L. K. Smith, all of Louisville, Ky.

Huntington, W. Va.—It is understood here that Delaware, New York and Philadelphia capitalists have in view the purchase of a large portion of the coal properties of E. B. Carr, of Philadelphia. Mr. Carr owns nearly 80,000 acres of coal and oil lands in Morgan County, Kentucky. The understanding is that the prospective purchasers propose to organize and charter a $10,000,000 corporation in Delaware, to purchase and develop at least a part of the Carr properties located in the center of the Kentucky coal and oil region, heretofore untouched insofar as the Carr lands are concerned. Should such development be undertaken, as seems highly probable, it will be necessary for the Chesapeake & Ohio to build an extension into the Morgan County field.

Wheeling, W. Va.—With the expectation of operating in Marshall County, near Moundsville (the county seat), the Miami Coal and Coke Co. has been formed with a capital of $60,000. The plans of this company indicate further expansion of mining operations in Marshall County which has been most marked during the summer months. Identified with the new company are: C. E. Brown, Wheeling; W. A. McGlumphy, Chas. E. Showacre, John E. Hamilton, all of Moundsville.

Beckley, W. W.—The Beckley Coal Mining Co. expects to be in a position to begin operations before long with its new plant on Meadow Creek which is now nearing completion. All work preparatory to actual operations is well under way, including the grading for a side track and for an incline.

Pittsburgh, Pa.—The Cement Gun Co. has recently opened offices at 211 Fulton Building at this places. H. K. Heathfield has been named as district manager of the branch office which will include the Traylor, Dewey Contracting Co. (cement gun specialists) and the Traylor Engineering and Manufacturing Co.—manufacturers of mining, milling, smelting and crushing machinery.

Chicago, Ill.—The engineering firm of Jacobson & Schraeder, Inc., with offices in the Marquette Building here, has recently taken over the entire top floor of the Majestic Building, Chicago, and has also established a branch office in the Oliver Building, Pittsburgh, Pa.

Akron, Ohio—Recently a unique banquet was held at this place under the auspices of the B. F. Goodrich Rubber Co. At this novel function no one was given admittance who had not been in the company 20 years or more. The affair was attended by 160 men and women employees. Officials and workmen alike were among the veterans, in fact a comfortable majority of them were superintendents, department heads, managers and sales and finance executives. During the evening each one of the 160 employees was awarded a gold service pin. The history of the growth of the company from its beginning in 1870 was told on this occasion and illustrated by slides. Today the Goodrich factories comprise 63 buildings and employ 20,000 workers.

Wilmington, Del.—The Atlas Powder Co., of this place, announces the removal of its general offices to 140 North Broad St., Philadelphia, Pa.

Charleston, W. Va.—The Boone County Coal Corporation, W. M. Wiley, of New York, vice president and general manager, will issue additional stock to the amount of $3,000,000 to provide for further development of its various properties. It owns 32,650 acres of bituminous coal land, on which are mining developments with an annual output of about 2,000,000 tons of coal.

Spokane, Wash.—Spokane capitalists have purchased and taken hold of the development of the coal properties, at Detillion Bridge, on the former Spokane Indian reservation, near Miles, Wash. This property belonged to B. F. Tilsley and associates, and the new owners are preparing to put on a large force of men to drive a tunnel to intersect the coal seams at the lowest possible surface depth. The 85-foot shaft that has been sunk shows coal of excellent quality, the coal outcroppings getting better with depth.

Buffalo, N. Y.—The mine of the J. B. Jenkins Coal Co., at Mabie, W. Va., has been sold to the Randolph Coal Co., of Elkins, W. Va. It has an output of about 100,000 tons annually and employs 100 men. The principal owner was F. P. Merrill, of Hornell, N. Y.; the management was in the hands of General Sales Agent Charles A. Storck, with an office in this city, where it has been since the organization of the company.

Charleston, W. Va.—The Pilgrim Land and Coal Co., of Chattaroy, W. Va., was incorporated to operate mines in Kentucky; capital stock $50,000; incorporators, H. V. Ingham, R. H. Campbell, W. E. Morgan, M. A. Emmons, of Chattaroy; A. D. Runyon, of Delorme, W. Va.

Brownsville, Pa.—Samuel N. Sapper and wife, of German Township, Fayette County, Pa., Thomas S. Collier and wife, of Pleasant Grove and Allen and Samuel N. Sapper, (executors of Leonard Sapper), conveyed to the Ontario Gas Coal Co., 13 tracts of the Pittsburgh, or River seam of coal, for a consideration of $350,000.

Princeton, W. Va.—The building of a branch line by the Virginian Ry. from Maben on its main line into the Milam Fork district of Wyoming County, W. Va., will make possible the development of a considerable avreage of Pocahontas coal. Some 30,000 acres in the Milam Fork area, are owned by the Wyoming Pacahontas Land Co., (headed by Andrew Squires) in which Cleveland capitalists are largely interested.

Zanesville, Ohio—The Ohio Standard Coal Co., of this place, has been incorporated with a capital of $50,000. The incorporators are Artrur W. Sieglaff, H. A. Taylor, Gus G. Katesempes, H. A. Sharpe, B. S. Goldman and P. H. Tannerhill.

Clements, Md.—The Morgantown Salkelt Company of this place is making extensive preparations for the development of a large tract of coal. The concern is composed of Pittsburgh interests and Roy Salkelt is one of the chief owners.

Martins Ferry, Ohio—Former Congressman W. B. Francis, of this place, is at the head of a $200,000 coal company, which has purchased the holdings of the Yukon & Pittsburgh Coal Co., in Melgs County, of this state.

Charleston, W. Va.—The Castle Pallo Coal Co., of Clarksburg, W. Va., was incorporated to operate mines in Taylor County of this state with a capital stock of $50,000. The incorporators are; John A. Washington, H. B. Cooper, C. H. Harris, N. L. Shiplett and P. W. Bailey, all of Clarksburg.

Charleston, W. Va.—The Donnelly Coal Co., of Garden, was incorporated with a capital stock of $25,000. The incorporators are: F. J. Ravenscroft, Robert Donnelly, J. V. Healey, James Donnelly and John M. Donnelly, all of Elk Garden, W. Va.

Indianapolis, Ind.—The Menchell Coal Co., of Clinton, was incorporated with a capital of $40,000 for the purpose of coal mining. The directors are: William F. Brown, Sr., James B. Brown and William Brown, Jr.

Whitesburg, Ky.—S. B. Hardy, C. C. Bryon and others who have organized the Darby Fork Coal Co., at Catlettsburg, Ky., with $100,000 capital, have announced the opening of new mines on Beaver Creek.

Charleston, W. Va.—The Marine and Commerce Pocahontas Corporation, of Welch, W. Va., was incorporated to operate mines in McDowell; capital stock $500,000; incorporators, W. Arthur Howell, Percy Bullock, Wm. S. Lare, Crittenden H. Adams, and Sanford D. Stockton, Jr., all of New York City.

Louisville, Ky.—The Pilgrim Coal Co., of Chattaroy, W. Va., was incorporated to operate mines in Kentucky; capital stock, $50,000; incorporators; H. V. Ingham, R. H. Campbell, W. E. Morgan, M. A. Emmons, of Chattaroy; and A. D. Runyon, of Delorme, W. Va.

Charleston, W. Va.—The plant and property of the Baren Creek Coal Co., at Barren Creek, on the Coal & Coke R. R., near Clay W. Va., has been transferred to the Barren Creek Colliery Co. The latter company has just been organized by John B. Hart of Charleston, head of the Bartland Colliery Co. Two separate tracts of coal were acquired, one of 100 acres and another of 307 acres, both in Big Sandy district, on Elk River.

Trade Catalogs

Abatement of Corrosion in Central Heating System. By F. N. Speller, Department of the Interior, Bureau of Mines. Technical Paper 236. Illustrated; pp. 12; 5⅞x9¼ inches.

Universal Concentrating Tables—Overstrom Manufacturing Co., San Francisco, Cal. Bulletin U1. pp. 11; 9x11½ in.; illustrated. Contains facts about the table from the maker and users.

Standardized Material-Hauling Machines—Barber-Greene Co., Aurora, Ill. Catalogue No. 3. Pp. 32; 8½x11 in.; illustrated. Description of **B.-G.** standardized belt conveyors, portable and stationary conveyors and self feeding bucket loaders.

Scranton Pumping Machinery—The Scranton Pump Co., Scranton, Pa. Bulletins Nos. 101 to 109 inclusive, and No. 113. All bulletins (except No. 104) illustrated; 6x9 inches. Bulletin No. 101: Duplex Piston Pumps; pp. 16. No. 102: Duplex Plunger Pumps; pp. 12. No. 103: Jet Condensers and Vacuum Pumps; pp. 12. No. 104: Triplex Power Pumps; pp. 4. No. 105: Triplex Plunger Pumps; pp. 8. No. 106: Triplex Plunger Pumps; pp. 8. No. 107: Triplex Plunger Pumps; pp. 12. No. 108: Triplex Plunger Pumpes; pp. 8. No. 9 Triplex Plunger Pumps; pp. 8. No. 113: Standard Double Suction Volute Pumps; pp. 8. Each bulletin describes a different type of pump.

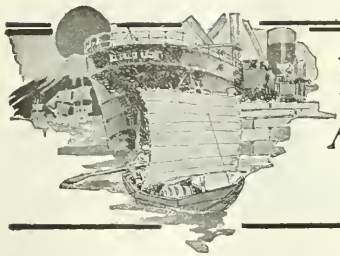
C. H. Rectangular Magnets—Cutler-Hammer Manufacturing Co., Milwaukee Wis. Booklet J, pp. 8; 8½x11 in.; illustrated. Describes magnets which are particularly adapted for efficient handling of regular shapes in steel and iron. Illustrations show their use at various plants.

Coming Meetings

American Society of Mechanical Engineers will hold its annual meeting Dec. 2-5 in New York. Secretary, Calvin W. Rice, 29 West 39th St., New York City.

Canadian Mining Institute will meet Nov. 26-28, in Vancouver, B. C., Canada. Dr. E. T. Hodge, professor of geology at the University of British Columbia, has been appointed general secretary of this meeting.

Coal Mining Institute of America will hold its 33rd annual meeting Dec. 3 and 4 at Pittsburgh, Penn. Secretary, H. D. Mason, Jr., Mine Safety Appliances Co., Pittsburgh, Penn.



FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Market Conditions for Coal in the Port of Naples

(Consul B. Harvey Carroll, Naples, Italy)

Naples, situated on the great Mediterranean-Asiatic steamship route which is now gradually assuming its former importance as an international trading route, is becoming again an important coaling station.

Southern Italy is generally supplied with coal by Great Britain through the port of Naples. The main kinds of coal on the market are Welsh, North Country, Pocahontas and New River. Inquiries are constantly being made regarding the supply that America can offer.

During the war the importation of coal into Italy through the port of Naples has been under the control of the Government. This regulation still obtains and the Royal Commissioner of the port, through whom permission is secured for the importation, is Vice Admiral Cutinelli. Statistics for imports are not available.

Facilities for Discharging Coal

There are three main centers in the Bay of Naples for the discharge of supplies of coal—Torre Annunziata and Portici, the regular port of Naples, and the Punto Franco or the free zone. Torre Annunziata and Portici together are the least important of the three centers, there being no facilities at those places comparable to those in the port of Naples proper. Coal there is unloaded on lighters and entirely discharged by hand. The regular port and the free zone have facilities for unloading and handling coal. There is dock space, plenty of labor, and to a certain extent machinery adequate for handling large supplies of goods. The depth of the water in the inclosed part of the port varies between 8 and 30 meters, and the water at all of the docks is deep enough to permit the entrance of the largest ocean-going steamships.

Labor at the port is normally readily obtainable. Coal is unloaded by workmen carrying it in baskets on their shoulders. These workmen are paid in normal times from 2.50 lire to 3 lire per day. As much as 4500 tons have been unloaded in 27 hours in this way. Regular workmen at the port, the supervisors and foremen, are paid now from 20 to 30 lire per day.

The free zone in the port of Naples occupies a space of 18,500 square meters, of which 3840 are devoted to the outer wharf and 6380 to the buildings. Unloading of goods in this part of the port takes place by means of cranes worked by hydraulic machinery. The transportation of goods to various parts of the warehouses is by a chain of dockhands who pass the goods from man to man. The advantages of the free zone are that goods can be brought into it and moved freely without the surveillance of the customs officials until it is actually carried into the city or dispatched to another place by rail. In other parts of the port special arrangement has to be made through the office of the acpitaneria of the port or with the agent who arranges the permission for docking through his office. A ship entered in this manner becomes subject to the regular tariff fees of the port and subject to its regulations. Derricks mounted on railway cars are readily available for the moving of coal from the ships to railway cars.

In Naples unloading of coal is done by the workmen who carry it in baskets on their shoulders. There are seven cranes in the port which are controlled by the Naples Chamber of Commerce. Six of these have a capacity of 15 quintals each and one is capable of lifting 25 quintals. Altogether they have an aggregate capacity of 250 metric tons.

After authority for unloading has been secured from the comissioner of the port the ship is assigned to its place and takes its turn. The tariff of the port for coal is 0.17 lira per ton. The expense of weighing the coal is paid by the consignee at the rate of 0.22 lira per ton and 0.07 lira for the men who operate the scales.

Coal Situation in Denmark

The U. S. Shipping Board recently announced that Denmark had placed 16 steamships, aggregating 61,000 tons, in the coal trade for carrying coal from America to Denmark. According to information received by the Danish Legation, two additional Danish steamers have now been chartered to carry coal from Hampton Roads to Danish ports.

Denmark normally imports 3,400,000 tons of coal and coke yearly, mostly from England, but also some from Germany. During the war it was difficult for Denmark to obtain the necessary coal supplies, and the importation decreased to about 2,000,000 tons a year. It was generally expected that conditions in the coal trade would become normal again as soon as peace was declared, but on the contrary the situation became worse.

Hardly any coal was exported from Germany, and England, suffering from a decreased coal production and an increased demand, put heavy export taxes on her coal. Denmark has continuously had about 150,000 tons of ships carrying coal from Great Britain, but while the months of May, June and July showed a fairly satisfactory increase in the importation of coal, August imports dropped considerably, and in the first week of September only 37,000 tons were received, or much less than it takes to keep Denmark going, even with the greatest economy.

Under the circumstances the Danish authorities are contemplating adopting once more the restrictive measures which were in force during the war, and during the coming winter coal will probably again be rationed for factories as well as for the homes.

The American import from which Denmark expected so much amounted to only 25,000 tons all told, in June, July and August. It is hoped, however, that the coal fleet which the Danish Government has now placed in the American trade will shortly relieve the serious coal shortage from which Denmark at present is suffering.

Coal Production in Poland

The chief coal-producing area of Poland, writes a consular official from Warsaw under date of Aug. 17, 1919, is known as the Dombrowa Basin, located to the west of the city of Krakow. The principal mining towns are Dombrowa, Sosnowiece, Katowice and Bedzyn. The report of the labor inspector of that district for the second quarter of 1919 indicates that industrial operations are being resumed in a fairly satisfactory manner. On June 30, 1919, 52 coal mines were running.

The following table shows the number of laborers and the production in the coal mines of Dombrowa for February, 1919:

Mines	Number of Laborers	Tons Extracted	Tons Shipped
Georges	1,071	17,721	11,020
Ladislas	815	12,033	7,649
Mortimer	1,303	14,774	6,032
Victor	2,035	28,910	23,142
Saturn	1,858	28,012	23,711
Jupiter	1,532	13,813	9,166
Cte. Renard ..	2,705	35,289	26,773
Andre II	266	2,241	974
Ste. Varsovienne	4,130	39,765	31,940
Paris and Koszelew ..	2,660	24,709	22,379
Czeladz	2,026	30,904	24,714
Grodziec II ..	1,550	19,392	13,947
Flora	1,915	18,861	14,863
Radem	1,420	16,664	9,349
Antoni	644	4,684	4,084
Grodziec	400*	3,235	1,777
Total	26,330	312,007	231,520
Surface mines	4,737	33,369	28,337
Grand total.	31,067	345,376	259,857

The number of days worked during the month was 24. Of the total number of 31,067 miners, 1,235 were employed in the smaller surface mines and 1,425 in lignite mines.

These Polish coal mines have been worked for over a century and, from 1790 to 1799, slightly over 8,000 tons were extracted from the Dombrowa Basin. The production in pre-war times is indicated by the following figures, which give the output in 1911: Dombrowa (Poland), 5,769,928 tons; Krakow (Galicia), 1,653,724 tons. The production of the Upper Silesian mines in the same year was 36,622,969 tons; and that of the Ostrawa-Karwin mines in Austrian Silesia, 8,073,713 tons. Thus the total output of Polish mines was 52,120,334 tons. The production of coal in France in the same year was about 40,000,000 tons.

In 1910 the mines of the Dombrowa Basin, worked by steam, represented a total force of 42,317 hp., and those worked by electric motors 21,944 hp. In the Krakow mines the mechanical force amounts to only 11,955 horsepower.

The average output per miner in the Dohmbrowa district was 233 tons in 1913, and in the Galician mines, 282 tons.

Acute Coal Shortage in Industrial Districts of Northern France

The coal shortage in the industrial centers of northern France is becoming acute, and manufacturers are registering complaint with French officials, according to a dispatch received by the Bureau of Foreign and Domestic Commerce from the American Embassy at Paris. Douai, formerly one of the important centers of the coal-mining industry, whose mines are now flooded and for the most part not producing, has complained that coal cannot be obtained for its reviving industries and its attempt at speedy reconstruction.

Several of the power stations in the Paris district, according to the report, have notified manufacturers that because of insufficient production of electricity they cannot meet industrial demands.

There is not only an absolute shortage of coal, but the quality of the coal available is poor, and power stations report they are getting 25 per cent less production out of the high-priced coal now coming in than they got out of the coal ordinarily used.

In complaints made recently it was stated that if the situation gets any worse there is imminent danger of a general shutdown of all the industries in the Paris district. Labor organizations as well as manufacturers are calling on the Government to meet this grave situation.

Coal Resources of Spitzbergen

Exploration work has proved that the group of Arctic islands known as Spitzbergen possess a wealth of coal. Of the three geological formations in which the coal occurs, the tertiary formation holds the most valuable seams. These seams are uniform in quality and thickness throughout the whole tertiary formation. Coal mining is being carried on by Norwegian, Swedish, English and Russian companies. The largest workable deposits are in Norwegian hands, and these areas have the most favorable location as regards ice and harbor conditions.

The coal output is characteristic of the distribution of the various interests. In 1918 the following quantities were shipped from Spitzbergen: From Norwegian-owned mines (600 hands) 55,000 tons; from Swedish-owned mines (100 hands), 4,000 tons; from Russian-owned mines (40 hands), 2,500 tons. The English territory, stretching over large areas, holds only relatively small deposits of workable coal.

Norwegian Coal Companies in Spitzbergen.

The following are the names of the Norwegian coal companies in Spitzbergen:

Store Norske Spitzbergen Kul Kompani, which has its mines at Advent Bay and Green Harbor. This company has a share capital of 9,000,000 crowns (at normal exchange the Norwegian crown is worth $0.268), and has been formed through the purchase of several English, American and Norwegian properties. About 350 hands, all Norwegian, are employed. The output in 1918 was about 40,000 tons, all of which was shipped to Norway. The output for 1919 is expected to run to about 60,000 tons. The company owns the mining town of Longyear City, with 30 dwelling houses, warehouse, power station and wireless-telegraph installation. Now that the war is over the company expects to work the output of the mines at Advent Bay alone to 200,000 tons.

A/S De Norske Kulfelter Spitsbergen also has its field in Advent Bay. The property was bought from an English company, the Spitzbergen Coal and Trading Co. Preparatory work was commenced in 1916. Last summer the company employed about 100 hands.

A/S Svalbard, formed in 1916, has its fields in the Advent Valley and in Green Harbor. The company is not working, but has watchmen on the property.

Kings Bay Kul Comp. A/S, of Aalesund, has its field in Kings Bay. The company commenced operations in 1917, and shipped about 13,000 tons of coal in 1918. The output in 1919 is expected to reach 25,000 tons. It employs about 150 hands.

Spitsbergen Kul og Mineral A/S, at Bell Sound, has carried on trial operations, but has now only watchmen on the spot.

A/S Kulspids is for the present only carrying on trial work at Recherche Bay.

Bjornoen Aktieselskap, on Bear Island, has a share capital of 4,000,000 crowns and owns the whole of the territory on this island.

The Norwegian companies are about to make large extensions, and, when they have completed their plant for full production in the course of a few years, they will presumably be able to cover the requirements of northern Norway. In connection with these Norwegian undertakings, mention may be made of a large English company that has mines and is carrying on trial operations at Bell Sound. A Russian company is erecting a plant at Green Harbor and a Swedish company owns coal fields at Braganza Bay.—Norwegian Trade Review.

Belgian Coal Transmitted as Electrical Energy to Italy

An agreement between Italy and Belgium stipulates that Italy is to receive from Belgium 60,000 tans of coal a month, which, however, must be transported at the charge of the Italian Government and with the facilities it furnishes. Because of the present lack of railway cars and of Italian mercantile tonnage, the transportation of this coal is difficult—almost impossible.

The remedy for this evil state of affairs is mentioned today in the project of the engineer Emilio Guarini, which is now undergoing an examination by Hymans, the Belgian Minister, and Dante Ferraris, Italian Minister of Industry, Commerce and Labor. Guarini proposes burning the coal in the Belgian mining districts—thus being able to make use of low-grade coal and even of coal dust—then, by means of a transmission line 1,200 kilometers long, transporting the energy evolved from the combustion of the coal at a tension of 150,000 volts and a total power of from 500,000 to 1,200,000 kilowatts. Guarini computes the cost of a kilowatt-hour obtained in this way at 8 centesimi about 1½ cents); whereas if the energy were obtained from coal brought in by railway, the kilowatt-hour cost would be 18 centesimi (about 3½ cents.)

It is further to be noted that with central stations of 100,000-kilowatt capacity the consumption of coal for industry is reduced to two-thirds what it would otherwise be. This saving would repay Belgium in large part all the expenses that would have to be incurred in the instalaltion of central plants with capacities of 1,500,000 kilowatts, equivalent to 12,000,000 tons of mineral fuel annually.

As a precedent for his scheme, Guarini cites an English company which has set up a power plant in South Africa to carry 1,200 kilometers a current of 500,000 horsepower developed from the force of the Zambesi falling into Lake Victoria Nyanza.—L'Epoca, Sept. 10, 1919.

Coal Production in Great Britain

Returns of coal production in Great Britain recently made public by the (Government) Board of Trade show that the output fell from 4,812,595 tons for the week ending May 31, 1919, to 2,642,895 for the week ending Aug. 9; but later figures now available show that there has been a rise in production since that time. For the week ending Aug. 23 the output, according to the Board of Trade, was 3,989,762 tons. However, as compared with the figures for May 31 there is still a shortage of 822,833 tons.

The most striking fiures are for the Yorkshire district, where during the period under review, the weekly output fluctuated between the maximum of 788,770 tons and a minimum of 5,540 tons—this latter for the week ending Aug. 2. For the week ending Aug. 9 there was an increase to 10,734 tons, and for the following week an advance to 19,917 tons; and in the week ending Aug. 23 output in the Yorkshire district rose to 162,638 tons.

The 7-hour working day was put into operation on July 16. During the week ended July 12, the production figures for Great Britain were 4,796,148 tons. In the following week, after the 7-hour law had been in operation for about three days, the output was 3,893,652 tons. During the next week (ended July 26), the output declined to 2,537,951 tons. Since that time there has been a steady increase, with the exception of the week ended Aug. 9, during which time the bank holiday intervened. As there are about 1,100,000 men and boys employed in the mining industry above and below ground, the figures shaw an average output of 4½ tons a week for each person in the month ended July 12 and less than 3 tons a week in the month ended Aug. 9.

Italian Coal Situation Improves

Trade Commissioner H. C. MacLean reports from Rome under date of Sept. 1, that the measures adopted by the Italian Government to relieve the coal shortage, which reached a crisis in July, when shipments from England were temporarily discontinued, are producing satisfacory results, and that the outlook for the future is considerably brighter. Imports of coal in August amounted to 600,000 tons, of which 350,000 tons came from England and 150,000 tons from the United States. This shows a considerable increase in the imports of American coal, which in June amounted to only about 65,000 tons and in July to about 100,000 tons. Furthermore, through the Italian Commision in the United States contracts had bee made for about 600,000 tons of coal c. i. f. Italian ports, and about 300,0000 tons more f. o. b. American ports. These contracts cover a period of about eight months.

During September Italy hopes to receive 400,000 to 450,000 tons of coal from England, and Belgium has agreed to furnish 50,000 tons per month. Some shipments have been coming through from Poland, although conditions there are too uncertain to permit a continuous supply. Furthermore, shipments of German coal from Westphalia begin Sept. 1, although it is impossible to say definitely at this time how much will be received from this source. Owing to transportation conditions France is unable to utilize all the German coal which is available and Italy is taking advantage of this condition.

Commissioner Laviosa, head of the Coal Office of the Italian Government, considers freight rates on coal from the the United States to Italy too high to favor the introduction of American coal on a large scale. He called attention to the fact that since the recent increase in the demand for American coal, rates had been increased, whereas England is maintaining its freight rates at the lowest posible figure in order to retain the business.

The unfavorable exchange is, of course, another serious obstacle to purchase in the United States. American coal is now quoted at Genoa at 320 lire ($61.76) per ton against 295 lire ($56.93) per ton for Cardiff coal.

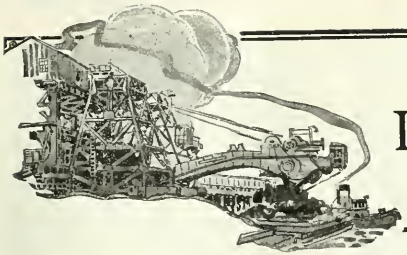
Bunker and Cargo Coal in Nova Scotia

There are three companies in the Sydney consular district which furnish bunker and cargo coal from the local mines. The Dominion Coal Co. (Ltd.) supplies both bunker and cargo coal at Sydney and Louisburg; the Nova Scotia Steel and Coal Co. (Ltd.) performs the same services at North Sydney; and the Inverness Railway and Coal Co. at Port Hastings on the Straits of Canso.

The amount of coal on hand and available at the three first ports mentioned for bunker is practically unlimited: for cargo the output of the local mines is something about 300,000 long tons per month. It is believed that over 50,000 tons might be contracted for to be used as cargo. The minimum stock which might be relied upon at all times for cargo would be much less.

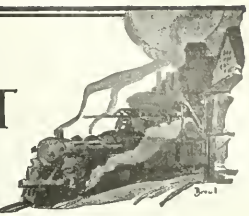
Over 50,000 tons of coal per month are supplied for bunkering from June 1 to Nov. 1. No figures are available for cargo coal.

The present price of cargo coal is $5.65. Bunker coal is furnished at $7 per ton and 25 cents for trimming. In 1916 the price averaged about $5 per ton of 2250 lbs. and was much less before the European war. The effect of the war has been to double the cost of coal and other supplies and decrease the production of coal in this district 25 per cent.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Coal Strike will be of Short Duration—Union Workers Obey Strike Order—Nonunion Fields Working to Capacity—Prices Fixed by Government.

Signs are not wanting at this writing of the speedy ending of the bituminous coal strike. Conditions as they now exist are intolerable to producers, miners and consumers alike, and it is quite likely that the operators and the mine workers leaders will come together in the near future and settle their differences.

In union mines, virtually all the workers responded to the strike order. In the nonunion fields the men stuck to their jobs, and though it is too early to estimate the tonnage that will be produced by the loyal workers, the situation is generally satisfactory.

In Pennsylvania, the National Coal Association reports, about 70,000 out of 180,000 men went out. In West Virginia, production is about one-half of normal. Illinois, Indiana and Ohio have been hard hit by the strike. According to reports, not a mine in any of these states is working. Kentucky is working to about 50 per cent. of normal, while in the Georges Creek field in Maryland only one mine was reported to be operating on Monday of this week.

The Southern fields are quiet, though Alabama reports that a large number of mines are running. Reports from the West show that Utah mines are working at nearly normal. Operations in Colorado have been curtailed about 70 per cent.

To circumvent any possibility of profiteering on the part of unscrupulous operators and dealers, the Government on Oct. 30, re-established the maximum prices of bituminous coal that prevailed prior to Feb. 1, 1919. In addition it has again assumed control of distribution, coal being confiscated in transit and held on sidetracks and in railroad yards subject to Governmental allotment.

No complaints of hardship as a direct result of the strike have come to hand. Some sections of the country are well stocked with fuel, the New England States in particular. The embargo placed on coastwise and foreign coal shipments will work out to the benefit of so-called esssential industries in this country whose reserve stocks are dwindling.

Every one fervently hopes that the situation here will not duplicate that of the miners' strike in Yorkshire, England, last summer. That strike cost Great Britain $53,000,000. In wages alone the English miners lost $16,500,000, and a strike fund of over $1,362,620, which it took the men 25 years to accumulate, was exhausted in one month.

WEEKLY COAL PRODUCTION

Recovering from the slight decline of the week before, the production of bituminous coal rose to a new high record for the year during the week ended Oct. 11. The curve of average daily output has left the line of 1917 far behind and now threatens to overtake the course of the 1918 line. The week's production is estimated at 11,924,000 tons, an increase of 3.4 per cent. over the preceding week, and greater by 311,000 tons than that of the first week in October, which had hitherto been the highest this year. The record could not have been accomplished had not all the agencies affecting production lent hearty assistance. Labor disturbances were at a minimum. Consumers, influenced in part by reports of a threatened strike in the bituminous fields, were quick to take the coal offered. The railroads supplied the mines sufficient equipment to load 217,749 cars of soft coal, 38,064 cars of anthracite and 306,000 tons of beehive coke. The record was the more remarkable in that it was attained during a period when fears had been expressed that the steel strike would react unfavorably upon the production of coal.

The anthracite region shared in the activity reported by the bituminous industry during the week of Oct. 11. Production is estimated at 1,955,000 net tons, an increase of 34,000 tons, or 1.8 per cent., over the preceding week. The current rate of production has been exceeded but once this year, and like that of bituminous coal, now closely approaches the performance of the corresponding season of 1918.

The output of beehive coke continued to decline slightly during the week ended Oct. 11. The total production of the country is estimated at 306,038 net tons, a decrease of 2.1 per cent. compared with the preceding week. The effect of the steel strike upon the demand for coke is suggested by the following statement, in which the current weekly output is compared with the average of the four weeks immediately preceding the strike: During first week of strike production was 78 per cent. of pre-strike average; during second week of strike production was 71 per cent. of pre-strike average; during third week of strike production was 69 per cent. of pre-strike average. The strike has not yet carried the production of beehive coke to as low a level as prevailed witnout interruption from the middle of last April to early July.

Lake shipments, as indicated by dumpings of bituminous coal at lower lake ports, were marked by a sharp increase during the week ended Oct. 4. The tonnage dumped was 725,986, nearly 25 per cent. greater than that of the preceding week. Shipments were no doubt stimulated by anxiety of consumers at the head of the lakes to make sure of supplies in anticipation of the threatened coal strike and by a tendency of producers to apply on their lake contracts capacity released by the slackening demand from the steel industry.

NEW YORK.

Anthracite steam coal situation shows improvement. Demand increases and quotations are stronger. The call for egg, stove and chestnut continues strong. New England lacks coal and buying is heavy. Consumers of bituminous aroused by strike talk and demand increases, as well as quotations. Big producers make efforts to keep prices down.

Anthracite—Considerable improvement is noticeable in the steam coal situation. Demand has picked up and there has been a corresponding betterment in the quotations. The improvement is attributed generally to the threatened strike in the soft coal mines and the lack of bituminous coal at the local docks which has been apparent the past few weeks. Shippers of anthracite steam coals see an opportunity to regain some of the trade lost several years back to the bituminous operators.

The demand for the domestic coals continues strong, particularly in New England. Locally there is a good call, caused in most part by the continuation of the strike in the harbor and the resultant slow deliveries

There is a steady call for chestnut, egg and stove in the order named, the trade inland taking more of the first named size than is taken locally. None of the sizes is plentiful but the larger companies are able to keep their customers supplied Independent producers find a ready market, notably throughout New England where dealers are said to be offering premiums.

Pea coal moves easily although the city dealers have an accumulation in their yards because of the heavy tonnages taken in the early summer when there was a scarcity of the larger sizes and it was necessary to accept the smaller size in order to get the larger.

Inquiries for the steam coals are increasing and shippers of the better grades find no difficulty in unloading their tonnages. There were reports

that premiums were being offered for the better grades. Rice coal is the longest of the three sizes.

Dumpings for anthracite for the week ended Oct. 24 were 5,507 cars as compared with 5,220 cars the previous week, an increase of 287 cars.

Bituminous—The fear of a strike on Saturday of this week began to show itself in the local market the latter part of the week when consumers began to place orders for additional shipments. At about the same time a few shippers increased their quotations, although efforts were being made by a great many producers to keep quotations on a level with what they had been for the past several weeks.

The strengthening of prices was not general among shippers but was attributed to a small minority and it was generally predicted that a great majority of the producers would refuse to advance their prices even though a strike would be inaugurated.

There is no accumulation of coal here. Some shippers have no coal at the local docks. Contract coals move rapidly and large consumers are watching the free coal situation. Railroads are reported as picking up any surplus tonnages they are able to find and there was some talk of their being about ready to confiscate tonnages in anticipation of the strike.

The efforts of consumers to get in a supply of coal before Nov. 1 is reflected in the report of the Railroad Administration which shows that 6,267 cars of bituminous were dumped at the local docks during the seven days ended Oct. 24, as compared with 4,790 cars the previous week, an increase of 1,477 cars.

Producers and shippers are carefully watching the outcome of the Federal officials efforts in Washington to bring peace in the miners ranks and predict that should the miners strike it will mean a considerable loss to the bituminous interests in that it will open the field for a heavier consumption of the anthracite steam sizes and also the consumption of oil which has already secured a strong foot-hold here as well as throughout New England and other sections of the country.

Boats are generally loaded although there may be no immediate buyer in prospect. The shipping interests have been hard hit by the continuation of the local marine labor difficulties and many vessels are forced to go to other loading ports for their supply of bunker coals.

Inquiries for export business continue to increase and buyers are not confining themselves to the coals contained in Pools 1, 9 and 71, but are willing in some instances, to consider coals sent to Pool No. 10.

Quotations for the various pools fluctuate continually, no quotation holding good for more than 24 hrs., as a rule. Late in the week the various pools were being quoted about as follows:

Nos. 1, 9 and 71, $6.50 to $6.75; No. 10, $6.25 to $6.50; No. 11, $6 to $6.26, and Nos. 18 and 41, $5.85 to $6.

Quotations on spot coal at the mines, were likewies continually changing but the following shows a fair range:

	Spot.
So. Forks (best)	$4.00—$4.25
Cambria (best)	3.50— 3.76
Cambria (ordinary)	3.10— 3.35
Clearfield (best)	3.50— 3.75
Clearfield (ordinary)	3.10— 3.36
Reynoldsville	3.25— 3.45
Quemahoning	3.75— 4.00
Somerset (medium)	3.25— 3.50
Somerset (poor)	3.00— 3.26
West Maryland	2.75— 3.00
Fairmont	2.50— 2.76
Fairmont ¾	3.10— 3.25
Latrobe	2.80— 3.00
Greensburg	2.90— 3.10
Westmoreland ¾	3.75— 4.00
Westmoreland r-m	3.50— 3.76

Philadelphia

Anthracite trade stirred by strike talk. Heavy calls for stove and nut. Egg still in heavy demand. Shipments light. Car shortage appears for first time. Pea is in fair demand, but receipts are about equal to outgo. Steam coals quiet. Bituminous market much upset by imminence of strike. Good demand for all coal. Wholesalers hold prices down. Few spot quotations.

Anthracite—From the standpoint of activity the retail business during the past week left nothing to be desired except the most vital need—coal. The people refusing to note any difference in the strike situation as between the anthracite and bituminous coal busines, take it for granted almost generally that there is trouble in store for them after Nov. 1. This was quickly shown in the amount of new business offered to retailers and in addition there were hundreds of anxious inquiries as to when orders already placed would be delivered. The weather has been in no way conducive to active buying and the demand for fuel is simply due to the trouble brewing in the soft coal fields.

As it is, the real demand for fuel continues to be confined to stove and nut, with these sizes running a close race for pupularirty. Coal dealers consulted find it difficult to explain why so many people heretofore accustomed to use a smaller size are now insisting on either of the two sizes above mentioned. The only explanation seems to be that while pea coal is a greater economy, yet it requires more attention in burning, and as the public seems to have the price it is indulging in the luxury of the larger sizes. Price appears to be a secondary object. The demand for egg has in no wise fallen off and it would seem that the call for this size, which is out of all proportion to that of a few years ago, can be traced to the increasing adoption of the pipeless furnace in this part of the country.

The shipments into the city have only been fair recently and for the first time this season shippers are inclined to blame car shortage in a measure. Early in the week the railroads withdrew a great deal of equipment from the anthracite trade in the effort to expedite shipments from the bituminous region, and this has reacted on the receipts of domestic coal. In any event this is only temporary, for no matter what takes place in the soft coal region car distribution is likely to be placed on its former basis in the anthracite region. In the event of a soft coal strike it is felt by some that it will throw quite a number of additional workers into the anthracite field and thus speed up production. On the other hand with a strike in the soft coal region there is no telling in times like these what might happen in the hard coal region, even though the men have agreed to work under the old agreement until next April.

The only shipments up to normal are those on pea coal orders. It can be said that the demand for this size slowly increases and this week perhaps did a little better than usual, as there is always a certain proportion of the consumers who are willing to take the next best thing to be had. The dealers are continuing to advertise the advantages of using this size, showing that there is a difference in cost of over $2 a ton. Despite the increasing sales it is not believed that many dealers have succeeded in reducing stocks, as the companies if they ship anything seems to be sure to ship pea. With the continuance of mild weather more than one dealer is expressing doubts of his ability to move it all before spring.

The steam coal situation is really unchanged. The real big users have been stocking up all summer and now there are only normal receipts being taken by most shippers. Buckwheat is moving fairly well, but even up to a week ago it was possible to buy this size off price; lately with possible trouble with bituminous coal there has been a tendency to stiffen the price, but certainly to date has not increased shipments. Rice is being called for in fair volume, with much going into storage yards and a still greater tonnage of barley.

Bituminous—The imminence of the threatened strike has much upset the trade. There has been quite a heavy demand for coal of the high grades, with the result that there has been little for the spot market at all. Many consumers, however, display complete indifference to the situation, especially those concerns with a three or four months' supply ahead. From the beginning of the week prices began to mount fairly rapidly, until Friday, when most houses temporarily declined to quote. This was ascribed to the fact that the operators seeing the seriousness of a rapidly rising market, got together in a meeting and decided that all sales should be made on a basis of just the regular commission for brokerage coal, with the understanding that prices would be kept as low as possible. Quite a few houses are not quoting yet, but are simply offering to procure coal at the lowest price plus a commission. Under such conditions it is not practicable to give a list of prices, but in a general way it can be said the best coals are running between $3.40 and $4.

Pittsburgh

Opinions on strike vary. Miners' demands impossible.

At this writing the chances seem to be about evenly divided as to whether or not there will be a general coal strike Nov. 1. Some observers think there will be a strike, some think there wil not, and some insist they have formed no opinion. Operators are united on one thing, that the miners' demands are absolutely impossible to grant. Even if the operators were willin, the burden passed on to the public would be more than it could bear.

As to the Pittsburgh district, it is pointed out that the day-labor cost of coal per ton is almost as great as the cost of mining itself, and as day labor demands 60 per cent. advance, with the company to pay for time spent going to and from the working face, the day-labor cost per ton would be increased much more than 60 per cent., while if overtime for hours beyond six were paid the increase would be augmented in that way, while capital charges per ton would be increased.

Coal operators state that on regular business there has been no material increase in prices in the past week, though it is admitted that odd lot sales have been made at fancy figures. There has been an effort on the part of many consumers to stock up. It is regarded now as too late to make purchases for this purpose, because if the strike becomes a certainty the railroads will doubtless commandeer coal in transit and the shipments would not reach the buyer.

Retail dealers have been buying domestic coal, and the great bulk of the sales in the past week of such coal have been at $2.75 for ¾-in. and $2.90 and $3 for 1¼-in. The regular market is regarded as standing about as follows: Slack, $2.20 and $2.30; steam mine-run, $2.30 and $2.40; gas mine-run, $2.50 and $2.70; prepared gas, $2.90 and $3.10; per net ton at mine, Pittsburgh district. Some odd lot business has been done, largely by brokers, as follows: Slack, $2.75 and $2.85; steam mine-run, $2.85 and $3.25; gas mine-run, $3.25 and $3.50; prepared gas, $3.50 and $4, per net ton at mine, Pittsburgh district.

Connellsville

Market up 50c in week. More blast furnaces operating. Threatened coal strike helps stiffen coke market.

There has been a further advance in coke in the past week, furnace coke in the past week, furnace coke selling up to $4.75, a 50c advance in the week, and foundry bringing about the same advance. The threatened coal strike has been an important influence, but apart from that there has been the better demand from furnaces, chiefly for stocking purposes, whereby all surplus coke has been moved, so that operators are indisposed to sell except at a fair price relative to cost of production, and $4.75 for furnace coke is regarded as such a price, representing the market value of the coal plus the bare cost of coking.

Blast furnace operations have continued to gain on the strike, though at a slow rate. The Shenango Valley is running almost full, and Buffalo is practically all running except the four

rs furnaces. Lackawanna Steel sold its coal for only a short time is now taking it all, together with due on contract. In the Mahoning ley and in Cleveland a few blast naces have resumed, but the strike is still strong in both those quarters, while the Wheeling district remains tightly closed.

On occasional lots fancy prices have been obtained for foundry coke, and extremely high prices have been mentioned for first quarter contracts, apparently without consumers taking hold in any instance. The market for spot and prompt is as folows. Furnace, $4.75; foundry, $6 and $6.50, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Oct. 18 at 204,445 tons, an increase of 51,681 tons.

Buffalo

Some spasmodic advances in bituminous. Fear of strike is the cause. Most consumers have plenty of it. Anthracite going to the Upper Lakes fast.

Bituminous—The trade is in a sort of transition state, for two reasons. As a rule the consumers are well stocked up and good for a long shutdown, but there are always a few who have failed to buy what they need for such an emergency and they are hunting for quick shipments. At the same time the mines are slow, so that if any deliveries are made promptly there must be special stimulus from some source. So the price in some instances has improved within the last day or two.

If the coal in shippers' hands could be distributed evenly according to consumption needs it would last several months. Some shipers say it would be good for six months or even longer, though this is a decidelly long time. It appears, then, that the strike will not need to be broken early if it does tie up the mines, which it is not expected to do even at the first. The general idea is that the miners will call the bluff, but with little expectation of winning. Even total failure will not count so squarely against them as to weaken now and call the strike off before it begins.

The jobbers are doing a pretty small business. The get few orders and it is not easy to fill what they get. So all they try to do is to keep in touch with the situation and be ready to resume when the difficulties are over. The effort to hear from such centers as Pittsburgh and Cleveland every day is common, though at present the letters and despatches are not conclusive as to anything. A strike of some sort is now generally looked for, but that it succeeds any better than the steelworkers' strike has done is not unlikely In some cases the prediction is made that the Government will interfere and put an end to the strike soon after it is declared.

The bituminous prices are unsteady and there will be small uniformity right away, so the following quotation must be taken as a fair average, with some coal selling at an advance of 50 cents or more a ton: $4.45 for Allegheny Valley sizes, $4.90 for Pittsburgh and No. 8 lump, $4.65 for same three-quarter, $4.20 for mine run, $4.10 for all slack, $4.60 for smokeless, $5.40 for Pennsylvania smithing, all per net ton, f. o. b. Buffalo.

Anthracite—The movement continues unusually active to the Lakes, but is correspondingly quiet in all other branches of the trade. Consumers are somewhat stirred up by the issuing of notices by the Public Service Commission ordering all natural gas burning apparatus that is capable of burning coal to be rigged for that fuel by the middle of December. The notice states that that arrangement kept the gas pressure up all winter for all strictly gas-burning stoves, though the fact was that the winter was so mild that there was small need of the regulation.

Some of the bituminous jobbers are actively engaged in selling independent anthracite, for which they ask all the way up to $3 premium, but as a rule so little of this coal can be had that small effort is made to obtain a supply. The regular quotations remain as follows:

	F. O. B. Cars, Gross Ton.	At Curb, Net Ton.
Grate	$8.55	$10.20
Egg	8.80	10.65
Stove	9.00	10.85
Chestnut	9.10	10.95
Pea	7.20	9.30
Buckwheat	5.70	7.75

The shipments to the Lakes have seldom been more active than they are now. Bituminous activity has not been well maintained all the season, but there will be considerably more anthracite moved by water than there was last season. Shipments for the week are 159,600 net tons. Rates are advancing slowly.

Coke: Buffalo, N. Y.—The demand for coke is slack. Consumption has been so much reduced by the strike that it will be some time before the regular output of material is reached again, though the strikers are returning to work pretty generally now. Prices are therefore a little better than nominal at $8 for 72-hr. Connellsville foundry, $7.50 for 48-hr. furnace, $7 for stock, $7.75 for domestic sizes and $5 for breeze. Iron ore is coming in by Lake at a good rate, all the cargoes tied up by the strike having been unloaded.

Cleveland

Feverish haste to stock coal against the threatened strike Nov. 1 features the various markets here. Though in instances prices have been advanced, the great majority of the dealers and operators are maintaining the old level.

Bituminous—Nothing has counted in the Cleveland market in the past week but the threatened strike. Demand for any and all kinds of coal has increased ten-fold, it appears. With the iron and steel plants in this district still unable to operate at more than 10 per cent of normal, much more coal—relatively—is available. Even so, it is doubtful if the average stock pile in Cleveland will last more than two weeks. Coal has been comparatively scarce in Cleveland all summer, and only in the past four weeks have any attempts been made to stock.

Opinion on the threatened strike is pretty well divided. One camp believes the mine workers are headed for sure defeat, and that public opinion is so adverse, that the strike is doomed to failure within ten days after the men walk out. On the other hand, some hold the belief that labor has been driven into a corner and that the President's new-defunct industrial conference has had the effect of solidifying labor and giving it a new lease of life.

Beneath both these undercurrents of opinion is the well-nigh unanimous sentiment that the government is not going to let the coal mines remain idle. Probably this wish is father to the thought, yet there is scarcely an operator who believes the government dare let the mine workers "get away" with such a flagrant breach of contract. Many look to see the war-time fuel restrictions under the Lever act revived.

One effect of the strike threat has been to deter iron and steel works from any concerted efforts to reopen. Believing that even if they did resume operations their fuel supply would be cut off shortly, most plants have been content to stay closed. The industrial paralysis is thus two-fold.

To the great credit of most of the operators here it must be said that they are making a conscientious attempt not to profiteer in the present emergency and give the mine workers basis for complaint. Prices undoubtedly are firmer, as they naturally would be, but except in instances that are the exception and not the rule, operators and dealers have not boosted prices. Domestic prices lately have shown a greater tendency to advance than have steam-coal prices.

Pocahontas—Though dealers are reassuring customers Pocahontas and anthrscite miners do not contemplate striking Nov. 1, demand for these grades has increased with that for domestic bituminous. Prices have not been increased this week, but within another week advances will be in order, dealers warn. Supply is about 35 per cent of requirements at present.

Lake Trade—Lake Erie docks are dumping from 1,800 to 2,100 cars a day, or about 750,000 tons a week, against 1,300,000 to 1,400,000 tons a week in normal times. The carriers are available, but the cargoes are not. Production at the mines is low, but in the last few weeks a larger percentage of the mines' output has been diverted to local consumers. Of the 17,681,223 tons dumped for the Lake trade in the season to Oct. 1, 13,994,057 tons were to American ports and 3,687,166 tons to the Canadian side. American Lake Superior ports took 7,761,286 tons and Canadian ports on that lake 1,283,495 tons. Lake Michigan ports took 5,419,006 tons to Oct. 1. An effectual strike will completely tie up the Lake trade, it is agreed on all sides.

Prices of coal per net ton in Cleveland are:

Antracite—Egg, $11.75 to $11.90; chestnut, $12.00 to $12.20; grate, $11.75 to $11.90; stove, $11.90 to $12.10.

Pocahontas—Forked, $10.00 to $10.50; lump, $9.00 to $9.50, Mine-run, $7.90 to $8.00.

Domestic bituminous——West Virginia splint, $8.50; No. 8 Pittsburgh, $6.60 to $6.90; Massillon lump, $8.25 to $8.50; Cannel lump, $10.50; Coshocton lump, $7.15.

Steam coal—No. 6 slack, $5.25 to $5.50; No. 8 slack, $5.10 to $5.50; Youghiogheny slack, $5.25 to $5.50; No 8 ¾-in., $5.70 to $6.00; No. 6 mine-run, $5.25 to $5.50; No. 8 mine-run, $5.75.

Columbus

A slight runaway market has developed in the past week, due to concern over the threatened suspension. Buyers of both domestic and steam sizes have flocked into the market, with the result that prices have advanced. Production is not large.

A strong market in every department of the industry in Ohio territory has developed as the time for the expected suspension approaches. Buyers of steam grades, which have shown little concern or fear previously, developed a desire to stock up in a hurry and flocked into the market. The result was that free coal was bid up to a higher point than has prevailed since the runaway market when the industry was taken over by the fuel administration. Steam users of every description placed orders for immediate shipment, and all available stocks were eagerly bought up. The result of the flurry was to advance prices of Hocking lump to $3.50 and $4 at the mines, and in some cases even higher. Hocking mine-run was quoted from $2.75 to $3, while screenings, which have been the weak point in the trade, advanced to $2.25 and $3. Reserve stocks are not large and strong effort is being made to cover at this late date.

The domestic trade also exhibited remarkable strength with prices advancing. Pocahontas is quite scarce, and the same is true of West Virginia splints. Retail stocks are only fair, and in some instances are lighter than usual for the time of the year. Dealers are selling rapidly to householders and all available teams and trucks are busy.

The Lake trade is rather active, as is noted by leadings at the Lower Lake ports during the week ending Oct. 25. The H. V. docks at Toledo loaded 114,875 tons as compared with 90,080 tons the previous week. The T. & O. C. docks also showed an increase in the movement. Lake shippers are trying to cover on their contracts before the suspension and are getting a large tonnage to the Northwest.

Production has been rather good under the circumstances. Some improvement in the car supply in the Hocking Valley field is reported and as a result the output is about 70 per cent. In eastern Ohio the car supply is reduced to about 60 per cent of requirements. Other fields are showing up with about 65 per cent production. The embargo against using open-top cars for the shipment of building supplies is expected to help the car situation. Prices delivered in Columbus are:

Hocking lump	$6.25
Hocking mine-run	5.50

Pomeroy lump	6.50
Pomeroy mine-run	5.65
Pocahontas lump	8.75
Pocahontas mine-run	7.50
Kentucky Wheeling Creek	7.50
West Virginia splints, lump	7.50

Cincinnati

The all-absorbing question the past week among the coal men of Cincinnati was the threatened strike of bituminous coal miners on Nov. 1. Inquiries during the week were mostly for coal for industrial purposes. The demand from industrial users was not great, owing to the fact that many of the plants have secured enough coal in the past few weeks to enable them to lay up a surplus. Ever since the talk of a miners' strike first appeared, the industrial consumers started to lay in their supply, with the result that today the greater portion have prepared to the best of their ability, availing themselves of every inch of storage capacity at their plants.

Coal men estimate that industrial plants, public utilities and domestic consumers in Cincinnati consume approximately 7,000 tons of coal daily during the winter months. It is also estimated that the city at the present time has a supply of about 250,000 tons. The coal men thus estimate that the strike will have to last longer than a month to cause suffering.

On account of the facilities offered by the Ohio River, there will be sufficient coal in barges along the river front in Cincinnati to take care of the needs here for that period. It is estimated that there are approximately 100,000 tons of coal already here or on barges en route to Cincinnati, enough to take care of the needs of industrial plants and domestic consumers for two weeks. It is estimated that about 70 per cent of the domestic users responded well to the warning last summer and stocked up for the winter.

Prices were well maintained during the past week. What coal is being received via the railroads is being fed out to consumers on contracts previously made and on which deliveries had to be delayed because of the delay in railroad transportation owing to the shortage of cars. Producers with headquarters here report that they are swamped with orders, the demand for West Virginia coal broadening to a great extent. The car supply, however, hold the mines to contract requirements. New River operators are being offered premiums for fuel. The Kentucky output is greatly curtailed because of car shortages. New River producers are being offered as high as $4.25 and $4.50 a ton for mine run smokeless, or about $1.50 in excess of contract prices, but comparatively few companies were able to take any additional business owing to export and domestic contracts which are taxing the capacity of New River mines in view of the inadequate car supply. Although shipments to eastern points have been resumed, there still is considerable smokeless being consigned to the west.

Operators attribute a drop in production of the northern Kentucky field of 15,000 tons as compared with the previous week entirely to car shortage, an increase of 8,000 tons in the car shortage loss being due to the failure of the L. & N. to furnish enough cars.

The steel strike has had little if any effect upon production, but has permitted a diversion of shipments to other industries in sore need of fuel. Little available tonnage remains uncontracted for and shippers are far behind on many of their orders because of a long-continued car shortage in previous months. The splendid supply of cars furnished by the C. & O. in previous weeks has dwindled slightly and the new allotment regulation has had serious effect on domestic mines in Kentucky, mainly because of the application of the double penalty for part loads left over, many mines being tempted to ship run of mine grades only.

Louisville

Threatened strike of miners demoralized market. Mines refusing quotations. Retailers and industrial consumers buying all the coal they can secure. Railroads confiscating coal according to report.

The market has gone wild during the week, and conditions have reached a stage where it is almost impossible to secure quotations. Many mines have contracted this season for about 40 per cent of their normal output, planning to sell the balance on the open market. However, with an uncertain car supply the volume available for open-market sales has been light. Numerous mines well sold up on open-market coal for next 30 days are refusing to quote any prices.

Retailers are short of coal, hardly a yard in the city having any block coal to speak of, and being short even on mine run, having delayed buying due to high prices and uncertainty concerning Federal control. Industrial consumers have become scared over the strike situation, and are stocking all the coal they can secure. It is reported that numerous industrial concerns have stocked three months' supply, and domestic consumers are fairly well stocked.

Reports in the coal trade on Tuesday, Oct. 21, were to the effect that the Illinois Central and Louisville & Nashville lines were commandeering coal shipments on their lines in order to lay up stock to carry them in event of a mine strike. These reports can not be verified, but dealers are worried over shipments that have not arrived.

Several large mine operators in eastern Kentucky are of the opinion that the strike will close a number of mines, and result in the balance being overloaded with business. In some sections miners appear fairly well satisfied with conditions, but in other sections they are ready to walk out on short notice. Western Kentucky is also uncertain.

Louisville retailers during the week announced a 25 cent a ton advance on western Kentucky lump and a 50 cent advance on eastern Kentucky block, making west Kentucky $6.25 delivered, and east Kentucky $7.50 delivered.

Quotations are uncertain as some mines are getting top prices, while others are selling surplus over contracts at a maximum price which they are not going over. However, reports are being received of some eastern Kentucky mine run selling at $3.50 per ton net and some block at $5.25@5.50. Reports are also being received of some western Kentucky block being offered at $5 a ton, with the operators indifferent about making sales. Actual facts of the case are that coal is so scarce that there isn't a market.

Leading quotations are — Eastern Kentucky Block, $4.25@$5.; Run of Mine, $3 @ $3.25; Nut and Slack, $2.60 @ $2.75.

Western Kentucky—Lump, $3.50@$3.75; Mine Run, $2.40@$2.75; Nut and Slack, $2.25@$2.35; Pea and Slack, $1.60 @$1.70.

Detroit

Though not general, some improvement is reported in demand for bituminous steam coal in Detroit.

Bituminous—Even the strike called for Nov. 1 by the bituminous mine workers has failed to create an appearance of active buying in the Detroit market. Jobbers say that a number of the consumers of steam coal have not cast off the indifference that has marked their attitude toward the market, though some of the dilatory ones are now becoming purchasers.

Jobbers say, however, there is a slight change for the better in the local buying demand, and that their customers outside Detroit are taking all the stock available. In this connection complaint is made of shortened mine production and a difficulty in obtaining a sufficient supply of cars for handling shipments.

Freight congestion is developing in the local market earlier than usual and the railroad administration has given warning that unless immediate improvement is effected in the matter of releasing cars held with freight of various descriptions, an order will be issued requiring any shipper having freight for Detroit to obtain a special permit before he will be able to obtain a car for loading. The transportation section of the Detroit Board of Commerce is striving to improve conditions.

Free coal on tracks is not plentiful in Detroit and jobbers say it is not a material factor in the trade. West Virginia lump is selling on a basis of $1.75 a net ton at the mines; egg size is offered at $4.50; mine run at $2.50, and slack at about $2.75. For Hocking domestic lump the price is around $4, for Hocking egg $3.50 to $3.70, for mine run $2.75 and for slack about $2.50.

Anthracite—Household demand for anthracite prepared sizes has been stimulated by the frosty weather and is not being satisfied as retailers have only small quantities of anthracite in stock. Their efforts to obtain additional supplies are not productive of satisfying results. Orders are not being filled promptly and shipments are slow in arriving.

Lake Trade—Shipments over the Lake routes are falling off. Lack of sufficient car supply is blamed for reducing shipments from some districts while reduced mine production is curtailing the movement from other points.

Chicago

The Chicago coal market is coming to resemble a mad scramble more than anything else. Dealers, factory owners and householders are clamoring for coal, and are using all means in their power to get distributors and operators to book orders for them. The householders, especially, are in a nervous state, and practically every yard in Chicago has been cleaned out of coal within the past three or four days. Luckily the weather has been mild, but it will only take a good cold spell to bring about a panic. There are some rumors that coal, and other necessities will be placed under Federal supervision, so that no profiteering will be possible. If things continue the way they have been for the past few days, this measure on the part of the Government will be wise.

Prices are not much different in Chicago than they are at other points in the Middle West. Larger companies, producing a better grade of coal, are holding prices down, while small companies, producing poor coal, are selling their outputs for higher prices, paradoxical as it may seem. Quality and preparation once more are forgotten, the main thing being just coal. Splint is selling in Chicago from $5 per ton f. o. b. mines up. Pocahontas prepared sizes are selling at even higher figures. Some poor-grade Illinois and Indiana lump is bringing as high as $4, while Franklin County, the peer of practically all Western coal, is still selling at $3.25.

St. Louis

A runaway market brought to a halt. A critical situation in the St. Louis territory if strike takes place. Railroads confiscating coal. Very little steam tonnage stirred and practically no domestic. Country districts seriously affected.

The local situation is unsatisfactory on account of there being no steam coal stored and but little domestic. Possibly 30,000 to 40,000 tons of coal are stored in St. Louis by the dealers for both steam and domestic contracts. The railroads have not more than from a week to ten days' supply of coal ahead and the Wabash and Missouri Pacific are confiscating.

There is no Eastern coal coming in of any kind. There is a good supply of gashouse and by-product coke on hand, but no cars to load it in.

The Mt. Olive district is short of equipment, but is getting out a record-breaking tonnage. These operators in the St. Louis market are selling their coal at the regular circular, which is about $2.65 to the St. Louis trade and not over $3 to the country trade. It is the only field in Illinois where coal is being sold below what the trade is willing to pay for it.

COAL AGE

Volume 16 New York, November 6, 1919 Number 19

Cures that Kill

BY R. DAWSON HALL

IT is unfortunate that many of the proposed remedies for the situation in the coal mines are temporary palliatives rather than cures. Even the best of them may harm rather than help many of the mine workers. We strive, for instance, to reduce the seasonal quality of the industry by one of the many remedies suggested —differentials in freight rates, increases in foreign trade, differentials in price or six-hour days and five-day weeks.

Suppose, which is questionable, that any or all of these will solve the seasonal difficulty and that we are willing to pay the price that such remedies involve, imagine then that coal flows as a steady stream from the mines under some self-regulating, self-feeding device. Then there will be no coal shortage in the winter, and the price will always be so low as to keep the poorer and thinner coal out of the market. The men who now mine this coal will be out of work, winter as well as summer. Thus the men who have turned the country upside down with their copious, and quite natural lamentations will be in worse condition than ever. Their griefs will not be seasonal but perpetual. They will be squeezed *out* of the industry as they are now squeezed *in* it.

Price regulation is still urged. When it is put in operation there will either be a uniform price throughout the country or a locality price based on cost plus. A uniform price would close the mines of a large area of the country.

A plus-cost arrangement, based on the general costs of the locality, such as was in force during the war, is a more feasible plan and the one more likely to be adopted. Such a plan in times when coal is not greatly in demand will close down all the mines producing coal at a high cost for there will be no demand for such expensive coal. As conditions now are, as soon as a shortage begins to be foreshadowed there is a rush for the better grades of coal. The prices of such grades go up, and the less fortunate coal fields get a little business at a figure, it is true, that barely pays.

With regulated prices this increase in the better coals would not take place and not until there was a coal famine would the high-cost mines have any work at all to do. Regulation of price will tend to starve out the high-cost mines and incidentaly will tend to aid in making the coal business more seasonal than ever, for who will buy early when there is no bait in the direction of a varying price.

Price regulation with a differential has been advocated, and, indeed, it has more arguments in its favor than price regulation without such a differential. But any kind of regulation is socialistic in that it removes the reward for economical production. Any cost-plus scheme causes the producer to be indifferent as to his costs or anxious to increase them, for in case of percentage compensation, with increased cost comes increased rewards. That these rewards have this effect was well shown by the action of some manufacturers who during the war had government contracts.

The operators would rarely be guilty doubtless, even in peace, of such policies as then occurred, and making a district price would in a degree prevent any such complete indifference to cost but in a minor degree the condition would exist. We all look for a reward for our activities. Without it we are apt to be lethargic. We seek for a recompense for our improvements. If it is not given, we are afraid to expend our money for fear of loss.

Hence price regulation with a differential will only cure the seasonal difficulty. It will not help the workers in the high-cost mines to get steady work. It will only subject them to worse conditions.

It is a strange situation. Those who are leading the fight against seasonal stagnation and price regulation will be quite likely to face an all-year stagnation instead of the steady work they are seeking.

Some Thoughts on Filing Systems

Exact information concerning the whereabouts of maps, drawings and other data is a necessity in the engineering department of all mines. Many filing systems for this material have been employed with more or less success. The system employed at the Bureau of Mines Station in Pittsburgh appears to meet all requirements and is accordingly here described in some detail.

By Donald J. Baker
Pittsburgh Penna.

If there is one department of a large coal company that has need of a precise, exact and well regulated filing system, it is the department of engineering. The filing of maps, tracings, blue prints, notes and correspondence, presents a problem that must be solved in an efficient manner or much of the accuracy of the field work and the skill of the designer or draftsman will go for naught, through the desired article being unavailable at a moment's notice.

THE DRAFTING ROOM OF THE U. S. BUREAU OF MINES AT PITTSBURGH, PENN.

Under present-day practice of using the telegraph as the medium for quickly obtaining information, only an approved filing system can go hand in hand with the afore-mentioned means of communication, since otherwise much of the effectiveness of the telegram is lost. While many of the engineering problems that confront any coal company are akin to those encountered by other firms, yet, in determining the kind of a filing system to be installed, much must be left to the originality and initiative of the man in charge. Certain fundamentals that must serve as the basis for any system, should of course form the foundation for all similar schemes, until such a time as these fundamentals have been replaced by others more practical.

There is a wide divergence of opinion as to just what constitutes a good system. Some companies have progressed farther than others in the development of filing schemes, and in so doing have increased the efficiency of their engineering departments. No matter how highly the system adopted has been developed, there is always room for improvement, for any filing plan even at best is laborious and a great killer of time.

It was not many years ago that drawings of all kinds were rolled up and placed in box-like compartments or pigeon holes. A small tag attached to a corner of the drawing by a string, was allowed to hang out from the compartment. This method has gradually been replaced by the more practical scheme of giving the drawing a series number and filing it flat in a drawer or specially constructed cabinet. There are numerous types of cabinets on the market that have been designed for this very purpose, the use of which reflects a progressive and up-to-date spirit. In particular, is the flat filing of tracings to be recommended, lest in the making of blue-prints, lines are brought out that may prove deceiving and the print thus lose much of its value. It may be said therefore that the approved method of filing drawings, is that in which each bears a serial number on the title and is filed flat. It is impossible to follow this scheme when it comes to large permanent location maps; however, it should apply as far as feasible.

PHOTOGRAPHIC LABORATORY AT THE U. S. BUREAU OF MINES

A rather common system that is used by many large coal companies, is to divide their operations into districts or divisions. In devising a serial number for use in the title space of a drawing, one of the letters of the alphabet is usually taken to denote a district. After the district letter in the series number should come a figure representing a particular mine. Following the mine number, a letter is used to designate a particular type of construction work or some unit of the plant itself. The use of T for tipple, S for sub-station, etc., is advocated by some departmental heads. An example of this type of series number would be F-14-B, where B refers to the boiler house of Mine No. 14 in F district.

NUMBER OF CABINETS EMPLOYED

The number of filing cabinets used depends upon the extent of the companies' operations. A whole cabinet may be taken up by one mine or even by one unit of the mine, though in the latter contingency this seldom occurs. Then again, the cabinet may serve to hold all of the drawings relating to an entire division. A cabinet such as the one manufactured by the Yawman & Erbe Co. of Rochester, N. Y., is an example of the flat filing type.

In filing the drawings vertically within the cabinet, they should be placed upside down with face to the rear. The title bearing the series number should then be in position at the upper right hand side of the cabinet. Whenever a drawing is placed in the cabinet, some care should be exercised to keep the titles in as near perfect alignment with each other as possible.

A 4 by 6 in. index card is an appropriate size for listing the various types of drawings. The index cards for this system are filed alphabetically with respect to the name of the mine, plant unit, type of construction involved in the drawing, etc. On the index card is found the title of the drawing, whether it be tracing, blue-print or original, the name of the draftsman or designer, and any other information that might be applicable. Care exercised in cross-indexing the cards from the standpoint of appropriate titles, naturally increases the value of the entire system. Large permanent maps and tracings that are too large to permit of vertical filing, are given the customary arrangement in pigeon holes and are provided with extended tags. Another variation of the scheme of series number is the use of A and B, etc., in the series to designate the scale, that is, whether the map is, say, 100 or 200 ft. to the inch.

In quite a few large offices, all drawings are still rolled up and filed in pigeon holes. In this case the drawing bears the same series number as the compartment in which it is filed. The index cards are made out in the same manner as previously mentioned. This system is easy to follow for anyone who is familiar with it. Its chief drawback is the unnecessary wrinkling of tracings. This is not conducive to long life. Furthermore the series numbers do not represent anything definite or tangible but merely show the compartment in which the drawing may be found.

SYSTEM USED BY THE BUREAU OF MINES

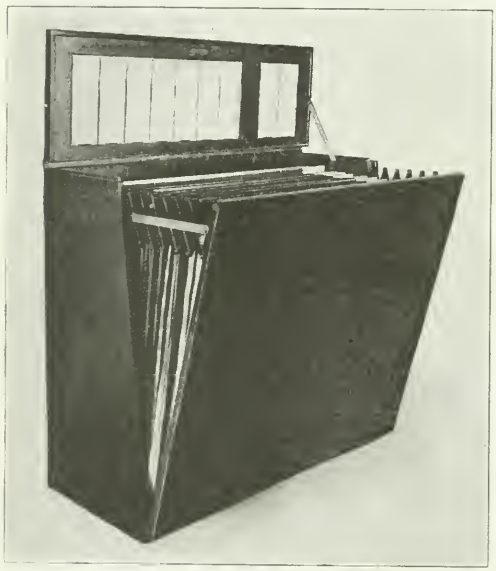
An example of one of the best filing systems in use today may be found in the Pittsburgh Station of the U. S. Bureau of Mines. Many of the requests for information, drawings and photographs that come to this institution are highly indefinite. Any filing system that can stand up under the various tests that are put to it at the bureau is well worthy of consideration. R. A. Wood, chief of the photographic and drafting department, at the Pittsburgh Station, employs an excellent system and is meeting the innumerable requests for information with a dispatch and in a manner well known to the mining public.

The filing system in use in Mr. Wood's department is a modification of the "Dewey Decimal" system, which is in force at practically all libraries. As applied to the bureau, it covers everything, that is, it includes the filing of tracings, blue-

prints, maps, notes, photographs, negatives, lantern-slides, computations, charts, correspondence, etc. There is nothing in fact that cannot be accurately filed for quick reference under this system

While the scheme as followed by the bureau could be applied to any engineering department, yet it is too broad and covers more territory than would be desired by the ordinary engineering department. However, modifications of it would perhaps form a background for the best system of its kind that has been devised to date. It might be interesting to note some of the high lights in this system and how it could be modified to suit the needs of a mine engineering department.

In the lower right hand corner of each drawing is found the title. This bears a serial number, the first letter of which refers to the size of the drawing. Of these sizes there are five, as follows: A—10½ by 16 in., B—16 by 21 in., C—21 by 32 in., D—32 by 42 in., E—8 by 10½ in. The next figures in the serial number refer to the chronological order in which the drawing was made. For instance, a drawing with a serial number of C—223, indicates that the drawing is 21 by 32 in.



TYPE OF STEEL FILING CABINET USED

in size and was the 223rd drawing made at the bureau. The same scheme of numbers is applied to all maps and tracings.

All drawings of the above mentioned sizes are filed vertically in steel cabinets built by the Art Metal Fixtures Co., each of which has a capacity of 1,500. Blue-prints, maps and tracings are of course filed in separate steel cabinets, all of which are contained in a vault. As each drawing is completed in the drafting room, it is filed according to its size and the order in which it was completed as shown by the series number.

A photostat print is made of each drawing upon completion. These prints are made on letter size paper, and given to a file clerk along with a card containing complete information about the drawing. The clerk fills out a 4 by 6 in. index card—the standard size used at the bureau—filing it in accordance with the decimal number under whose head it comes. Something further will be said later regarding the decimal number. Each photostat negative that is considered sufficiently valuable to warrant retention is also filed.

The prints are filed in a leather and corduroy bound book where they are classified by number, negative number and title. In referring to any drawing from the index card, the photostat print is usually looked up first. Often in consulting a drawing, the print answers all of the purposes that the drawing itself could offer, and considerable time is saved to say nothing of the avoidance of wear and tear on the drawing. However, the real purpose of making photostat prints is not that they may serve as any particular unit of the filing system, but rather that they may be included with reports that are submitted by bureau men in the field.

The method of handling the index cards is the same for all articles that are filed. The strict alphabetical listing of titles is not followed, this being entirely too cumbersome and necessitating the use of too many cards. The card index is kept separate for drawings, data and photographs. However, the right hand corner of the card contains the serial numbers of any other articles that may be related to the subject listed on the card. The following major divisions are followed as represented by the corresponding numbers:

00—All data and material pertaining to the administration of the Bureau of Mines or of general use in its work.
0— Information of such a character that it may, with equal accuracy, be placed under the heading of any of the minerals that follow.
10—Coal, including lignite and peat.
11—Production.
12—Manufacture
13—Utilization.
20—Oil, natural gas and liquid fuels.
30—Iron.
40—Copper.
50—Lead.
60—Zinc.
70—Silver.
80—Gold.
90—Rare metals.
100—Stone, clay, cement, etc.
110—Miscellaneous minerals.

The subdivisions as shown by second figures 11, 12 and 13 are applied to each mineral. Thus the production of oil would be found under 21 and so on. Everything is then filed under the head of the mineral to which it pertains.

A SUGGESTED VARIATION

A variation of the above major divisions might be easily applied to any engineering department. Some such scheme as the following might be installed to advantage:

00—All matter and data pertaining to the administration of the engineering department.
0 —Information of such a character that it may, with equal accuracy, be placed under the heading of any of the mines that follow.
10 —Any individual mine.
11—Tipple.
12—Sub-station.
13—Fan-house.
14—Boiler-house.
15—Machine-shop.
16—Etc.
17—Etc., etc.
20—Any other individual mine.
30—Any still other individual mine, etc.

The divisions from 10 to 20 are of course appropriate for any of the other mines.

The actual working out of the system as applied with the index cards can best be shown in the following series of cards, relating to the filing of an individual photograph. (The same system would apply to the indexing of cards for any drawing, or other data that it was desired to keep on file.)

Fig. 1 shows the index card filed according to serial number. The name of the company is the title of the card. In parenthesis, a suggestion is made in a few words as to what the subject proper of the print is. The title of the print is shown in the central portion of the card, with the date on which the picture was made shown in the lower left hand corner. To the right of this is the photographer's name. The number of the

11.025 (11.032) Negative No. 9157
Order No. 3845

Northwestern Improvement Co. (Log Stopping)
Number 4 Mine
Red Lodge, Mont.

Flashlight of Log stopping used in Red Lodge Mines

8-22-17 C. A. Allen

FIG. 1. CARD FILED BY SERIAL NUMBER

negative from which the print was made is placed in the upper right hand corner along with the order number used by the photographer. The figure 11 in the upper left-hand corner indicates that the print comes under the head of production in the major division of coal. The decimal portion of the figure indicates under what head of protection the print is classed. The card is filed alphabetically with respect to the name of the company at its head.

Fig. 2 shows the card with the same subject, but filed under the head of ventilation in the sub-division of Production. The name of the mine is used as the title of the card.

Fig. 3 represents the same print as filed under a geographic heading of the index cards, in this case the name of the town is the title of the card. This card is filed alphabetically along with all others containing the same decimal number, 11.025.

Fig. 4 represents the card as filed under the heading of underground equipment with respect to a particular classification under production.

In all four examples as illustrated above, the card titles are taken for alphabetical filing. If any tracing or drawing had

11.025 Negative No. 9157

NUMBER 4 MINE
Northwestern Improvement Co.
Red Lodge, Mont.

Flashlight of log stopping used in Red Lodge Mines.

8-22-17 C. A. Allen

FIG. 2. CARD FILED UNDER PRODUCTION

been made in connection with this photograph, the drawing number would be included on all four cards as well as the photostat number, and would be placed in the upper right hand corner with the negative number. On the lower portion of the card along with the photographer's name would be included the name of the draftsman or designer.

In addition to the cards that are prepared as shown above, cards are indexed so that the serial number of drawings, tracings and photostats can be ascertained, provided the geographical location is known. These cards are filed according to states and also alphabetically within each state, according to towns

Charts and papers containing test data are filed in the same manner as drawings and photographs. Lantern slides are

11.025 Negative No. 9157

RED LODGE, MONT.
Northwestern Improvement Co.
Number 4 Mine

Flashlight of log stopping used in Red Lodge Mines.

8-22-17 C. A. Allen

FIG. 3. INDEX CARD AS FILED GEOGRAPHICALLY

filed in a special metal case made by the Multiplex Fixtures Co., each having a capacity of 1,500 slides.

Drawers containing the index cards are stored in special steel safes. Over each drawer is pasted a label showing the variation of the numbers it contains. On one side of the safe is pasted a sheet with an index to the subjects covered by the decimal numbers found therein. Several copies of a loose-leaf book in which are shown the subjects covered by the serial numbers of the index cards are placed within easy reach of the workers in Mr. Wood's department. This book is kept up to date at all times.

It is questionable whether the making of photostat prints of all drawings could be advised for the average mine engineering department. Most companies do not require a map with any report that is made. The original expenditure for photostat apparatus would be practically the final one, however, as the making of prints could easily be done in conjunction with the making of blue-prints.

Another point to be considered in connection with the adoption of any system, is the waste of time that results from the

11.032 Negative No. 9157

NUMBER 4 MINE
Northwestern Improvement Co.
Red Lodge, Mont.

Flashlight of log stopping used in Red Lodge Mines.

8-22-17 C. A. Allen

FIG. 4. CARD AS FILED UNDER UNDERGROUND EQUIPMENT

removal of a drawing from the files without a note having been left in its place stating the location of the drawing at the time of removal. This is a matter that frequently results in much confusion, which could be obviated by the clipping of a short note to the adjacent drawing in a vertical filing cabinet. In the pigeon-hole arrangement, there is even less excuse, for the

note can be directly placed in the compartment left vacant by the drawing

Notes, survey data, etc., should be filed in loose leaf books, on special forms in the case of the data. The forms as they are filled out should be given a series number to show the order in which the computations were made with respect to other pages, and filed accordingly. On the outside of the book, appropriate labels should be pasted to show the extent of the numbers in the book. Each sheet within the book would then be indexed by the cards in the card cabinet. This manner of filing notices is practically the same as that for drawings, as used at the bureau.

The beauty of the Dewey Decimal system is the ease with which it can be adapted to filing anything filable. Correspondence can be filed by the same system. In fact, it is an excellent practice to file the correspondence of the engineering department by this method. The common practice of asking a correspondent to refer to a certain file number would automatically tie in all of the drawings, photographs and other data by the same number. This eliminates the necessity of searching through other files for information pertaining to the subject of the letter.

The installation of the decimal system involves a little more time than that required for other similar schemes and will

VIEW OF THE COMPUTING ROOM AT THE PITTSBURGH STATION OF THE BUREAU OF MINES

perhaps take part time of someone to keep it up, but the results are so far superior that it is well worth both the initial effort and the time involved later in keeping the system up. A man to operate the blue-print machine is a necessity. However, it is a rare occurrence that he is kept so busy that he could not find time to keep up the index cards of such a system. Mr. Wood, of the Bureau of Mines, estimates that half of one stenographer's time is employed in the writing of index cards. When the volume and variety of the articles covered are considered, the amount of time thus spent is comparatively small. Thus the amount of labor involved is not a serious problem. As most large coal companies employ file-clerks, it is quite possible that the handling of the engineering files could be accomplished as a side line entirely.

Another feature of this system is that the longer it is used, the greater becomes the ease with which an article may be filed. Each number in the serial stands for something concrete and the mention of any particular sequence of figures will bring to mind a particular subject. This is a big advantage over any system where the serial number merely represents a particular compartment that contains a drawing.

Velocity of Combustion

When other factors remain constant the velocity of combustion and the time of contact necessary for the completion of the reaction are closely related. The time of contact may be considered to be the length of time during which the combustible and the air supplied over fuel bed remain in the furnace. If the velocity is slow a long time of contact is required for complete combustion and a large combustion space must be provided in order that the gases may be burned before they pass out of the furnace and are cooled. The rate of burning the coal and the size of combustion space determine the length of time the gases remain in the furnace. As the size of combustion space with a given furnace setting is constant the time the gases remain in the furnace is proportional to the rate of combustion. With high rates of combustion a larger volume of gases is produced and a larger volume of air must be supplied to burn it than with low rates of combustion. The larger volume of the mixture passes through the combustion space more rapidly; therefore the length of time the mixture stays in the furnace or the time of contact is shorter. The combustion space should be large enough so that the gases and the oxygen in the air supplied remain in contact long enough to burn the gases completely when the furnace is operated at its maximum capacity.—*Bureau of Mines Bulletin No. 135.*

The Federal Trade Commission reports that the railroads of the United States in normal times take 25 per cent. of the coal produced each year; this means that they have been using 125 to 135 million tons of coal per year. It has been estimated that during 1916 and 1917 the demand for railroad fuel increased about 30 per cent. due chiefly to the extra mileage, to the wastefulness of the large number of old locomotives forced into service and to an increased demand for fuel needed for new locomotives. Thirty per cent. more per year called for at least 175 million tons of coal. The bulk of this increase was in bituminous coal, but in many cases anthracite was substituted.

The supply of fuel for the production of cement has been curtailed 25 per cent. by order of the Fuel Administration. If governmental requirements necessitate the manufacture of cement in excess of the 75 per cent. allotment, then provision is made whereby the manufacturers may produce it.

AN INDICATION of the tendency of present-day practice to conserve resources and enmesh development is the custom of burning bituminous fuel on many locomotives operating in the anthracite coal regions of Pennsylvania. The transportation problem is a serious matter. At least one-quarter of all the coal mined is used by the railroads to move freight in normal times. A movement to establish big steam-electric power plants at the coal mines has been agitated for years, and now it is receiving a new impetus. Similar plants are proposed at tidewater, and also connecting lines for transmission of electric current for the extensive electrification of railroads and the supplying of many industries with power.

The horsepower of a boiler may be taken in two ways. Either as a unit expressing the rate of work done in a certain time; or when it is the measure of the size and rating of the boiler.

Effective Means of Using Rescue Apparatus in the Fighting of Mine Fires*

By J. T. Ryan
Pittsburgh, Penna.

SYNOPSIS:—It is estimated that 90 per cent of the apparatus in use today, is for the purpose of controlling mine fires. The most effective means of using apparatus as well as the oranization and equipment of rescue crews for fighting fires, are described in Mr. Ryan's paper.

SELF-CONTAINED oxygen breathing apparatus, most commonly termed rescue apparatus or helmets, was originally designed, developed and advertised as an equipment for use in rescue work following mine explosions. It was the possibility of saving life that brought about the development of the various types of equipment, because it was a popular idea to which the public was receptive, and it possessed great advertising possibilities. This feature was overdone to some extent, particularly in the early days of the introduction of breathing apparatus on this continent, for the reason that the apparatus was advertised as a panacea for all evils. The general public was under the impression that in the event of a mine explosion all that was necessary was to get a few men equipped with breathing apparatus on the job, who could immediately go underground, regardless of the condition of the mine, and explore every part, revive the injured miners with special apparatus which they were supposed to carry with them and bring them to the surface in good condition.

When it was discovered that these things could not be accomplished with the breathing apparatus a reaction set in, during which time the use and utility of self-contained breathing apparatus became the subject of research and study by scientists and men in the mining industry under the direction or guidance of the United States Bureau of Mines.

Among the many possibilities in connection with the use of mine rescue apparatus came the application of this apparatus to the efficient fighting of mine fires, so that at the present time 90 per cent. of the use of self-contained breathing apparatus around the mines is for the purpose of controlling mine fires, sealing them off or isolating them, and exploring fire areas that have been sealed in order to determine whether or not the fire is extinguished and whether it is safe to break the seals and ventilate the fire area. The apparatus is used to great advantage in exploration work following explosions, by having a crew equipped with the apparatus explore in advance of the crew, restoring ventilation to discover any incipient fires that may have been caused by the explosion and to extinguish and isolate them before ventilation is established in that section, thus preventing a second explosion.

It is gratifying to note that during the past five years there has been a great reduction in mine explosions in this country, due to the safety measures employed, such as the general use of electric safety cap lamps, permissible explosives, rock dusting, humidifying the air, watering the dust, and more rigid inspection for gas and other dangers.

Mine Fires Not Confined to Coal Mines

Unfortunately, however, there is no apparent reduction in the number of mine fires, and while explosions occur mostly in coal mines, mine fires are common to all classes of mines, so that the subject of fighting mine fires should be of interest to every man connected with the mining industry. I would like to emphasize the fact that a fire hazard exists in every mine, and therefore careful study and attention should be given this subject by mining men with a view of anticipating and eliminating some of the more common causes of mine fires.

The Old Method of Fighting Mine Fires

Since mine fires have always occurred in the industry, they had to be combated in some manner long before breathing apparatus was heard of. The common method employed was, of course, to get to the seat of the fire before it had attained much headway and extinguish it by use of water or chemicals, or by loading out the burning material. If the fire had attained such headway that it was impossible to do this, then it had to be sealed off or flooded. This work was done by men without any protection and required great courage, energy and judgment, and in districts where mine fires were prevalent it developed a class of men who are usually called upon in case of fires to take charge of the work. There was also developed a few of the type commonly known as "fire-eaters," men who possessed great moral and physical courage, but who were lacking in judgment, and some of whom believed that they were immune to the effects of gases produced by the fire and that they could walk right into the seat of a blaze and literally eat it up. Very often these men led crews, consisting mainly of men having knowledge of the mine, into the fire zone and the whole party would be overcome or be affected by carbon monoxide gas to such an extent that they would not be available for further service for some time, which of course would retard the work, due to the fact that the men having knowledge of the mine and who should have been directing the work were out of commission.

Modern Method of Fighting Mine Fires

The same general method of fighting mine fires is employed today as formerly, with the exception that rescue apparatus is now very generally utilized in connection with the work. Unfortunately, it is seldom on hand or readily available at the mine where the fire occurs, and this is the time when it can be used to the greatest advantage, because frequently the fire is discovered in time to permit men without protection to get close enough to the fire, but they are unable to do effective work or stay long enough to extinguish the fire. Hence they are unable to seal it off near the origin on account of the smoke and gases, and they either have to drop back a considerable distance with their seals or await the arrival of men equipped with breathing apparatus.

Effective Means of Using Breathing Apparatus

No work can be done successfully without proper organization. This certainly applies to the use of mine-rescue apparatus in connection with fighting mine fires. An organization in this case is twofold: First: the proper organization of the rescue crew, and second, the organization of the work. Unless your rescue work is organized to the extent that the apparatus is rigidly inspected and tested at least once a month (preferably once a week), and men properly trained and certified by some competent authority, and training periods continued at regular intervals, then you do not maintain a real rescue equipment. You are only laboring under a false sense of security, and certainly if you see the need of such an equipment to the extent that you have gone to the expense of installing it, you should see that the work is properly carried out so far as keeping the equipment in condition

*Paper read before the Mining Section of the National Safety Council, Cleveland Meeting, Oct. 3.

and your men properly instructed and trained. This requires only a small additional expense and assures you of a full degree of efficiency when an emergency arises which calls for the immediate use of your equipment. When the emergency arises, it is then too late to order material, to put your apparatus in proper working condition, or to train your men, and it is unwise as well as dangerous to send a rescue crew not properly trained into a mine to fight a mine fire, or with apparatus not in good condition or properly inspected.

All Concerned Should Know the Apparatus

The second phase of organization in connection with the use of rescue apparatus in fighting mine fires is the general organization of the work of which the rescue squad is an integral part. Some recognized authority must be in charge of the entire operation. The one invested with this authority should be a man of courage, possessing good judgment, a cool head, having had previous experience in fighting mine fires, and training in breathing apparatus. Regardless of how much experience a man may have had in fighting mine fires, if he has not taken the trouble to acquaint himself with breathing apparatus so as to realize its advantages and limitations in connection with fighting mine fires, he lacks progressiveness and is not competent to conduct this work efficiently, providing rescue apparatus is to be used in the operations. Fortunately, most up-to-date mining men have this knowledge today and are competent to direct this work. When the rescue squad knows that the man who is directing the work is familiar with their phase of the work and will not ask them to go where he himself would not go if he were wearing the apparatus, then the work will be carried out with dispatch.

Value of a Well Organized Crew

The rescue squad should be composed of men familiar with the mine. Therefore, every mine should have at least ten of its men trained in the use of self-contained breathing apparatus. If the mine where the fire occurs is equipped with breathing apparatus and a properly organized rescue crew in charge of a competent man familiar with the mine, they can get on the job in a short time, depending upon their own emergency organization, and in most cases can control the fire before it reaches serious proportions.

Procedure at a Mine Not Equipped with Rescue Apparatus

If a mine is not equipped with breathing apparatus and the fire gets beyond the control of the local officials, a rescue crew is called from the outside. The first thing they should do upon arriving at the mine is to test out their aparatus and see that it is properly charged and in good working order. The captain should supervise this work.

While the crew is engaged in this work the man in charge should confer with the officials in charge of the mine and familiarize himself with the workings by consulting the mine map or model and ascertain the probable location of the fire and what has been accomplished previous to his arrival.

If men are in the mine and it is not definitely known that they are dead, the first thing to do is to endeavor to reach them. This may necessitate controlling the fire temporarily or changing the ventilation to permit the apparatus crews to penetrate the workings to the points where the men are most likely to be. This work usually requires the use of apparatus and should be done without delay.

If men are known to be in the mine never assume that they are dead. If it is definitely known that no live men are in the mine the problem resolves itself into controlling the fire and protecting the men who are doing this work.

Procedure of the Rescue Crew

Before sending a rescue crew underground clear instructions should be given the captain as to where and approximately how far they should go and what they should attempt to do. Unless the captain is thoroughly familiar with the mine the route should be marked on a blueprint which the captain should take with him. Even though the crew is familiar with the mine a blueprint should be taken along.

As soon as possible a fresh air base should be established as near to the irrespirable zone or zones as safety permits, and preferably near a telephone. Temporary telephone communications should be established with the outside as soon as possible. Whenever a rescue crew works beyond this base there should be stationed there a fully equipped reserve crew ready for immediate service, one or two light or short period apparatus or carbon monoxide gas masks, stretchers, canaries, blankets and first-aid material. As soon as possible the necessary tools and material for erecting temporary brattices should be advanced to this point.

If the first crew is able to complete its exploration to the limit of safety without reaching the fire zone, they should return and report conditions; and then steps should be taken to move the fresh air base nearer to the fire area. This work usually requires some use of the apparatus crews. The same procedure is then continued until the fire area can be reached by the apparatus crews. However, in coal mine fires this procedure must be conducted with great caution, particularly in gaseous mines. The return air should be tested at frequent intervals by a Burrell gas indicator (a safety lamp is not sensitive enough), and when the methane (CH_4) content increases to a certain point previously decided upon as the allowable limit, further advance should be discontinued in that direction and seals constructed, or some other plan of attack outlined. If the rescue crews are able to establish a fresh air base near the fire area, they can then proceed to extinguish the fire by the best method conditions will permit or seal it off in the smallest possible area consistent with safety.

Equipment of Mine Rescue Crews

A rescue crew should consist of five properly trained men in good physical condition equipped with rescue apparatus capable of providing the wearer with breathable air for a minimum of two hours of maximum exertion. Each man should be equipped with an approved electric cap lamp or flashlight, preferably the former, as it is carried on the head.

The captain, who should be in the lead, should carry a canary or carbon monoxide detector, or both, and a pick-handle for testing roof or feeling the way in smoke. The second man should carry a flame safety lamp to detect explosive gas or oxygen deficiency. The third and fourth man should carry a stretcher and half-hour apparatus or carbon monoxide mask. The fifth and rear man should have a supply of white chalk and should, where the atmosphere is clear, indicate the route by means of arrow marks pointing outby.

If the crew is going to enter a smoke atmosphere a life line should by all means be carried in and each member should take hold of it, at even intervals of 6 ft. wherever practicable. A competent man should be in charge of the reel at the fresh air base. The life line serves as a means of preventing members of the crew from becoming separated, as a marker for the return journey, and provides a means of signaling to the fresh air base.

The geophone, a listening device developed during the war for detecting and locating underground mining, has great possibilities in connection with locating fires or entombed men, and should now be a part of a rescue crew equipment as the device is light and compact. This device, along with the carbon monoxide detector and carbon monoxide gas mask, is a war development which has possibilities in connection with the fighting of underground fires.

Effective Use of Rescue Apparatus

In 1915 a serious fire in a coal mine in Utah operating in a 20-ft. seam was extinguished solely through the use of rescue apparatus, 24 sets of which were used continuously for a period of 41 days. This fire threatened to destroy property worth millions of dollars, as it was impossible to seal the fire.

A large coal mine in West Virginia operating over an ex-

tensive property suffered a severe explosion in 1916. As the result of two subsequent explosions caused by fire resulting from the first explosion the mine had to be sealed at the top of the shafts. One or two unsuccessful attempts were made to reopen the mine, and it was finally opened and recovered through the use of rescue apparatus, 18 sets being used continuously by day and night crews for a period of seven months in completing this operation.

A few months ago a slope mine in Western Pennsylvania had a fire near the mouth of the mine, six men being in the mine at the time, four of them being about two miles from the mouth. All six men were recovered alive through the use of rescue apparatus. It was necessary to attach the rescue apparatus on four of these men as they were recovered and revived in fresh air but had to be brought through a 4,000-ft. zone of irrespirable atmosphere to get them to the outside.

Metal mine fires and coal mine fires each present their own peculiar problems. The metal mine fires are as a rule more difficult to reach, harder to control, and generate more carbon dioxide and sulphur dioxide gases. Coal mine fires are more dangerous to handle on account of the ever present danger of an explosion.

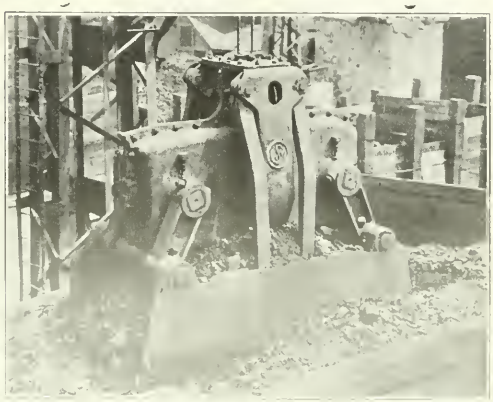
In either case fighting them is a hazardous job. Yes, the most hazardous work incident to mining, and the men who put on breathing apparatus and enter an irrespirable atmosphere to extinguish fires when no lives are at stake are the finest examples of the strong courageous men that the mining industry has developed.

Wellman Geared Bucket

Throughout the entire field of handling bulk materials, such as coal, sand, gravel and ashes, the use of clam-shell buckets has been attended by serious and serious delays necessitated by the removal of hanging cables or coins

The operating segments. These segments are keyed to the operating shafts, which are supported in bearings cast in the casing. The outer end of the operating shafts are finished square and support the rear bucket arms, which in turn are connected to the shell shafts. The cutting edges of the shells are pin-connected to the side bars, suspended from lugs cast in the top part of the casing. This method of supporting the shells produces a flat cutting path and turns the shells in such a manner that, in penetrating the material, only the thin edge of the shell is presented, resulting in a high digging efficiency.

The wide opening of the shells enables the bucket to fill in material which would otherwise be too shallow. The shells are open at the back to prevent compression of the material when the bucket is closing.



VIEW OF BUCKET SHOWING CASING

Failure to act promptly after an explosion or mine fire has often resulted in the needless loss of many lives, especially in the case of fires that at first did not seem to be dangerous. Also, after an explosion unnecessary delay in exploring the near-by entrances to the mine has resulted in the death of miners.—Rescue and Recovery Operations in Mines.

Storage-Battery Locomotives in Mine Work

Early storage-battery mine locomotives offered to the coal industry were not properly proportioned to withstand the severe usage to which all such machines are subjected. These difficulties have been overcome, and machines of rugged construction and ample capacity are now obtainable. If one of these locomotives is cared for as carefully as are mules, they will give long and efficient service

By Joseph Appleton
Ironton, Ohio

RESULTS obtained with storage-battery locomotives in coal-mine service during the last two or three years have been so uniformly successful where properly applied that today the storage-battery locomotive is probably receiving more prospective attention and consideration than any other piece of machinery connected with coal-mine operation.

This being the case, I will relate briefly the past history and present status of the storage-battery locomotive, showing why the early installations were not so successful as they might have been, what developments have been made, and why during the last two or three years they have been so extensively used and with such uniformly satisfactory results where the proper methods of purchase and installation have been followed. It will also be well to look into the future to discover what lies in store for the coal-mining operators through the use of this type of machine.

Unfortunately, it must be admitted that there were many failures in the early days. This can be attributed to the fact that the locomotives in question were not constructed along practical lines and were not at all suited for the conditions under which they had to work. At that time (and even today in some cases) the machines have been too much the product of draftsmen and designing engineers who did not have a sound basis for their plans or practical experience in or knowledge of the coal mines. The result was a piece of machinery unsuited for the work.

Best Battery Locomotives the Result of Long Years of Practical Experience

The best storage-battery locomotives on the market today are those that have been developed from the practical knowledge and hard-earned experience of mining men combined with good mechanical and electrical talent. The result is a rugged, simple piece of machinery that is not out of place in a coal mine but fits in well with the rest of the equipment.

Alongside of the unsuitable design and construction in the earlier types there was another good reason for their unsatisfactory performance, and that was because the locomotives were installed without proper knowledge and investigation of the conditions and the amount of work to be performed. Either they would not perform the work expected of them or more often they would not perform it for a full day's time. This caused mining men to look upon them as unreliable and even as a nuisance.

Again, as is always the case, the failures were heard of and heralded abroad, whereas the successful installations kept on quietly working and making good without being much noticed outside the mine in which they were operating.

The storage battery, which is the vital power-giving portion of the locomotive, was not at first built to withstand the conditions met with in mining service. Furthermore, being something strange and looked upon as more or less of a mystery, it was never understood and therefore did not receive the little attention it required.

Today the story is different, and if care is taken in the selection and purchase of a storage-battery locomotive, it is possible to obtain a machine which is truly the result of mining experience combined with good engineering and electrical design equipped with a battery specially built for mine use and having ample capacity to give uninterrupted daily service for a length of time which makes it commercially successful and profitable. Today it is not a question of such a locomotive being a success or otherwise, but whether or not the conditions are suitable for storage-battery locomotive operation.

Storage-Battery Locomotives Not Suitable for All Conditions

It should be emphasized that storage-battery locomotives are not suited for all mining conditions, and it is important to ascertain from those competent to decide whether the use of a storage battery is warranted.

The leading manufacturers of storage-battery locomotives today will not sell or install a machine of this kind unless they know it is going to be a success both from an operating and financial standpoint. I would suggest as a protection to those installing such locomotives that they include in their contract a duty cycle showing clearly just what work the machine will have to do and for how long the work has to be done each day on one full charge of the battery.

Let us consider what are the requirements of a successful storage-battery locomotive and why a properly designed and constructed machine of this type will perform more cheaply and efficiently the work of gathering and hauling coal under average conditions than any other method.

I can safely say that under nearly all conditions of gathering the storage-battery locomotive is without equal when it comes to quick work and low cost of operation. Except in special cases, coal can be gathered much cheaper with these machines than with mules or with cable-and-reel locomotives. When it comes to the

*Paper presented before the Kentucky Mining Institute, Lexington, Ky., June 7, 1919.

question of hauling the coal from the parting to the tipple or shaft bottom, another problem is encountered which will have to be considered in each case on its individual merits.

The storage-battery locomotive is not suitable where the haul is too long, or where steep grades are maintained for too great a distance. It has its own field, and it is hardly possible that it will ever compete with or replace the trolley locomotive on main-line hauls over considerable distances.

For gathering coal we want a locomotive that will handle the cars quickly, get them to the parting in the shortest time so that the car turnover may be as great as possible, and place the empties up to the face so that the loaders may load coal continuously without interruption for pushing or placing the cars.

A storage-battery locomotive is ideal for this work. It is independent of any external source of power, is easily handled, has quick acceleration (both running light and under load) and will go into rooms and entries where mules or cable-and-reel locomotives cannot be operated on account of the height.

No feeders, trolley wire or track bonding is required and, if desired, the machine will operate successfully on wooden rails in the rooms. For low coal it is built in small sizes only 28 or 29 in. above the rails, and in larger sizes 32 to 33 in. above the rails. In fact, wherever a man can work, this locomotive can follow him.

A storage-battery locomotive must be easily returned to the track if derailed or wrecked, and there are machines built today with special features of flexibility to enable them to stay on the track even though this is uneven and irregular.

The fact that a storage-battery locomotive can be operated on cross and butt entries without trolley wires or track bonding is in itself a big argument in its favor on account of the saving in investment and upkeep. Furthermore, the saving in taking down top or lifting bottom in low coal, as must in many cases be done for mules, frequently amounts to enough to pay for the locomotive in a reasonable time.

In gathering with a reel-and-cable locomotive, no matter how carefully operated, the cable is often run over and cut, necessitating an interruption and delay to splice and reinsulate it. All this costs money besides keeping down coal production. There is also the danger of starting a fire from the short-circuit and arc when the cable is parted.

Have you ever figured out just what the cost per annum is for cable for such machines? I have had figures given me from actual records which are surprisingly large. All of this can be done away with and avoided if storage-battery locomotives are used. Furthermore, better time can be made. Ask the men who have operated both storage-battery and reel-and-cable machines which is the easiest to handle and which will give the most continuous service and gather most coal.

STORAGE-BATTERY LOCOMOTIVES ARE USED BY THE GRAND JUNCTION MINING AND FUEL CO. AT GRAND JUNCTION, COLO.

The coal industry is facing a shortage of labor that looks as if it were going to be serious. The storage-battery locomotive is a great labor saver. Its use releases the men otherwise employed as mule drivers to the loading of coal, while the time of the loaders which is taken up in placing the cars at the room face can also be devoted to loading.

It is impossible to state generally how many mules and drivers can be replaced by one storage-battery locomotive. This depends entirely on conditions and arrangement of the work. I have known a 5-ton locomotive to replace seven mules and five drivers, although this was an exceptional case. Three to five mules is a fair average.

In connection with the question of comparative costs of the storage-battery-locomotive operation with other methods, it must be understood that it is only by careful investigation of the conditions in each case that this can be figured out. No general figures will apply to all cases. The company I am connected with insists on making a personal investigation of all the conditions

before recommending for or against the use of storage-battery locomotives, having found that this is the only way to put before the mine operator a reliable statement as to what saving he can make if he uses storage-battery machines. Of course, after the first locomotive is placed in operation in a mine it is easy to figure out by direct comparison what can be accomplished by adding others.

Today it is possible to show a prospective customer storage-battery locomotives operating in some mine in almost every territory, under conditions quite similar to his own. And after all, this is the most convincing argument that can be furnished. Results are what count, and a personal investigation of what one of these machines is doing in another mine and a few minutes' conversation with those who own or operate it is far more convincing than an elaborate report.

Only a few weeks ago I had a remarkable instance of this. The general manager of one of the largest mines in the country some years ago had an unfortunate and costly experience with storage-battery locomotives; and besides having no use for them himself, he had been in the habit of telling his brother operators all about his troubles and warning them not to have anything to do with such machines.

We knew that this man could use storage-battery locomotives to advantage and kept right after him. It took a great deal of persuasion to get him even to investigate what was now being done with such machines, but finally friendship and persistency won the day and we showed him some up-to-date operations under conditions similar to his own. I might truly say that some of Billy Sunday's wonderful and estimable experiences with unbelievers appear quite insignificant beside the change of heart in this general manager. His is not an isolated or uncommon case.

Storage-Battery Machines Operate at Maximum Efficiency as They Carry Own Source of Power

A storage-battery locomotive carrying its own source of power is always operating under the best possible conditions. This makes it possible to design the entire locomotive both mechanically and electrically along decidedly different lines from those of the trolley locomotive. This is also necessary to secure the maximum results from the energy stored in the battery. This is not generally realized or appreciated, there being one point in particular which is brought up when considering storage-battery versus trolley locomotives, and that is the size of the motor or motors employed.

I have frequently heard the argument that the storage-battery locomotive cannot be as satisfactory and reliable as the trolley machine because it had a much smaller motor capacity per ton of weight than the trolley type, and therefore becomes more or less of a toy as compared with the trolley.

It is certainly true that the motor or motors on a storage-battery locomotive are much smaller per ton weight of machine than in a trolley type, but it is just as true that they should be so because of the different conditions, for example:

A storage-battery locomotive carrying its own source of power is always operating at full normal voltage for which the machine is designed. Consequently, the motor itself is much more efficient than is the trolley type of machine, in which the motor has to operate frequently on as low as one-half the normal potential. I have seen the voltage on a trolley motor, normally operating at 250 volts, as low as 105 volts when a long distance within the mine and away from the power plant or source of supply. When the voltage at the motor terminals drops to one-half normal the current must be doubled or even more in order to obtain the same output in horsepower. Consider the design of motor necessary for these conditions.

A storage-battery machine does not have to operate at the same speed as a trolley locomotive—and speed means power. In every kind of propulsion a given increase in speed requires an addition in power consumption far in excess of the speed increase. Speed is not required in the large majority of situations which are suitable for storage-battery-locomotive operation, and while it may appear a fallacy, yet in gathering, making up trips and similar work, the storage-battery machine with its slower maximum speed will perform more work in a given time than the trolley type with its higher rated speed. The power consumption is much less.

Not only has the storage-battery locomotive been developed to a successful point along the lines of mining experience but the manufacturers have realized that there is a profitable field for storage batteries in locomotives for mine service. There are now available storage batteries which are commercial successes in this service.

Successful Storage-Battery Machine Must Be So Constructed as to Withstand Rough Usage

It is necessary for the battery in mine locomotive service to be rugged, have a long life, and perhaps the most important of all to be assembled and arranged in the locomotive in such a manner as to withstand the bumps and knocks incident to this service. The earlier storage batteries were built along the lines of the electric vehicle batteries in which service they can receive regular attention at a garage and furthermore do not have the rough usage which is a necessary part of mine service. Consequently, the batteries were assembled too light—separators not durable enough, rubber jars too light and fragile, and the trays or crates in which the cells were assembled anything but suitable for the strenuous service in mines.

Today mine locomotive batteries are built and assembled in such a way as to withstand successfully the rough handling they are certain to receive. The rubber jars are made of a better and more durable compound besides having thicker walls, and the manufacturers are willing to guarantee both jars and separators in addition to the battery elements themselves.

Speaking from an electrical viewpoint, the work done by the accumulator in locomotive service is not hard, not nearly so hard in fact as in many other applications.

Large Number of Storage-Battery Machines in Daily Use and Giving Good Service

Hundreds of thousands of storage batteries are in daily use performing exactly the same function in connection with the starting and lighting system on automobiles as is done in a locomotive except with this difference—the small box of batteries on a gasoline car is called upon to do many times the amount of work for its weight and size that any locomotive battery can possibly do.

Those who have cranked a gas car that has high compression know that it requires some energy, yet all the

energy required to do this work is obtained from a little box of batteries which is just about the same weight and size as a single cell in a locomotive battery; and there are about 40 to 48 cells in a storage-battery locomotive.

I mention this to show that the problem involved is only that of building a storage battery suitable for the work and service in a locomotive. This is not difficult if ample capacity is provided. Since batteries in this service are rapidly becoming better understood, longer life and better results as to cost of operating are being obtained.

The accumulator, as I said before, is the vital power-giving portion of the locomotive and, being something entirely different from any other mechanical or electrical device, it has been misunderstood and looked upon more or less as a mystery. The consequence was it was neglected and allowed to starve itself into a condition of weakness and unreliability through nothing but want of ordinary care and attention. The way in which a storage battery performs its function of storing up electrical energy and giving it out again when called upon is not generally understood. If it were, I believe the mystery attendant upon it would be dispelled.

It is somewhat of a misnomer to say that a storage battery stores up electricity—it does, but in an indirect way through chemical action which is brought about by the passage of an electric current through the cells. An accumulator cell consists of the following parts: The metal plates in which the chemical action takes place, the separators to keep the positive and negative plates apart, the liquid solution which acts as a conductor between the plates and also as a reagent, and the containing cell.

As a current of electricity is passed through the cell, the water in the solution is split up by electrolysis into its component parts—hydrogen and oxygen. The oxygen is absorbed by the positive and the hydrogen by the negative plates, creating a chemical action and change in them. This process of chemical action goes on until the plates cannot absorb any more of the gases or have become fully charged.

If charging is continued to any great extent beyond this point, the gases are given off freely in the form of bubbles and the cell heats up, which is injurious and shortens the life of the cell. This is the danger of overcharging. When the battery is called upon to furnish current or discharge, the chemical action is reversed and the plates are again brought gradually to the condition where they can again absorb the hydrogen and oxygen gases or to a point of discharge.

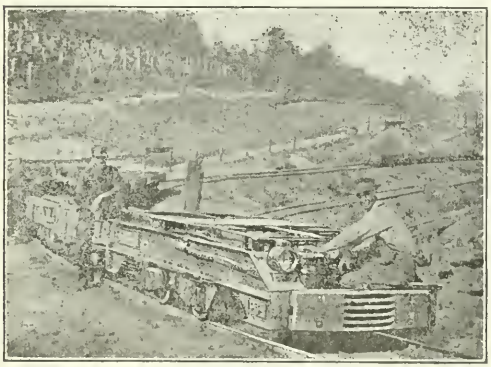
This is only to give an idea of how the electricity is stored up in a battery. There are chemical changes in the material in the plates and also in the solution, but we need not consider this here.

The cycle of chemical action and reaction may be repeated for a long time and is just as sure and certain as the setting and rising of the sun, provided the cells are kept in condition to permit this action to take place. By keeping in condition, I mean the adding of distilled water to replace evaporation and maintaining the cells clean and free from foreign materials and impurities.

There are two types of storage batteries available today for this service—the lead battery, which has been the longest on the market, and the Edison battery, which is a more recent development and which on account of its radically different construction makes it extremely rugged and well suited for this service. In the lead battery the elements are composed of plates built up of lead and lead oxide, the liquid solution being dilute sulphuric acid. Wood and rubber separators are used to insulate the positive and negative plates. This whole combination is placed in a containing jar of hard rubber. On account of the sulphuric acid solution, acid-proof construction must be employed, hence the necessity for the hard-rubber containing cells.

This feature has been looked upon as introducing an element of weakness and trouble from the acid, but as I stated before modern construction has helped this greatly.

The Edison battery uses nickel and iron in the construction of the battery plates with an alkaline or potash solution. This enables a cell to be built which is rugged and long-lived, and having no acid solution a steel containing can is employed. The action of charge and discharge in a battery of this kind is, generally speaking, along the same lines as in the lead cell, but owing to the material used the battery is more rugged and less likely to be injured by abuse. Since it utilizes metallic construction in the containing cell, it is less liable to accident through breakage in wrecks, etc. The



LOCOMOTIVE USED BY THE J. A. ESSER COAL AND COKE CO., ESSERVILLE, VA

price of the Edison battery is higher than that of the lead, but the life is much longer and the extremely rugged and foolproof construction insures a continuity of service which is of great importance.

As the battery situation stands today, both lead and Edison are an entire success commercially. The question of first cost is usually the deciding factor as to which shall be selected, and a good plan is to investigate both types and get the recommendations of the locomotive manufacturer, who is naturally vitally interested in furnishing the battery equipment that will give the best results in his locomotive.

The lead-battery manufacturers guarantee the life of their batteries in this service for 18 to 21 months, according to the type of battery, while the Edison battery company gives a schedule of prices for replacements ranging over a period of ten years, so that it is possible for the user of storage-battery locomotives to predetermine closely what the annual expense will be for battery upkeep based on the guarantees furnished by the manufacturers.

Of course, the maximum cost of upkeep is calculated

in this manner, and if by careful operation and handling the guaranteed life of the battery is exceeded, the annual expense is reduced accordingly. All battery manufacturers maintain service departments that make periodic inspections of the batteries in service and are available if anything occurs requiring their attention.

As the utility of the storage-battery locomotive in mine service has been recognized, great improvements have been made in the charging apparatus. In the earlier days, sufficient attention was not given to this point with the result that cheap and inferior apparatus was used in order to keep down the first cost; but the fallacy of this practice has been recognized and there is not now the hesitancy that formerly existed toward making a reasonable investment for this part of the equipment. The result is a good return on the additional exxpense in the shape of longer battery life and 100 per cent. satisfactory operation of the locomotive at lower cost with greater reliability.

There are two general methods of charging locomotive batteries in coal mines. The one most frequently used in the past has been to take current from the 250-volt, direct-current line which furnishes power to the coal-cutting machines, trolley circuit, hoists, fans, pumps, etc. The charging of the battery from this source is done through a rheostat which reduces the current to the proper voltage for the accumulator.

This method is entirely practical provided good automatic instruments are included on the charging rheostat panel; but these automatic features always require inspection and care, and if they fail to operate through lack of attention the battery is liable to be overcharged.

The other method is to install a small motor-generator set for charging the battery or batteries, taking current preferably from the alternating-current supply where power is purchased or the main generator if the mine has its own power plant. With a motor-generator set of this description the proper charging of the battery is not dependent on any automatic features and is as nearly foolproof as it is possible to make it. The battery cannot be overcharged and moreover is charged with the smallest possible consumption of electric power.

Method of Charging Adds to or Detracts From the Life of the Battery

Batteries charged from motor-generator sets invariably have a longer life than those charged from rheostat panels. This is particularly noticeable with lead batteries, which are more susceptible to overcharge, and the extra investment required for the motor-generator set is much more than offset by the longer life obtained from the battery. It is advisable to give careful consideration to the latest developments in charging equipment.

There has recently been developed and put on the market a new type of combination storage-battery and trolley locomotive which is a distinct and marked advance over the old types. This will, I feel sure, fill a long-felt want and also increase the scope of usefulness of the storage-battery locomotive.

The original combination locomotives were simply a trolley machine with a small auxiliary storage battery which was used when no trolley wire was available. The battery was very small—not large enough to give real service as a storage locomotive, and was liable to be seriously overcharged or overdischarged on account of its limited capacity. Only by extremely careful and skilled attention could the combination locomotives be operated really successfully.

The new type of combination locomotive to which I refer is built on different lines. It has as much battery as the straight storage-battery machine. In fact, it has the same standard equipment but has an auxiliary charging attachment, so that current may be taken from the trolley wire wherever possible. This current is used to run the locomotive or charge the battery, or both, according to the amount of work the machine is doing at the time.

The current taken from the trolley wire is a fixed amount of all times, say, for example, 80 amp. If the locomotive requires this amount or less than, say 60 amp., the difference of 20 amp. charges the battery while the locomotive is running. If the load is heavier and requires more current than the 80 amp. coming from the trolley wire, say, for example, 140 amp., 60 amp. is taken from the battery and assists the current coming from the trolley to operate the motor.

If the locomotive is not running, the entire 80 amp. coming from the trolley wire goes into the battery. The amount of current allowed to flow from the trolley can be fixed at any desired point up to 100 amp. according to the condition of the work in the particular section of the mine and the length of time the locomotive will operate on the trolley. This arrangement is wonderfully flexible and gives many advantages, as follows:

Some of the Advantages That Accrue in the Operation of Storage-Battery Machines

The locomotive can do the regular work of a straight storage-battery machine but can cover a much larger area than is possible with the strictly storage-battery locomotive, because the battery is recharged during the day's run. While running on the trolley, the work on the battery is reduced, conserving the battery capacity for work where there is no trolley wire.

If the locomotive is standing idle between trips, the battery can be charged from the trolley and the length of time required to fully charge it at the end of the day's run is reduced. There is no danger of injuring the battery, because it is of ample size and the amount of current that is taken from the trolley at any time is predetermined and fixed according to the conditions existing.

This combination locomotive bridges a wide gap between strictly storage-battery and trolley locomotives and has a wonderful field of usefulness. In fact, it makes storage-battery locomotives practical and available in situations where the length of haul would be too much for a machine of this type, and yet enables its good features to be retained with the further advantage of extending its scope of operation by the auxiliary trolley attachment.

Use of Storage-Battery Locomotive Leads to Power Savings in General Operations

Under many conditions, the battery in a combination locomotive of this type is not called upon for as much work as would be the case in the straight storage type, yet at the same time the locomotive does more work during the day's run.

There is one benefit to be derived from the use of the storage-battery locomotive in mine service to which sufficient attention has not been given, and that is its

relation to the power plant or purchased supply of energy. No matter whether the electric power used in a mine is purchased or generated, it is important to get the most out of the power comany's contract conditions or to run the generating plant in the most efficient way. The latter entails so far as possible a full load while running and making the time of operation as short as can be arranged.

The storage-battery locomotive can be made to play an important part in this connection. When power is purchased it is necessary to pay for the maximum amount used, if only for a short time. If the maximum demand can be reduced and averaged up or the load factor can be improved during the entire 24-hour day, the power bill at the end of the month is going to be advantageously affected.

Every trolley locomotive in use during the day is drawing power from the source of supply, but every storage-battery machine in use during the day does not draw power while it is running but is using the power which was stored up at a time when the mine was not gathering or hauling coal. What is the result? Storage-battery locomotives relieve the power supply or generating plant of demand during the busy hours and create a load during the idle part of the 24-hour period, thereby reducing the maximum demand or size of generating plant required.

I have known of situations where advantage has been taken of this feature and where the use of additional storage-battery locomotives in place of trolley machines has prevented the necessity of installing more generating machinery and the purchase of more power besides improving the load factor. Here is a point well worth investigating. The new combination locomotive fits in here splendidly. Every straight trolley locomotive when starting a trip of cars throws a heavy demand on the power line, but with the combination type the pull on the power line is absolutely limited to the 80 amp. or whatever current the adjustment was made for, the balance coming from the battery. Any electrical engineer can figure out what this means.

Again, with this cobination type of locomotive, a large proportion of the current used from the battery can be put back during the working hours. This will shorten the time required for charging after the mine closes, and enables the generating plant to be shut down and the attendants released that much earlier.

Of course, this feature has to be worked out differently according to whether the cutting is done during the day or at night, and whether the power is purchased or generated. The fact remains, however, that with the storage-battery locomotive a method and opportunity is available for arranging the load in the most efficient and economical manner.

There is one consideration which, although not directly connected with storage-battery locomotives has nevertheless an important bearing on their operation, and that is the use of anti-friction bearings on the mine cars.

Anything that will reduce the tractive effort or drawbar pull required to move a trip of cars tends to increase the amount of work that can be done by the storage-battery locomotive, not only as regards the number of cars per trip hauled but also the total number of cars moved per day.

In trolley locomotive haulage, while friction means a loss of power, it is not of such importance as with a storage-battery machine where the total amount of power available is limited to the battery capacity. If double the amount of work can be done by the locomotive on the same battery capacity it means that the investment cost for a given operation can be approximately cut in half. Another way of looking at this matter is to consider that moving a trip equipped with plain bearings is equivalent to hauling a train of cars with the brakes partly set.

Now, a few words as to the cost of maintenance and upkeep of the storage-battery locomotive. The batttery end of this problem is taken care of by the manufacturer's guarantees and renewal schedule, under which it is possible to determine what the maximum figure is likely to be. The actual cost will depend on whether by careful operation it will be possible to make the life of the battery exceed the guaranteed period.

Given a well designed and constructed storage-battery locomotive built along the proper lines of ruggedness, simplicity and easy accessibility to all wearing parts, the wear and tear is small and compares favorably with that upon other mining machinery such as coal cutters, pumps and hoists. In fact, a locomotive, if kept in proper adjustment instead of being allowed to

THIS LOCOMOTIVE IS BEING USED BY THE TROLL COAL MINING CO., FAIRPORT, OHIO

run without attention until something breaks, should be kept in first-class operating condition for less than 5 per cent. of its first cost per annum. This figure has been checked carefully by ascertaining the amount of material and spares purchased by a number of customers.

To summarize briefly on how to secure the best results from the use of storage-battery locomotives, I would submit the following suggestions:

1. Be sure that the conditions are suitable for the use of storage-battery locomotives.

2. Select a locomotive built to stand the service and one that will give reliable and continuous operation. Ruggedness, simplicity and easy access to parts are the three special features to be secured. These insure continuity of service, which is the prime necessity in a coal mine. The loss of part of a day's output is not all the loss incurred. The injurious effect and the slowing up of the entire organization counts for vastly more.

3. Be sure that the battery capacity is ample to afford a full day's work with a comfortable margin left. Expect and demand an equipment that may be relied upon for 300 working days in each year.

4. Having secured such a locomotive, give it reasonable care and inspection. If one-half the care and regular attention were given to storage-battery locomotives

that are given to mules, the results would be surprising. It should be remembered, also, that storage-battery locomotives do not have to be fed every day when they are not working.

5. The storage-battery locomotive is a willing servant, it will go on operating in spite of lack of attention without giving visible signs of distress until something breaks and has to be renewed. Feed it—that is, charge it regularly. Inspect and overhaul the various parts before lack of adjustment produces undue wear and it becomes a piece of machinery that can be depended upon absolutely.

I would gladly, if it were possible, have given some general information on costs of operation as compared with other methods of mine transportation, but each case must be considered on its own merits. It would be only misleading to estimate what could be done, without a careful investigation of conditions. I know of mines today that are considering the use of storage-battery locomotives for the sole reason that they feel that if they provide this modern equipment they will have less trouble in getting and keeping their men because of the better and more regular conditions of operation that will be thus created.

I have tried in the foregoing to present only real facts concerning the accumulator locomotive and its proper place in the coal-mining industry. I am personally interested in the development of this machine and in seeing it reach the place it should occupy in the mines, but at the same time I would urge primarily careful consideration of conditions in each case, to see that they are suited to such locomotives. Secondarily, but of almost equal importance, is the proper selection of the machine.

The time has passed when it is either necessary or advisable to wait for the other fellow to

The New Wellesley Colliery

The Wellesley Colliery is one of seven collieries owned by the Wemyss Coal Company, Limited, Fifeshire, Scotland. After a large outlay of capital, the colliery is now capable of an extensive output, and the beds worked reach outward under the Firth of Forth. No. 1 pit was completed before the war, and No. 2 has been resunk recently to a depth of 1570 ft. Both shafts are situated not far above high-water mark on the shore of the Firth of Forth.

No. 1 shaft is 1612 ft. deep to the sump, and the Dysart Main coal was cut at 1566 ft., but the landing for this seam is at 1540 ft. This shaft was dug upward for 700 ft. from five different levels driven off No. 2 shaft. No. 1 is circular, 14 ft. 10 in. across by 27 ft. 9 in. long, and is lined top to bottom with 18 in. of brickwork. It is fitted with steel rail guides fixed to steel girder bearers. The upper portion of No. 2 shaft was recently deepened and enlarged to full size shortly.

Ten beds of coal and one of cannel are interesected by the shafts. Five are at present being opened out from No. 1 pit, which is fitted with double-deck cages holding eight cars, the capacity of each car being 1680 lb. of coal. Both the pit bottom and the pit head are arranged with two decks for simultaneous loading. The pit bottom is double-decked for 100 yd. on the west side and for 80 yd. on the east side. The feeders are so arranged that every main haulage road can deliver its coal to either the top or the bottom deck as required, while the empty cars running off at the east side of the shaft come together at a common level at the foot of two "tub creepers," which elevates them high enough to run by gravity to the hanging-on places for the different haulages.

A DOUBLE-DECKED BOTTOM

The dimensions of pit bottom are: 22 ft. wide by 18 ft. high from the floor of the bottom deck to the roof of the top deck. The side walls are of brick and cement, 5 to 6 ft. thick, and the roof is supported by steel girders surmounted with cement concrete. The top deck floor is of girders and concrete.

Two main pumping engines are employed, one at the Dysart main level and the other at the Coal More level (1345 ft. deep). Each has a capacity of 1000 gal. per minute at 40 r.p.m., and both deliver to the surface. The engines are compound condensing, with Corliss valves, and each has a heavy flywheel. The steam pressure is 150 lb., and seven of the eleven Lancashire boilers have super-heaters in the main uptakes giving 150 deg. Fahr. of superheat.

The steam pipes in the shaft are of lap-welded steel with [illegible]. They are covered with 2 in. of [illegible] sectional covering with steel [illegible]. The expansion is taken up [illegible] and pocket [illegible]. [illegible] are driven by squirrel-cage motors with a voltage of 6000.

A LARGE HOIST IS INSTALLED

The winding engine at No. 1 shaft consists of a pair of 38 x 75-in. cylinders, with a drum 20 ft. in diameter by 3 ft. 6 in. long. The drum is lagged with oak staves on top of thin boiler plate. Steam brakes and reversing gear are fitted to this machine, while Landale's control gear for prevention of overwinding is connected to the engine. The steel-lattice pit-head frame is 100 ft. high to center of the pulleys, which are 18 ft. in diameter. These are built up in sections with flat arms and cast steel rims turned to take ropes 2¼ in. in diameter. Ormerrod's detaching hooks are employed.

The screening house is of steel construction with concrete flooring and corrugated sheeting on sides and roofs. There are nine shaking screens and picking bands. The plant has a capacity for screening 4000 tons in 8 hours, and is driven by direct-current motors throughout; each motor is duplicated. The boiler plant

consists of 11 Lancashire boilers, working to 150 lb. pressure. These are fed by Weir pumps through Green economizers.

In the electric power house are three Belliss & Morcon direct-connected engine-driven units of 220 kw. each. These operate at 500 volts direct-current. A mixed-pressure turbine plant of 1000 kw. capacity also operates at 6600 volts, as well as a high-pressure turbine set of 1200 kw. capacity. The mixed pressure set uses exhaust steam from the winding engine and the Belliss sets. The power house is ventilated with air drawn by a fan through an air filter of the water-spray type. The air is delivered at a water-gage pressure of about ¼ in. and finds its exit at the open window. No dust-laden air can enter by windows or doors. The condensing water from both turbines is cooled in two spray ponds.

A WADDLE FAN IS EMPLOYED

One Waddle fan 21 ft. in diameter over the blade is used for mine ventilation. This is designed for 200,000 cu.ft. of air at 4 in. water gage when running at 125 r.p.m. There is also a Sirocco fan 119 in. in diameter, capable of giving 400,000 cu.ft. at 8 in. water gage driven by a Belliss & Morcon engine direct-coupled. This fan can be used for either exhausting or forcing as required. The Baum washer plant consists of two units with a capacity of 100 and 120 tons per hour respectively. Both are run together when required. The slack coal through 2½-in. diameter holes is washed in one double washing box and sized into five different grades. Slack coal is brought to this washer from six other collieries of this company.

A bath- and [illegible] is provided for the workmen. [illegible]

[illegible]

The [illegible] white glazed bricks. The [illegible] 110 x 39 ft. and is from 10 to 14 ft. high. There are 24 bath cubicles, and in each is a hot water spray. These cubicles are made of galvanized [illegible] with white enamel paint. Clothes are hung on hooks drawn up to the ceiling along which are disposed a series of ventilation pipes with apertures for the ingress of air. These tubes are connected to an exhausting Sirocco fan. The air enters the building through a series of steam-heating coils fitted over apertures in the floor, and is thus warmed. It is drawn off by the fan.

There are 320 clothes hooks at present, but more can be fitted when required. The men enter the bathroom by the outside entrance in the morning. They change into their pit clothes and leave their clean ones hanging on the hooks. Each man has his own hook and padlock. From the bathroom the men go upstairs to the banking level. When coming off their shift they go directly downstairs to the bathroom so that there is little chance of catching cold. The baths are free, but the men provide their own soap and towel.

A New Arc-Welding Dynamotor

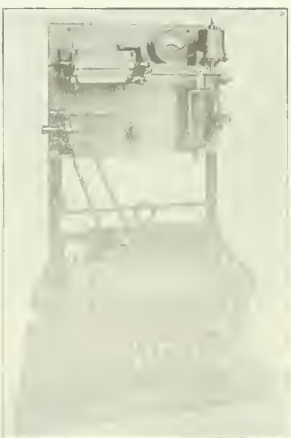
A new plastic-arc welding unit has been brought out by the Wilson Welder and Metals Co., 2 Rector St., New York City. This set is composed of a dynamotor and current-control panel. The generator is flat-compound wound and maintains the normal voltage of 35 on either no load or full load.

The control panel contains many new features. It has been designed to provide a constant-current controlling panel, small in size, of light weight, simple in operation and high in efficiency.

The panel is of slate 20 x 27 in., and on it are mounted, a small carbon pile, a compression spring and a solenoid working in opposition thereto. The solenoid is in series with the arc so that any variation in current will cause the solenoid to vary the pressure on the carbon pile, thereby keeping the current constant, at the value to which it is adjusted.

This is the well known principle of the Wilson control of constant heat in the weld. Practically any metal can be welded with this outfit, without preheating or annealing, which are decidedly troublesome.

Three switches on the panel provide an easy means of current adjustment, between 25 and 175 amp. The arrangement of the welding circuit is such that 25 amp. always flows through the solenoid when the main switch is closed, whether [illegible]



DYNAMOTOR WITH CONTROL PANEL

[illegible] current [illegible] three phase alternating current [illegible] gasoline-driven unit, or it can be [illegible] to be [illegible] driven. The [illegible] The net weight of this new [illegible] characteristics in [illegible] direct-current motor, 807 lb. with alternating current motor, [illegible] lb. with gasoline engine and 550 lb. as a belted outfit without motor. These new dynamotor sets can be mounted on a truck for portability, if desired.

'Hog' fuel consists of sawmill refuse after it has been put through a machine which shreds and grinds it into a fairly homogeneous material. This fuel varies in consistency from fine sawdust to slivers or shreds several inches in length. The value of this material as fuel depends upon the class and kind of timber being cut in the sawmill.

Long Conveying Apparatus in a Pittsburgh Mine

One of the longest conveyors in western Pennsylvania may be found in the No. 3 Mine of the Valley Camp Coal Co., situated near Parnassus. The mine in question is in the Upper and Lower Freeport beds of coal.

A rather unusual geological formation is encountered at the No. 3 Mine. The two beds mentioned are nearly together, being separated by a scant 4 in. of binder. The two beds have a general working thickness of 7 ft. On top of the upper bed is found 18 in. of cannel coal, which to date has not been removed as it forms an excellent roof with a negligible tendency to weather.

The mine is entered by a slope on a pitch of nearly 60 deg., the distance to the bottom being about 500 ft. The conveyor is a typical piece of steel apparatus made by the Link Belt Co. It leads from the top of the tipple through a covered shed, and thence down the slope to a point several feet beyond its bottom. It is of the endless chain type, the total length being 800 ft. Of this only 400 ft. actually conveys coal, the rest forming the return underneath the loaded side.

This conveyor has a carrying width of 5 ft., and is electrically operated by a 250 hp. General Electric motor. At the bottom of the slope, the mine cars are dumped into a hopper from a horn type of dump, which feeds onto the conveyor, at the same time distributing the coal evenly over the surface. The coal is brought up the slope and into the tipple, whence it passes over shaker screens where four sizes are made. The slack enters a conveyor and passes underneath the lump conveyors. The other sizes are each loaded from a boom forming an extension of the picking tables. The entire apparatus on the tipple is under the control of one man, who also assists in the picking. Slate and refuse separated from the coal on the conveyors passes into a rock bin through steel chutes.

The No. 3 Mine has a daily output of 3,000 tons in 8 hr. This is a remarkable figure when it is considered that only 550 men are employed, 500 of them being underground. The operation is less than three years old. Fifteen Westinghouse, 13 and 10 ton, trolley type locomotives are used on the haul-

GENERAL VIEW OF THE TIPPLE AND SURFACE BUILDINGS OF THE VALLEY CAMP COAL COMPANY

VIEW SHOWING EXPOSED PORTION OF CONVEYOR

CONVEYOR LEADING DOWN THE SLOPE

ageways, the heavier machines being utilized on the mains. Twenty Sullivan short-wall cutting machines are employed in the work at the face.

As can be noted in the illustrations, the slope has two compartments, one of which being occupied by the conveyor. The other side or compartment is utilized for the transportation of supplies, in which work motive power is furnished by an electric hoist engine. There are 15 General Electric motors of various sizes, used at the tipple for driving the Link Belt equipment. Power for the operation of the entire plant is purchased from the West Penn Power Co. One of the features in the construction of the plant buildings is that each has been given a stucco covering from a cement gun. Many of the miner's dwellings have likewise been given the stucco treatment.

World Production of Coal

The table below, prepared by C. E. Lesher, of the U. S. Geological Survey, attempts to assemble the available information on the world production of coal during the last six years. Owing to uncertainties caused by the war, especially in Central and Eastern Europe, the statistics must be regarded as tentative.

In the last year before the war the world's total output of coal approached a billion and a half tons. The outbreak of hostilities caused a tremendous drop in production which had reached its lowest point in 1915. Thereafter, as the warring powers realized that the struggle was one of munitions quite as much as of men, the world's production was greatly increased. During the last two years of the war it reached a level approximating that of 1913.

All of the great coal fields of Europe lay within the belligerent countries, and in all of them production declined. Even those districts that were fortunate enough to escape devastation suffered from lack of man power and transport. Deprived of their normal imports from England and Germany, the neutrals and Italy endeavored to increase the output from their own scant resources. The stimulus to production supplied by the scarcity in Europe was felt even in Africa, the South Seas and the Orient.

Upon the United States, however, fell the chief burden of making up the deficit caused by the war. In 1913 the country was contributing 38.5 per cent. of the world supply. During the war its share increased at the rate of about 2 per cent. per year, until in 1918 approximately 46 per cent. of the world's output of coal came from the United States.

PRODUCTION OF COAL IN THE IMPORTANT COUNTRIES OF THE WORLD
(In Net Tons)

	1913	1914	1915	1916	1917	1918
United States	569,960,219	513,525,477	531,619,487	590,098,175	651,402,374	678,211,904
Great Britain	321,922,130	297,698,617	283,560,980	287,140,410	278,319,149	255,040,328
Germany	305,714,664	270,594,952	259,130,732	272,099,000	281,429,000‡	273,930,000‡
Austria-Hungary	60,575,201	53,396,400*	52,670,712†	55,482,000†	50,000,000*	.....
France	45,108,544	32,765,156	21,946,000*	23,670,000*	31,847,000*	30,864,000*
Russia	35,500,674	36,414,560	31,158,400	28,962,724	30,047,000*	.....
Belgium	25,196,869	18,424,000	15,691,000	18,588,000	16,446,000	15,229,000
Japan	22,988,292	24,574,000	22,539,000	25,238,000	28,000,000*	30,600,000*
China	15,432,200	10,199,200*	19,800,000*	22,000,000*	.....	.....
India	18,163,856	18,439,975	18,673,984	18,389,372	19,405,550	.....
Canada	15,115,089	13,637,529	18,267,023	14,461,678	14,046,759	14,979,213
New South Wales	11,663,865	11,644,476	10,582,889	9,102,420	9,290,000	10,160,000
Spain	4,731,647	4,877,000	5,155,000	6,160,380	6,619,102	.....
Union of South Africa	9,857,361	9,461,674	9,275,083	11,208,402	11,628,870	11,937,682
New Zealand	2,115,834	2,548,664	2,473,659	2,527,991	2,316,629	.....
Holland	2,064,608	2,121,394	2,488,363	2,920,000	3,326,000	5,277,813
Chile	1,362,334	1,198,000	1,291,000	1,563,000	.....	.....
Queensland	1,162,497	1,180,825	1,147,186	1,016,654	1,174,290	1,101,176
Mexico	982,000*	.....	.....	.....	.....	.....
Turkey	909,000*	.....	.....	.....	.....	.....
Italy	772,802	859,516	1,045,256	1,439,538	2,090,000*	.....
Victoria	668,524	691,644	588,104	468,270	566,007	.....
Indo-China	617,912	608,660	708,800	856,000*	.....	.....
Dutch East Indies	453,136	626,351	485,158	539,816	910,000*	1,000,000*
Sweden	401,199	404,146	457,184	457,262	.....	.....
West Australia	351,687	357,526	321,065	337,709	.....	.....
Serbia	335,000*	.....	.....	.....	.....	.....
Bulgaria	324,000*	.....	.....	.....	.....	.....
Peru	301,970	317,923	323,680	351,703	395,802	.....
Roumania	267,000*	.....	.....	.....	.....	.....
Rhodesia	237,728	391,394	458,934	491,532	.....	.....
Tasmania	61,648	68,130	66,000	62,244	.....	.....
Other countries	2,550,000*	.....	.....	.....	.....	.....
Approximate total for the world	1,478,000,000	1,332,000,000	1,312,000,000	1,401,000,000	1,473,000,000	1,468,000,000
Per cent of world total produced by United States	38.5	38.5	40.5	42.1	44.2	46.2

*Estimate, subject to revision. †Hungarian production estimated at 10,000,000 tons. ‡German lignite production estimated at 97,000,000 tons.

NOTE—Because of the confusion introduced by the war into the official statistics of many countries, the above figures must be regarded as tentative and subject to revision.

Unless the most economical methods of coke manufacture prevail after the war, according to the *Iron Trade Review*, the world supremacy of the iron and steel industry of the United States may be seriously threatened in the coming days of competition when productive science promises to be more efficient than ever before.

Black smoke is the result of the decomposition of hydrocarbons driven from coal as volatile matter. The black part of smoke consists almost entirely of finely divided carbon. Analyses of the solid portion, or soot, show it to be nearly pure carbon, with a little tar and ash.—*Bureau of Mines Bulletin No. 135.*

None but safety and approved portable electric lamps should be permitted in a mine during the rescue and recovery operations. Immediately after an explosion the store manager or supply clerk should arrange to obtain 100 safety and 100 electric miners' lamps. If such lamps are not already on hand, requests should be made to near-by mines, and the agents of the lamp firms should be immediately reached by telegraph or telephone. Most lamp agencies keep large quantities of safety and electric lamps ready for immediate shipment.—*Rescue and Recovery Operations in Mines.*

It is reported that electrical and compressed air coal-cutting machines will be introduced shortly into coal mines in the Manchester, Bolton and Leigh (England) areas.

COAL AGE

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A Country of Privilege

Gradually our nation has drifted from a country of equal opportunity into a country of privilege—a land where certain acts are permitted to some and not to others. Many there are who favor the idea that the race of life be run by each individual on his own merits. Others seek to have handicaps placed on the speedy, claiming that the best race is that where the fast and the slow by an equal exercise of endeavor have an equal chance of attaining a place at the goal.

This latter condition, in which favors are shown to those who appear to need favors and withheld from those who appear not to need them, is a wide deviation from the program as laid down by our fathers. They believed firmly in the doctrine of "leaving be" (laissez faire), advocating that there should be no handicaps whatever for all restrictions imposed on the fleeter only give the laggard an unfair advantage.

In consequence of this handicap view of the race of life, we have accepted in our political world the practice of representation without taxation. There has been more than a suggestion that the same principle be put into industry; in fact industrial democracy is nothing more nor less than an extension of that principle.

Again labor has for generations been privileged to profiteer. A man receiving $1000 a year, if he has the talent or merely the opportunity, may leave his job and enter another paying several thousands of dollars per annum. No one blames the workingman when without combination he obtains a large remuneration either with his own company or by a shift to another. He may double, treble or quadruple his pay, without doing any more work, and everyone is ready to congratulate him as a genius and a "lucky dog." One of the rights of labor and one generally conceded is that the working man shall be allowed to sell his labor in the highest market.

To continue along the same line, it may be added that for the most part labor is no longer subject to the injunction; and the right to combine in restraint of trade is now no longer denied to the workingman. In fact the Government has been actively friendly to such combinations. The organizations of working men are not required by law to keep contracts, no matter how solemnly and recently made. Furthermore, laws against boycotting have been repeatedly violated, and perhaps only in one case, has recovery been sought and obtained. Misrepresentations amounting to slander by labor unions are never made matters of criminal prosecution. Though labor union organizations have again and again aided and abetted violence, they have been allowed to escape scot free. In this way the practice of permitting privileges to grow up between certain types of citizens and others has grown rapidly until we have a country of privilege.

We are repeatedly told that the public is against privilege as a thing abhorrent. Doubtless it is, but the sentiment is not so strong as is the apprehension and conviction that if labor is given powers which are refused to capital, labor will do just what capital intended to do when it was not restrained. We are learning that if we leave labor uncontrolled we shall be sure to find that the laboring men are not of such moral and intellectual fiber that they will abstain any more than the capitalist from taking undue advantage of that fact. The present coal strike is evidence that the public fear is well justified.

The public's opposition to private law is not so much that it violates the equality between man and man, as that the persons having a private law which gives them exemption are given a dangerous power to put an undue burden on the public. Producers' trusts, which extort more from the public than the costs of production justify, are restrained by law because high prices distress the public. Just in like manner, labor trusts must be suppressed, at least restrained, not because the laboring men are unfair to their employers but because by their ill-advised action they injure the public, and this public is predominently made up of wage earners. The objection to the exclusion of labor from control is not so much to the privilege thus granted as to the fact that the lack of control of labor ends in the exploitation of one laboring man by another.

America has just gone through one of the greatest wars in all history and has emerged triumphant. Can it now escape paying the price? The burden will fall upon each individual whether he wishes it or not. The labor profiteers appear to be attempting vainly to shift the load to the shoulders of somebody—anybody-else so long as they themselves can escape.

Seasonal Industries Are Many

One of the great sorrows of coal mining is statistics. For instance, the United States Bureau of Mines keeps detailed and careful track of the fatalities and accidents of the industry. For a while the Bureau planned to take cognizance of the mortalities and sicknesses from tuberculosis among coal miners, but it lost interest when it found that the mortality rate was low and sickness less than what is usual in other industries.

Again the United States Geological Survey is diligently recording the regularity with which the mines work. Perhaps no other industry has a service of this kind rendered it by a department of the Government. No one suggests that these inquiries shall be done away with. They are certainly not without their value, but it is necessary that the public should be careful not to assume that the industries that are so meticulously watched and censoriously scolded are necessarily as bad as, or worse than, those which are not subject to so much scrutiny.

There are a number of seasonal employments—bricklaying, brickmaking, stonemasonry, carpentering, draying, moving, decorating, papering, icemaking, ice gathering, lumbering, railroading, to mention only a few. Nothing has been said about farming or merchandizing though they also are quite irregular in their activity. Some are so seasonal that there is no attempt made by the employees to enter the industry permanently, and no effort on the part of the employer to keep a permanent force. Apparently the less an industry does to guarantee steadiness of employment the less it is held responsible for that irregularity.

It is quite generally the custom for the employee in an irregularly operated industry to weather the idle time either by adequate savings or a good reputation on which credit can be built. The mine worker, however, has little credit because the industry has always had company stores and this has attracted men to the industry who had no credit and who entered the mines because after

a day's work they could draw sustenance and clothing from the store. The existence of such credit has tended to bring improvident men into the industry, to hold them there and to keep them improvident.

Any industry where collections are slow and uncertain and where credit cannot be obtained attracts men who are able to wait for their pay and who "salt down" their earnings against an evil day. Where such provident men labor, no statistics register their misfortunes and no one sympathizes with their difficulties. Often by reason of their frugality they ask neither statistics nor sympathy, for they, despite all their adversity and irregularity of employment, build up a fair deposit at the bank and buy a home.

It is far from fair to say that all mine workers are of an improvident type. Their happy homes and the social standing of their children are a tribute to their frugality and to the unremitting toil that they have exhibited whenever occasion offered. They meet the summer slackness by an economy as careful as that exhibited in other seasonal industries. But there are many who are extremely ill equipped to meet a period of irregular operation. The worker in many a seasonal occupation would esteem himself fortunate if he could get 50 per cent. full time in the slack seasons.

At Last Our Strike Is Ended

(Written as of Nov. 25, 1919)

The long, long trail has been traveled. We are through with the pressmen's strike and the compositors are returning, and in this fact, not only ourselves, but our striking employees are greatly to be congratulated, for if they had won that for which they contended, and a few more strikers like them had also carried the day, there would have been an orgy of strikes, and life in this America of ours would not have been worth living.

They have helped the steel workers, and the mine workers also, to prove that striking does not pay, that, in general, justice can be secured without it. They have exhibited the fact that the public is against attempts to raise wages in larger proportion than the cost of living. That being so, we congratulate them. The public is gainer, they are gainers, so are we.

The public, pushed along unceremoniously, has at last backed its foot against a rock—the firm foundation that wages must be based on cost of living and not on the desires of any group of workers. Others may advance till they reach that rock, but hereafter they may go no further. There is a bigger union than the American Federation of Labor, than any international union, than any seceeding local, and that is the Union of the United States of America.

The whole public has sanely determined that while injustices must be removed, no unjust increases must be obtained at the expense of the public. Uncle Sam is well armed. He has thrown his redoubtability against trusts of capitalists; it was but his good nature that made him tolerant of the labor trusts regarding the real character of which he, for a long time, gave not even a thought.

We rejoice, not only in our triumph, not only in the fortunate outcome for the public, not only that our employees are happily back at work and again making those earnings on which their families depend, but in the fact that the strike increased and rendered infinitely stronger than anything else could have done, the goodwill between ourselves and our readers. We did not expect so many words of sympathy and appreciation. The flood of kindly letters we received gave us a fuller sense of our opportunities, a deep regret that for a while we could not meet them and a sense of the big heart of the coal industry which will give wings to our words whenever a chance to present such words is afforded.

Unfortunately we are behind with our issues and something must be done to bring them up to date despite the congestion of the presses here and in other towns. It may be necessary to take steps to combine issues and thus accelerate matters, thereby getting back to our former schedule.

Trade is Still Barter

Coin, notes, checks, and drafts do but mysteriously disguise the fact that trade is merely barter just as it was in barbarian days. When a commercial transaction takes place both parties are sellers; both also are buyers. We must take as much as we give; we must give as much as we take, or it is not trade.

Gradually we are learning that we must be ready to receive from Europe or we cannot go on selling. For copper or for coal or for whatever we send shipladen to Europe we must take in like measure from Europe. What it shall be, we do not know, but that it must be, that we do know. At present, we are casting around for the name of the booty that must cross from the western bounds of Europe to our eastern shores. But the search eludes us. There is little that we are willing to take and almost nothing that we need.

Soon, seeing that we cannot sell because we see nothing that we want to buy, we may give up all attempt to trade. But we are not likely to give up trying to sell, so perhaps we shall rejoice rather than mourn when we find something that John Bull or Jean Crapaud has that Uncle Sam requires. Mayhap we shall look around just as cheerfully for something we would like to buy as we look around today for places in which to dispose of our product.

Great Britain was a creditor nation more willing to buy than we and less anxious to sell to those who already had a large account with her. Great Britain was, therefore, an advocate of free trade during those years.

We have changed roles with Great Britain and perhaps we shall change policies also. A banker remarked in confidence the other day that *we* of all others may yet be the great free-trade people, the followers of the doctrines of Bright and Cobden. New conditions result in new manners. The Britisher as often went abroad to buy as we send men abroad to sell and we may find a change in our national psychology.

Undoubtedly exchange involves inferiority of some kind on the part of the exchangers. He who gives salt for cowries must have more salt than his fellow trader and less cowries than he, or he would not make the exchange. If we would, as a nation, be self-sufficient we cannot trade with other peoples. When once we "have it all" we are like him "who knows it all", we can receive nothing.

In the war we lamented that Great Britain had nearly all the rubber of the world and a large part of the tin, that Germany had potash and Russia platinum and it was fortunate that we were not in time of war able to supply ourselves without outside assistance. We propose now to be as nearly independent as possible. It will serve us well in war, perhaps also in peace, but if we are inferior to none, in every blessing of earth what foreign goods shall we be willing to receive and therefore what can we send away in barter?

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Ballasting Mine Tracks

Letter No. 1—I was much interested in reading the editorial entitled, "Proper Ballasting of Mine Tracks," which appeared in COAL AGE, Sept. 25, p. 536. In the same connection, kindly permit me to submit the following notes from my own experience in ballasting track on haulage roads, in sections of mines that required constant attention to keep the roads in passable condition.

In one instance, we had a particularly troublesome piece of track, which it seemed almost impossible to drain properly. Such was the nature of the bottom or floor of the seam that the tendency was for the roadbed to constantly sink below the level of the ditches. It so happened that, in that particular section of the mine, sandrock was very plentiful. This rock was broken to suitable size and used as ballast under the track and for filling local dips. The result was the formation of a very substantial dry roadbed, which greatly improved the hauling, at points on the road where the soft fireclay bottom had previously given much trouble.

In another instance, much trouble was experienced when a road was opened up through some old workings where the bottom was soft. The drawslate being plentiful in that section, it was first broken to size and used as ballast; but this material proved too soft for the purpose and the attempt to improve the road by that means was unsuccessful.

Stone taken from the field was then broken on the surface and sent into the mine. The result was a good roadbed that gave no further trouble. We found that it was more convenient to break the field stone and haul it into the mine than it was to crush the sandstone mentioned in the first instance.

Let me add, as the outcome of these experiences, it is my belief that where proper care is taken in selecting and breaking the stone this form of ballast is superior to lagging or corduroy for the making of a good roadbed, where mine haulage roads must pass over a soft bottom. The stone ballast affords excellent drainage and the road is kept dry.

Portage, Penn. JEROME C. WHITE.

Perpetuating the Thrift Habit

Letter No. 3—I was much interested in the letter of John Rose, COAL AGE, Sept. 18, p. 501, and in the previous letter of W. H. Noone, to which Mr. Rose has referred. With the writers of these letters, I feel that if the coal companies throughout the country would take more interest in matters that relate to the present comfort and future welfare of their miners there would be far less labor trouble.

In support of this conclusion, allow me to cite one instance that I believe would greatly assist in establishing better relations between employers and their men. The thought that I have in mind is not new but is greatly emphasized by the result of the efforts of many large coal operators to have their men invest in Liberty Bonds and Thrift Stamps at the beginning of the war.

Before the war, the miners were making as good money as now, considering the purchasing value of the dollar, and yet they did not as a rule save a cent of their earnings. As a result, few miners had anything laid by to enable them to invest in Liberty Bonds and stamps on the terms offered by the Government. Few indeed among these men could have bought a hundred dollar bond and paid for it as required.

In order to assist the Government and at the same time to impress on their men the principle of thrift, many of the larger coal companies came to the rescue and purchased bonds in any amount desired by their men, giving them from ten months to a year to pay for the same. This act of the companies resulted not only in a large percentage of miners and laborers investing a portion of their earnings in government bonds and stamps, but incidentally the habit of saving was strongly impressed on the men.

In this connection, it has occurred to me that great good can be accomplished along similar lines if coal companies would start a movement that would encourage their men to allow the company to deduct a certain amount from their pay, the same to be deposited in a savings bank to the credit of the individual from whose pay it was taken.

As has already been stated, the average miner who has once started to save and has accumulated a snug nest egg will not be inclined to favor unjust demands on the company to the same extent as one whose habit is to spend as he goes. It is my experience that the man who saves a portion of his earnings takes more interest in his family and has a pride in the education of his children.

Not long since, I overheard a well-meaning man say, "I wish I had the money to send my boy and girl to college and give them the education that would fit them for higher work in life." The result of this man's having failed to save a portion of what he had earned is that his children must be satisfied with a common school education and, in the majority of such cases, the children must start to work and assist in the support of the family as soon as they reach the age limit.

My thought is that more co-operation between corporations and their men along the lines suggested will establish a better feeling between employer and employed, and make better citizens and more efficient workers. I feel that a goodly portion of the better class of miners would take advantage of such an opportunity if offered by their company and be thankful for the privilege. On the part of the company, it would require no greater effort than what they put forth in the matter of securing subscriptions for Liberty Bonds and Thrift Stamps to aid the Government in the prosecution of the war. INTERESTED.

Johnstown, Penn.

Letter No. 4—Speaking of the thrift habit among miners, one is reluctantly compelled to admit that too many of this class of workers spend all they make. While the number may be smaller in some localities than in others, it would be difficult to find a mining community that did not furnish many examples of this thriftless class.

It has been said that "poverty and drink go hand in hand." Certain it is that the man who spends his money for drink has seldom enough left to buy the common neecssities of life for his family. But, when a man begins to save and lays by his earnings to make a home, he finds that there are plenty of places for the money to go without spending it at the saloons.

The most casual observer cannot fail to find in every mining camp a shiftless class of men who never save money—they do not try, claiming that their pay is too small and the cost of living necessities too high to make it possible to lay any money by under these conditions. It is this class of men who are always found casting their vote in favor of a strike. It goes without saying that it takes but a few of this class to mar the prospects of a whole community of men.

Again, there is another class of pleasure-loving men who are all too ready to invest their hard earned money in luxuries that they cannot afford. Many miners are buying autos that they do not need except as a pastime. Buying a car is all right for a man who can afford it; but many fail to realize that it takes more money to run a car than the actual cost of the machine. A man who has a large family to support would do far better to invest his money in buying a house and thereby avoid the necessity of paying rent.

It is my belief that, once a man begins a bank account, he will keep at it if given a little encouragement. To this end, a good plan would be to distribute circulars explaining how money may be saved and safely invested and giving warning against exchanging Liberty Bonds for the many fake stocks that are being offered so widely at the present time.

Let me urge, in closing, that every father of a family should make it a point to school his children and give them the training that is needed today more than ever. Let us remember that the lack of education is the cause of much trouble every way, both in the work in the mine and in our social life.

Rawdon, Quebec, Canada. C. McMANIMAN.

Letter No. 5—I quite agree with the suggestions made by others in regard to encouraging the thrift habit among miners. It is well worth while to give a little of our time to the study of such a worthy cause. I believe that coal companies would derive much benefit that would reward them for the efforts put forth. All that is needed is to devise some practical means that will be effectual in promoting thrift among mine workers.

When one considers the results that may naturally be expected to come from an organized effort to encourage thrift among employees in every industry, the plea that coal companies are "too busy" to take upon themselves further burdens falls into insignificance. Some feasible plan needs but to be started and, if started aright, it will gain momentum and need little to keep it going.

Someone may ask, what have I to suggest as a beginning? The question must be studied from the operator's standpoint and we must realize that there are two general classes of mine workers: Those who live in the town or mining camp and form a community among themselves; and those who live further out in the country and enjoy the freedom of the country life. It is the first of these two classes that requires the most attention to interest the men and enlist their co-operation and help in sustaining a community life and spirit that will prove a benefit to all.

The social quality is inherent in all human beings and miners are no exception to the rule. Unless special efforts are made to counteract evil tendencies in any community, there will always develop what is undesirable, owing to the work of some few who become the active element in society and the majority are unwittingly led into their ways of thinking and acting, which are too often wrong and lead to inefficiency and loss to all concerned. The tendency is thus in the opposite direction to that of thrift.

The work of coal companies and employers of labor in other large industries is obviously to devise some means of satisfying the inherent social quality that I have mentioned and develop among their employees a social intercourse that will be helpful and right. As has been often urged in COAL AGE, social clubs should be formed, libraries and reading rooms started, gymnasiums built and other means of recreation and enjoyment encouraged. Lectures and evening classes in the study of English and the simple sciences relating to mining, short courses in gardening, small fruit growing and sanitation should be introduced. All of these will be found most effectual in the accomplishment of their object, which is the building up of a strong, thrifty community life and making good workers and good citizens.

In making these suggestions, it is not my idea that the financial burdens should rest entirely on the companies who start and encourage the work. The project should be shown to be worthy of support by the state, from an economic point of view. When properly managed, many of these efforts will prove self-supporting. On its part, the state can well afford to supply good lecturers and competent teachers, while coal companies will generally be more than willing to build suitable places for assembling and give what is necessary to make the plan successful. In many instances, these several efforts can be so organized as to reimburse, by monthly payments, the company who furnished the means, and this would have a tendency to increase the pride and enthusiasm of the workers in carying on the scheme.

At the present time, I feel somewhat as though neither employers nor their employees have the necessary confidence in each other to produce the highest efficiency and progress in the coal industry. Let me say that to the extent that we are short of the necessary efficiency, to the same extent will we be short of the desired amount of thrift.

Linton, Ind. W. H. LUXTON.

Finding a Mine Door Set Open

Letter No. 7—Much credit is due Richard Bowen for having presented what it cannot be denied is a most important question and one which should be widely discussed by mine examiners and firebosses who have had long experience in the work. As stated by the editor, in his reply to Mr. Bowen's inquiry, COAL AGE, Sept. 11, p. 462, there are arguments on both sides of this question that are worthy of consideration.

The question is: How should a fireboss proceed when, on commencing his examination of a mine, he finds a door accidentally left open, which has destroyed the ventilation in the section of the mine he is about to examine? Mr. Bowen takes exception, seemingly, to the answer he quotes as given in a certain textbook, where it is stated that "the fireboss should close the door and wait a proper time for the circulation to be restored before continuing his examination of that section." To my mind, this is a proper answer.

Right here, let me say that a careful and competent fireboss would acquaint himself with what the fan was doing by observing both its speed and the water gage produced. A low water gage and a somewhat increased speed of the fan would at once tell him that the circulation in the mine was short-circuited. On entering the mine, his first step would be to ascertain the cause. We all know that, in such a case, he would enter the mine on the intake air and follow the current until he found the door that was not set open.

It should be remembered that mines are opened in different ways, by shafts, slopes and drifts, and, while some shaft mines are shallow, others are very deep. Now, it is my belief that the suggestion of closing the door and waiting for the circulation to be restored in the mine had reference particularly to the custom in vogue in deep shafts, in the old country, at a time when the entire mine was ventilated by a single continuous current, requiring many doors. It was then the custom for a fireman who found a door open at or near the foot of the shaft to close the door and return at once to the surface and notify the night engineer, who would take steps immediately to increase the circulation of air in the mine.

Assuming these conditions, it cannot be denied that it would be safe practice to close the door and return to the surface to wait for the circulation to be restored. It is true

that if a feeder was burning, at a point beyond where gas had accumulated, the restoring of the circulation might result in the gas being ignited and causing an explosion; but the fireboss, in that event, would be safe on the surface. It is possible to find recorded in old accident reports occurrences such as these.

The question presented by Mr. Bowen, however, requires us to consider present methods of ventilating coal mines on the split system; and we observe his illustration represents but a section of the mine, to be examined. This situation views the question from another angle and one cannot say but that it would be safer, as he suggests, to investigate further and ascertain the condition of the working places in the section, before closing the door.

Before deciding this point, however, it is important to consider if it is practicable and safe for the fireboss to incur the risk of entering unventilated places, which would require good judgment and the utmost precaution on his part when so doing. As a fireboss for a number of years, it is my belief that it is not practical to enter a section of a mine and proceed to make an extended examination where the circulation has been destroyed for any length of time.

Regarding the question raised by Mr. Bowen in reference to starting the examination of a section on the return end, let me say that my practice has always been to follow the air current, beginning at the intake end and examining each place in order. It is my habit to build the regulator at the head end or where the air enters a section.

However, it cannot be denied that to close the door shown standing open, in Mr. Bowen's sketch, would be dangerous owing to the gas accumulation in the first chambers of that section and the feeder burning at the face of a room further on. In the case presented, his point is well taken when he advises making a brief inspection of the place and extinguishing the feeder before closing the door. If officers are employed in this same [illegible] duty to see that no such feeder is left burning after shots have been fired.

[illegible]

[illegible]

[illegible]

caused by living under unsanitary conditions. The fundamental principle of hygiene is the elimination of the causes that undermine health and produce disease. Remove the cause and avoid disease is my motto. Likewise, in mining, eliminate the cause of danger and accidents are largely avoided.

Chief among the factors that contribute to the safety and welfare of mine workers I would mention the following. 1. Adopting the most improved methods of modern mining practice. 2. Making and enforcing strictly safe rules and regulations in the operation of a mine. 3. Maintaining strict discipline at all times.

Modern mining practice, in respect to underground haulage, requires separate travelingways and forbids other than those whose duties call them there to go on the haulage road for any purpose whatsoever. When this is impracticable in any mine, refuge holes and other precautions must be adopted to avoid accidents. Either the workmen should be hauled to and from their places in special trips, or the work of hauling coal should not be commenced until all the men are in their places, and cease before the time for the men to start home at the end of the shift.

The power of discipline loses its force when a selfish foreman or boss, desirous of making a record for himself, orders a motorman or triprider to rush out another trip, which he knows cannot reach the bottom or mine entrance before the men will be coming out of their places. When this is done at the last minute there is much confusion and every possibility that a serious accident will result.

HOW ONE ACCIDENT OCCURRED

In closing, let me cite an incident that I recall and which occurred when I was a boy. It was on a Saturday and everybody was anxious to get out early to see the football match. About a mile of the haulage road, in that mine, was an incline rising on a heavy grade to the shaft bottom. The last trip out had started from the inby parting where the fireboss was struggling to keep back the men until the trip had reached the top of the incline. In spite of his efforts, a few of the more reckless of the men managed to slip by and started on their way out.

Before the trip reached the top of the incline, however, a coupling broke and 22 cars loaded with coal started on a wild run down the slope. The sad result was that five mangled and lifeless bodies were carried out of the mine that day. This incident and others of a similar nature have impressed on my mind the truth of the old adage, "Fools will run where angels dare not tread."

True mine discipline depends largely on good mine management and the bosses living up to the rules and regulations they impose on the men. The best results were obtained in a mine where I was employed and strict discipline prevailed. The slogan was "Safety First," and anyone guilty of violating the laws and rules was called to the office and lectured in a manner to convince him that he was wrong, after which he was laid off a number of days or weeks, depending on the offense.

STEPHEN DAVIES,
Pocahontas, Alberta, Canada. Jasper Park Collieries, Ltd.

Coupling Hooks in Rope Haulage

Letter No. 1—Referring to the suggestions on coupling devices, for use in hoisting and haulage on slopes and planes, appearing in COAL AGE, Sept. 26, p. 520, it occurs to me that the device shown in Fig. 3 on that page would be improved by the addition of a swivel, instead of the link connection shown. A swivel would permit the rope to untwist itself without turning the clevis over, allowing the pin to drop out.

In the case of long hauls, say 2,500 ft. or more in length, especially if there are curves in the road, the twist in the haulage rope becomes an element of danger. Th use of a swivel would prevent the rope from accumulating any considerable twist, which might result in serious injury to the triprider when he uncouples the rope.

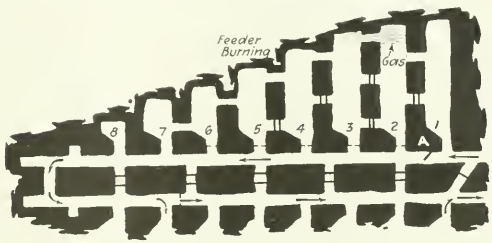
Portage, Penn. JEROME C. WHITE.

Finding A Mine Door Set Open

Letter No. 8—A study of the interesting question asked by Richard Bowen, "Coal Age", Sept. 11, p. 462, regarding the proper method of procedure of a fireboss on finding a mine door set open when starting his examination of the mine, shows that no hard-and-fast rule can be applied to suit every case. Practically all that can be said is, that the general rule requiring the fireboss to follow the intake current, in the examination of a mine, has many advantages; and, in the absence of any exact knowledge of extraordinary conditions prevailing in the mine, this is a safe rule to follow.

Assuming the conditions described by Mr. Bowen, as illustrated in the accompanying figure, if a fireboss traveling with the current found the door standing open at A, just inby of the mouth of the first room, he would naturally not waste any time attempting to find out who left the door open; but, from his knowledge and experience of this gassy section, he would immediately set himself to ascertaining the condition of the working places.

Proceeding up Room 1 and passing through the breakthrough at the face, he discovers gas at the head of Room 2. Without disturbing the gas, he passes on through Rooms 3 and



4 and finds the feeder burning in the face of the coal in Room 5. It is plainly his duty to attempt to extinguish the fire and if this is impossible, summon help. He knows the danger of disturbing the gas in Room 2 before extinguishing the fire in Room 5, and if he is a careful man he will at once close the breakthrough between Rooms 4 and 5 with a canvas, taking this from the mouth of Room 3 or 4, which will lessen the danger of the gas reaching the fire if accidentally disturbed by a fall of roof.

On the other hand, for the sake of argument and assuming the same conditions, let us suppose that the fireboss, having started his examination at the return end of this section, has proceeded as far as the head of the entries and while examining Rooms 8 and 7, a fall of roof occurs in room 1, which forces the gas through the breakthrough in the several rooms until it reaches the burning feeder and is ignited, causing an explosion.

The difference between this situation and that of an explosion occurring when the fireboss is at the intake and concerns only the position of the fireboss at the moment. If he is on the return side of the explosion he is sure to be overcome with the afterdamp produced and will have little chance for escape to fresh air. If he is on the intake side and the violence of the explosion is not sufficient to do him harm he has ready access to fresh air and his escape is assured.

I regret to say that, in several sections of the country, firebosses following instructions from their higher officials are starting the daily examination of the mine at the return end of the section to be examined, traveling against the air

current. The reason given for this practice appears to be that, if a dangerous percentage of gas is found in the main return airway, the source of its generation is quickly ascertained when the fireboss reaches the junction of the air split with the main return.

This argument, however, applies equally well whichever way the fireboss is traveling. It is only a question of which direction will bring him sooner to the split generating the gas. On the other hand, it must be admitted by all that it is a very dangerous practice to travel with a flame safety lamp against an air current charged with a dangerous percentage of gas.

DOORS ARE OFTEN LEFT OPEN OR BUT PARTIALLY CLOSED

In my personal experience both as fireboss and as mine foreman, I have frequently found doors propped open or only partially closed, because a driver or motorman, expecting to return shortly has set the door open for his own convenience; or because a triprider has allowed the door to drag along the trip, expecting it to close itself after the last car has passed, but this was prevented by a chunk of coal that fell from the car. In such cases, as fireboss, I would leave the door as I found it and continue the examination until I had ascertained the condition of every place in that split, after which I would return and close the door if it was safe to do so.

My conviction is that it is safer to follow the air current when making the examination of a mine, because the fireboss is then always working in fresh air, but if he advances against the current he is continually exposed to the foul air and gases generated in the section and his work is far less efficient. Moreover, when traveling with the current there is little danger of the flame of the safety lamp being blown against the gauze, which will invariably happen when proceeding against the current. Not only is there a chance of burning out the gauze in that case, but gas may be ignited should an explosive condition of the air develop unexpectedly.

TEXTBOOKS ARE USUALLY ACCEPTED AS DEPENDABLE BY MINING MEN

Let me add that our textbook methods of doing things are generally reliable, being the result of the observations of practical men. The idea so often expressed that textbooks are pure theory is rapidly meeting with disfavor among intelligent men who possess practical mining experience. However, there are many questions that arise in mining practice, the answers to which depend entirely on local conditions, and no hard-and-fast rule can be given to determine the practice in such case. Following are a few such questions:

Which should be the largest, the intake or the return airway in a mine?

Which is the more efficient, a force or an exhaust fan?

In sealing off a mine fire, should the intake or the return end of the section be closed first?

When making his examintion of a mine, should the fireboss travel with the air or proceed against the current?

My experience as a mine official and instructor in the principles and practice of mining has led me to urge students to consider carefully each side of these and similar questions before laying down a hard-and-fast rule for general application. In firebossing in a gaseous mine, however, I do not hesitate to advise that the best mining practice, in the absence of known extraordinary conditions, is to begin the examination at the intake end of the mine or section and proceed with the air current.

R. Z. VIRGIN,

Assistant Professor of Coal Mining, Carnegie Institute of Technology, Pittsburgh, Penn.

Preservation of Mine Timber

Letter No. 3.—I was interested in reading the letter of C. McManiman, COAL AGE, Sept. 11, p. 459, and am tempted to offer a few remarks giving my own experience in the matter of preserving the life of mine timber, especially timber used on main roads, travelingways and air-courses in mines.

Since it is the air of the mine that, penetrating the pores and the seams of the timber, causes it to decay or induces dry rot, any method that will keep the air from thus penetrating the wood will preserve the timber and lengthen its life.

In my judgment, the common black paint that is so largely used in mines for the purpose of preserving iron makes a good coat or covering for the protection of mine timber when properly applied after the bark has been removed from the timber. This will not prove an expensive operation, as the paint is cheap and quickly applied. It will generally be found to pay in reducing the outlay for timber on the roads.

It is unnecessary to attempt to preserve timber used in longwall work and in rooms and in pillar workings, as the life of such timber is short at the best. On the other hand, a great saving is accomplished by doing what we can to prolong the life of the timber used on main roads, travelingways and air-courses, which must be retimbered frequently when no means are adopted to preserve the timber from dry rot and decay.

I am under the impression that sufficient care is not taken generally by those who have charge of the prop yards at collieries. A large saving can be effected by arranging the distribution of timber in the yards so that it is not kept on hand an indefinite period, but is sent into the mine regularly as needed.

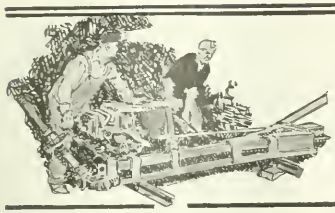
BEST WOOD IS CUT IN MIDSUMMER

Just here, I want to state my opinion that the best mine timber is that which has been felled and cut during the midsummer months, when the trees have attained their fullest strength, the bark is toughest and the sap strongest in the wood. I know that this is contrary to the advice generally given in textbooks to the effect that mine timber should be cut in the winter months when the sap has ceased to run in the tree; but it is my belief that mine timber should be full of sap and not stripped of its bark, except for the purpose of applying a protecting coat of paint such as I have mentioned. In my experience, crossbars and props live longest in the mine and show a greater resisting power when the timber is full of sap and the bark entire.

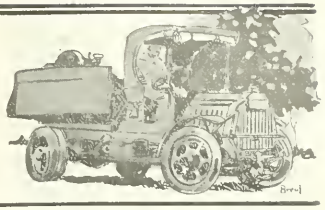
To test this question further, I consulted two mine foremen, one an older man having 10 years' experience in the coal mines of England and about 20 years in handling timber in and around the anthracite mines of Pennsylvania; the other, a practical young foreman who has passed through all the grades of mining from slate picker to foreman. To these men I stated the case plainly, asking them what timber in their judgment was the best to use for crossbars and props in mines, that with the sap in the wood and the bark protecting it, or timber free of sap and bark; in other words, well seasoned timber. Without hesitation, both of these men replied that the timber with the bark on and full of sap was the best to use for any purpose whatever.

Of course, I felt that this would be their answer, as it agreed with my own experience with mine timber. Speaking of the different qualities of some woods, let me say that chestnut makes as durable a mine timber as oak, and does not decay as quickly under the same conditions in the mine. It has nearly the same resisting power or strength as oak. My experience is that chestnut, oak and pine timber make the best crossbars, while ash and hickory are very serviceable for longwall work and in drawing back pillars.

Pittston, Penn. J. HENNIGAN.



COAL AND COKE NEWS



Fairmont, W. Va.

In anticipation of strike, northern West Virginia fields speed up production. Operators swamped with orders. Prices advance. Railroads make special effort to secure additional fuel. Pay prevailing prices. Pronounced increase in shipments, both east and west.

While the car supply in northern West Virginia fields was somewhat uncertain during the week ended Oct. 25, yet, taking the week as a whole, production was fairly well sustained. The most acute shortage during the weekly working period developed on the twenty-third, when there was only about a 50 per cent supply, that applying to the Baltimore & Ohio, Monongahela and other railroads. Every effort was being made by producers to speed up production as much as possible, so as to reach the markets with the maximum amount of fuel before the strike order became effective. It was generally believed in the Fairmont and other northern West Virginia regions, that a strike was certain unless the Federal Government stepped in, and while northern West Virginia operators had made up their minds to make no effort to operate after Nov 1, in the event of a strike, still they were anxious to get out as much coal as possible before the first, a task in which they succeeded for the most part.

The certainty of a strike of course, spurred buyers to the necessity of securing a supply of coal over and above ordinary requirements, and consequently northern West Virginia producers were swamped with additional inquiries and orders. It was possible to take care of only a limited amount of additional orders owing to contract requirements. Prices advanced in some instances as much as 75c a ton.

Railroads were making a special effort to secure additional fuel, claiming that they could not handle coal except with enough fuel with which to operate; therefore, a special effort was made by producers to meet the increasing requirements of railroads, which it is understood are paying prevailing prices. Shipments to the West grew in volume, naturally, in view of the demand developed in that part of the country as a result of strike talk. There was also a pronounced increase in the volume of tidewater shipments.

Charleston, W. Va.

Car shortage and labor troubles in the high volatile fields cause low ebb in production. Tidewater embargoes sent high volatile West. New River mines not hampered by labor troubles as in the Kanawha region. Smokeless in great demand, but contract orders absorb the output.

Conditions were far from satisfactory in the high volatile fields, or at least in the organized portion of such fields during the week ended Oct 25, production reaching a low ebb partly because of an inadequate car supply and partly because of labor troubles which have become chronic in the last two months. At the outset of the week the car supply was fair and a promise was made that it would improve as the week progresed. This it failed to do so that by the end of the weekly working period, the empties available had dwindled to such an extent that a number of mines were precluded from operating because of a total absence of cars.

Embargoes were still in force as to eastbound shipments from the high volatile fields; coal that would have been consigned to tidewater was shipped west and was accepted with avidity, owing to the growing demand for fuel in Western markets. As the strike clouds loomed blacker and blacker, many buyers were seeking cover and there was a sharp increase in the demand for both smokeless and high volatile fuels; yet in neither case was it possible for producers to afford much relief owing to a curtailed production due to causes already described.

It was regarded as certain that the miners in both a portion of the organized high volatile and smokeless fields would join the miners of the Central competitive field in a strike, in case the strike order should not be rescinded. While producers were anxious to speed up production before Nov. 1, both transportation disabilities and wilful hampering of production on the part of the miners precluded them from doing so.

With numerous mines on Cabin Creek and on Coal River (both in the Kanawha district) shut down, either throughout the week or at least a part of the week, production in the Kanawha region was even below that of the previous week. Radicals once again sought to organize another armed invasion of the Logan field and did succeed in forcing a suspension of several mines on Cabin Creek for several days; at one mine they succeeded in forcing all miners to agree not to work until November 1. While they endeavored to organize a large gathering at Cabin Creek Junction, from which point the armed march on the Guyan field was to be started, they only succeeded in persuading a few hundred miners to turn out, and the latter were forced to give up their plans in response to orders from the district and national president of the organization.

In addition to labor troubles operators were handicapped by particularly poor car supply, especially during the latter part of the week, empties from the Lakes failing to materialize. That was the only direction from which they could come owing to an embargo on eastbound coal freight. Up until Oct. 20 the prospects of a strike had not seemed to stimulate the demand to as great an extent as might have been imagined. Beginning on that date, however, there was a good deal of scurrying around for coal and there was a very pronounced increase in the demand in the Kanawha region. At the same time prices underwent a change, the advance amounting to about 25c a ton.

New River mines were hampered by no such labor troubles as stood in the way of a larger production in the Kanawha region, but production was still a good deal below normal in the New River district; principally because of the inability of the mines to secure as many cars as were needed, although the first of the week found mines fairly well supplied. During the last half of the above period, however, cars were a good deal more scarce and mines were much handicapped in meeting the demand, particularly at tidewater for smokeless coal, there being no embargo against that kind of fuel. As might have been expected there were Macedonian calls for smokeless over and above the demand recently prevailing, but producers were so rushed with contract orders as to make it next to impossible to come to the rescue with any additional fuel, even though prices reached a general level of at least 50c a ton above recent quotations

Huntington, W. Va.

Mine disability principal cause of decrease in production in Guyan field. Car shortage also occasions loss of tonnage. Capacity of Logan mines 350,000 tons a week. Unorganized fields to supply country with fuel during strike.

Production underwent a slight decrease in the Guyan field during the week ended Oct. 25 as compared with the previous week, the difference amounting to 5000 tons; this despite the fact that the car shortage was not running quite so large in tons (though larger in percentage) as compared with the previous weeks, mine disability being the principal factor in reducing the output. Still there was a los of 26 per cent and of 84,227 tons from lack of cars. However, even with the output reduced to 216,000 tons, that was 50,000 tons in excess of production for the corresponding period of 1918, when the influenza epidemic interfered so seriously with production.

As the full time capacity of Logan mines is in the neighborhood of 350,000 tons a week, it is believed that plants in this field will be able to come within a fair degree of reaching such production, when other mines are closed down and cars are more plentiful. At least a determined effort will be made to materially increase production with a view to supplying as much of the demand as possible, as it is realized by Guyan operators that the burden of supplying the country with fuel, for a time at least, will rest upon the unorganized fields.

Owing to the fact that fully 60 per cent of the output has been required to take care of contracts, Guyan producers have not been able to meet a very large proportion of the extraordinary demand which has arisen in connection with the strike, which will have become effective before this report appears. While prices had advanced in the Guyan field, operators in that field were making an effort to keep prices in leash as much as possible.

The tonnage of coal handled on the Chesapeake & Ohio system was increased during the week ended Oct. 25, as compared with the previous week, reaching a total of 13,259 cars; whereas during the previous week the movement had only reached a total of 645,000 tons.

Bluefield, W. Va.

Slight gain in tonnage in Pocahontas field. Car supply improved. With organized mines closed down, car supply is better and tonnage increase in proportion. Production speeds up in Williamson field. Output highest of the year. Conditions ideal for large tonnage.

While Pocahontas producers managed to regain a little lost ground, the gain was quite slight amounting to only 4,000 tons, the output being increased from 299,000 to 303,000 tons. Although a greater number of hours were worked during the week ended Oct. 25 than during the previous week, there was not a proportionate increase in production. There should have been a much larger gain in view of the fact that the car shortage was reduced to the extent of 19,000 tons, or from 182,000 to 163,000 tons. Coal coked amounted to 11,000 tons, or just about the same tonnage recorded during the previous week.

Owing to the limited production mines in the Pocahontas region were unable to do much toward supplying the country with additional fuel, finding it necessary first of all to take care of regular customers. It was generally expected, however, that with organized mines closed down for the most part, it would be possible to secure a better car supply, and that, under such circumstances, it would be possible for the Pocahontas district to assume its share of the burden of furnishing its country with fuel.

Much progress was made in the Williamson field in speeding up production, the ouptput for the week ended Oct. 25 being 140,000 tons, the highest for the year and 32,000 tons in excess of the output for the same week of the previous year. This improvement was due in part to a slightly reduced loss in car shortage and also the loss of a less number of tons from a labor shortage. Labor conditions are ideal for a large production here during the strike, and Williamson operators are making every preparation to get out a large tonnage during the continuance of the strike, having every reason to believe that a better car supply will enable them to do so.

Alberta, Canada

With the object of establishing a coal reserve, the Dominion Government, by order-in-council, has withdrawn from location a large area of coal land near the junction of the Muskeg and Smoky rivers, in the northern part of this province. The area is situated within 70 miles of railway communication and contains a number of large seams of bituminous and semi-anthracite coal. It is probable that a survey for a railway to connect the area with the Canadian Government railways will be made in the spring.

PENNSYLVANIA

ANTHRACITE

Shamokin—High officials of the Philadelphia and Reading Coal and Iron Company, after an inspection trip here, announced that a new shaft and million-dollar breaker will be erected at the Big Mountain colliery near here. This will be the last work in modern coal mining practice according to Superintendent John Hardesty. New coal seams, as yet untouched, will be reached which will mean a great increase in production at this colliery.

Hazelton—Owing to the scarcity of houses here and in the surounding towns, due to cessation of building during the war, the Lehigh Valley Coal Co. is ordering out tenants from its properties who do not work for this corporation. This is done so that employees can be accommodated. It is said that there never was such a demand for dwellings as exists at present.

Pottsville—Judge Bechtel handed down an order recently in which the Raven Run Coal Co. wins title to a colliery near Shenandoah, which was claimed by the Girard Mammoth Coal Co.

WEST VIRGINIA

Charleston—The Chesapeake & Ohio R. R. has been obliged to enter the market for coal following the issuance of an order directing the road to cease giving mines furnishing coal to it, the preference in the distribution of cars. This fact has been brought out through a letter from the fuel purchasing agent of the road at Richmond, Va., addressed to coal operators in this section, in which the statement is made that the company is compelled to arrange for a supply of fuel outside of the tonnage under contract, owing to the fact that contract-fuel mines have not developed the tonnage expected. The Kanawha Shippers' Association is contemplating making a request that the mines, which were demanding their fair share of cars while the C. & O. was giving its contract mines preference, be given a supply sufficient to make up for the loss, over and above their regular rating.

Charleston.—With more than 70 operators in attendance, the annual meeting of the Kanawha Operators' Association was held in this city on Friday, Oct. 17, officers being elected for the ensuing year. The association also gave its attention not only to problems immediately affecting them but to other questions of national importance in the coal industry. The session of the general meeting was brought to a close with a luncheon, at which D. C. Kennedy, secretary-commissioner of the association was presented with a handsome gold watch signalizing 15 years of continuous service with the association, the presentation being made by Quin Morton, newly elected president of the association. Officers chosen by the association were: Quin Morton, Charleston, president; W. C. Mitchell, of Plymouth Coal Mining Co., Plymouth, vice president; P. L. Dickinson, Quincy Coal Co., Charleston, W. Va.; D. C. Kennedy, secretary-commissioner, Charleston, W. Va.

OHIO

Macksburg—Another mine is to be opened near here about the first of the year, according to an announcement of the H. C. Snyder Co., of New Philadelphia. A shaft is to be sunk on the Leland Longfellow farm about a half mile north of this place. A tipple is to be constructed at a cost of $65,000 to $75,000. The output of the mine is expected to be approximately 800 tons of coal a day when the plant is in full operation. A complete electrical power and lighting plant will be installed. This company has its main office in Cleveland.

KENTUCKY

Ashland—A largely attended meeting of the Northeast Kentucky Coal Operators' Association was held in this city on Wednesday, Oct. 29, all parts of the district being represented. One of the principal attractions was an exhibition of the film "The History of Coal" loaned by the National Coal Association. The routine of the day's sessions was broken by a most enjoyable luncheon. Among several speakers present at the meeting was F. J. Gum, chairman of the Chesapeake & Ohio Allotment Commission. Mr. Gum addressed himself to the subject of car allotment and distribution.

The subjects under consideration at the meeting were: The labor situation and the threatened strike of bituminous miners; car supply and allotments; collective purchasing department; uniform monthly cost sheets; improved railroad, telephone and telegraph service up Big Sandy; community welfare work; compensation insurance.

ILLINOIS

Benton—Four men who robbed the Middle Fork mine (last June) of $42,000 after wounding two of the mine's employes, have been sentenced to serve from 10 years to life in the penitentiary. The four men are: Angelo Trini, Albert Trini, Antonio Fernetti and Riso Lubin. A fifth man, Nalo Pertigatto, was killed by an employes of the mine in an attempted escape. The other four men were captured several hours after the holdup in a nearby woods after a revolver fight with 200 residents of Benton. The men have been held in the St. Clair County jail at Belleville, Ill., as it was feared that they would be lynched at Benton.

Carterville—Application has been made before the State Public Utilities Commission for a certificate of convenience and necessity, to build an electric railway from Davenport, Iowa, to Metropolis, Ill. The commission has not given its decision on the matter. It is said that the building of this line would greatly facilitate the marketing of southern Illinois coal in the Northwest. The promoters state that the line will be built and equipped for heavy freight service in event of its construction.

Mt. Vernon—It is stated that a large acreage of coal has been contracted for in the western part of Jefferson County and that steps will be taken immediately to prove the field. The contracts are said to have been signed and a considerable sum of money deposited to insure the carrying out of the contract by the purchasers. This coal field covers a large portion of Blissville, Casner, Shiloh and McClellan townships. It is understood that it is the intention of the parties interested in buying this field to develop it in the near future should the coal prove satisfactory.

INDIANA

Anderson—The American Steel and Wire Co. has informed its 800 employees that the company will sell coal to employees contributing to the support of families at $4.30 a ton. The coal, which is said to be a good grade for domestic use, will have to be hauled by the mill employees. The mill has probably the largest stock of coal in Madison County, Indiana. Last winter the mill relieved a general shortage by selling several hundred tons of coal through the fuel administrator.

NEBRASKA

Omaha—A municipal coal department has been opened at the city hall here. Colorado coal will be offered for cash at $8.50 per ton.

MONTANA

Billings—One of the largest deeds recorded in Yellowstone County was filed here recently. It was a warranty deed from the Bull Mountain Coal and Realty Co., of Eau Claire, Wis., to the Bull Mountain Coal and Realty Co., of Billings, Montana. The transaction involved $450,000 in addition to any encumbrances there might be on the property. The sale involves almost 12 sections of coal in the Bull Mountain district east of Billings, acquired several years ago by the Wisconsin corporation. The new company intends to start development work on its holdings in the near future.

NEVADA

Tonapah—J. D. Darms, president of the Darms Coal Mining Co., who has been in charge of operations for the company in the Coaldale section for several years, is arranging for the resumption of work at his mines. Mr. Darms states that it is his plan to continue the main shaft an additional 100 ft., expecting to strike a new seam of coal in that distance. In that event the shaft will have a total depth of 640 feet.

Industrial News

Charleston, W. Va.—Construction work on two large plants of the Raleigh-Wyoming Coal Co. is to be in charge of Carl Scholz, consulting mining engineer, who has been engaged for some time in supervising the construction of mining plant for the Chicago, Burlington & Quincy R. R. Co. Offices will shortly be opened in Charleston by Mr. Scholz and construction operations directed from here, it being the intention of Boston capitalists who are behind the new company to establish one plant at Raleigh and one in Wyoming County. The plant in Raleigh will be at Manatus and is to be a drift mine in the Eagle seam with a capacity of 3,000 tons of coal a day. It is stated that it will require about 18 months to construct the Manatus plant. The Wyoming mine is to be at McGraws and will have a capacity of 5,000 tons a day. A shaft is to be sunk 600 ft. to the Pocahontas seam. It will require two years to have the shaft mine ready for operation. The property consists of 9,000 acres of coal land.

Louisville, Ky.—The Sun Coal Co., recently incorporated in Louisville with a capital of $100,000, by C. F. Lowther, J. W. McCullock and others, has recently leased mines of the Manchester Coal Co., Manchester, Clay County, Ky. The new company has purchased a commissary store at that point and has also bought outright the mines of the Flat Lick Coal Co., at Flat Lick, in Knox County. Deals are pending for mines in other eastern Kentucky counties and for some western Kentucky mines. The output of the company's mines will be handled through the Allied Coal Co.

Clarksburg, W. Va.—Rapid progress is being made by the Cornog-Cartright Colliery Co., in which Philadelphia capitalists are largely interested, and which was organized only a short time ago. The company is building a large plant near this city on the Parkersburg division of the Baltimore & Ohio where the company owns a tract of Pittsburgh coal. Approximately two months will be required to finish work on the plant which will represent an expenditure of about $100,000, including electrical equipment, the usual mine buildings and dwellings for miners as well as 2,800 ft. of tram-way. The company expects to begin using about 150 miners by Jan. 1 and to produce coal at the rate of 1,000 tons a day. H. M. Sipe is not only supervising all construction work but will be in charge of operations as general manager. The largest stockholders in the new company are H. K. Cartwright and H. B. Conor, of Philadelphia and J. G. Ebert, of Portage, Pa.

Louisville, Ky.—The Sun Coal Co., recently incorporated in Louisville with a capital of $100,000 by C. F. Lowther, J. W. McCulloch and others, has recently leased the mines of the Manchester Coal Co., Manchester (Clay County), Ky. The new company has purchased a commissary store at that point and has also bought outright the mines of the Flat Lick Coal Co., at Flat Lick, in Knox County. Deals are pending for mines in other eastern Kentucky counties and for some western Kentucky mines. The output of the company's mines will be handled through the Allied Coal Co., a selling organization which controls the Sun Coal Company.

New York, N. Y.—The Ingersoll-Rand Co., of this place, announces that the industrial growth of Texas and Oklahoma and the large demand made for modern machinery in this and other lines, has led the company to establish a branch office in the Sam Houston Life Building, Dallas, Texas, which will be in the charge of R. H. Brown, Jr., as manager. Mr. Brown has heretofore been connected with the company's St. Louis office and has, for years, been in intimate touch with the Texas-Oklahoma territory.

Charleston, W. Va.—The Pilgrim Land and Coal Co., of Chattaroy, W. Va., has been incorporated to operate mines in Kentucky; capital stock $50,000; incorporators, M. C. Ingham, R. H. Campbell, W. E. Morgan, M. A. Emmons, of Chattaroy, and A. D. Runyon, of Delorme, W. Va.

Princeton, W. Va.—The building of a branch line by the Virginian Ry. from Maben on its main line into the Milam Fork district of Wyoming County, W. Va., will make possible the development of a considerable acreage of Pocahontas coal. Some 30,000 acres in the Milam Fork area are owned by the Wyoming Pocahontas Land Co., headed by Andrew Squires, in which Cleveland capitalists are largely interested.

Huntington, W. Va.—Holdings in Wayne and Mingo counties, W. Va., will be developed by Huntington men who have formed the Wilson Thacker Coal Co., a $50,000 corporation. No time will be lost in completing arrangements for the beginning of operations. While the new company will operate in the territory mentioned, the general offices of the company will be at Huntington. Prominently identified with the new company are Walter C. Williams, E. M. Pyle, A. R. Mulers, P. K. King and John Bowman.

Charleston, W. Va.—The plant and property of the Barren Creek Coal Co., at Barren Creek, on the Coal & Coke Ry. near Clay, W. Va., has been transferred to the Barren Creek Colliery Co., the latter company having just been organized by John B. Hart, of Charleston, head of the Hartland Colliery Company. Two separate tracts of coal were acquired—one of 100 acres and another of 307 acres, both in Big Sandy district, on Elk River.

Carlinville, Ill.—On Oct. 25, shaft A of mine No. 1 of the Standard Oil Co., broke all records at the plant by hoisting 1311 tons of coal or 1034 cars. This is a splendid record when the equipment that is in use is considered. All of the cars were hand dumped and caged. The hearty co-operation of all men at the plant was given in making the new record.

Grafton, W. Va.—Within two months the Jenkins Coal Corporation expects to have a mine in operation in Wilson district of Upshur County, this company having just been organized with a capital of $25,000. The plant will ultimately have a capacity of 100,000 tons a year. The company announces it will be in the market for a quantity of 20-lb. steel rail, a steam, gasoline or kerosene locomotive and loading aprons. Operations will be superintended by Earl Jenkins. Principally interested in the new company are Captain F. P. Rease, Anna C. Rease and Earl B. Jenkins, of Belington, Martha E. Jenkins and G. H. A. Kunst, of Grafton, W. Va.

Charleston, W. Va.—Headquarters have been established by the Kelly's Creek Colliery Co. as well as by the Valley Camp Coal Co., in Charleston, offices having been secured in the Kanawha Banking and Trust Co. Bldg. C. S. Paisley is the office manager. The Valley Camp company was only recently organized.

Welch, W. Va.—The Link-Belt Co., of Philadelphia, has just been awarded a large contract for the complete installation of a modern coal tipple and retarding conveyor by the Mohawk Coal and Coke Co., at Mohawk, W. Va. Col. L. E. Tierney, president of the Mohawk company, is also interested in a number of other modern collieries in West Virginia and Kentucky. In order to properly clean and prepare coal for market this company decided to replace the present old structure with a plant of the most modern design. The new equipment will include automatic machinery throughout for handling about 2,000 tons of coal daily, from a seam at the top of the mountain or from one midway along the conveyor. The conveyor will deliver coal to a 750-ton coaling station or to the new tipple.

Charleston, W. Va.—T. E. B. Siler and others of this vicinity have organized the Posler Coal Co., which will operate mines on an extensive scale in the Kanawha field, this company having a capital of $120,000. So far as can be learned construction work will be started in the near future on this plant. Identified with this company were, in addition to Mr. Siler, C. G. Peters, J. L. Siler, Fred O. Blue and R. E. McCabe.

New York, N. Y.—The Ingersoll-Rand Co., of this place, announces that the industrial growth of Texas and Oklahoma, and the large demand made for modern machinery in various lines, has led the company to establish a branch office in the eSam Houston Life Building Dallas, Texas, which will be in the charge of R. H. Brown, Jr., as manager. Mr. Brown has heretofore been connected with the company's St. Louis office and has for years, been in intimate touch with the Texas-Oklahoma territory.

Charleston, W. Va.—The Pinnacle Pocahontas Development Co., Thos. H. Mordue, president and treasurer, has recently closed a lease with the Morris Smokeless Coal Co., of 1625 acres of No. 3 Pocahontas smokeless coal land near Nerndon, W. Va., on the main line of the Virginian railroad. The lessee will begin the construction of an up-to-date mining plant and town immediately, and expects to be shipping coal within three months

Weston, W. Va.—Plans of the Coal Land Development Co. for the operation of coal mines presage quite a large operation in the southern part of Lewis County. At the point mentioned the company has started construction work on a large plant; the company proposes to equip the mine with the most modern and efficient machinery with a view to securing a large production. Work on grading a sidetrack has been completed and general construction work is being pushed on the plant as a whole.

Fairmont, W. Va.—The Winfield Coal Co., will establish operations in Winfield district, of Marion County, W. Va., this concern having just been organized with a capital of $25,000. Plans are being made for early operation. Represented as incorporators were R. B. Satterfield, of Lumberport, W. Va.; G. B. Hartley, T. W. Powell, Alpha Orr and Paul G. Armstrong, all of Fairmont.

Morgantown, W. Va.—The sale of the Elkins Coal and Coke Co. with mines and coal properties in Monongalia and Preston counties, to the Bethlehem Steel Co., was ratified by the directors of the Steel Corporation recently. This not only marks one of the biggest coal deals in recent years in northern West Virginia, but it also means a change in ownership of approximately 23,225 acres of coal land in Monongalia and Preston Counties. Furthermore nine mines operated in those two counties are included in the deal, these mines having a daily capacity of 61 cars of coal and 19 cars of coke. The Elkins Coal and Coke Co. has been operating since 1902, when it was organized by the late Stephen B. Elkins. While four mines are operated in Monongalia County, the important holdings of the company were on the Monongalia-Preston line, where the company owned about 22,000 acres of Freeport coal. It seems to be pretty generally understood that following its purchase of the Elkins Coal and Coke Co., at a price approximately $4,000,000 the Bethlehem Steel corporation will construct byproduct plants at two or more points on the Morgantown & Kingwood Railroad.

Charleston, W. Va.—The Kanawha Smokeless Coal Co. has just been organized for the purpose of engaging in the business of mining coal in Raleigh County; although the new concern, which has an authorized capital of $1,000,000, has not so far made any actual purchase of land. Principally interested in the new company are: R. W. Steele, of Pittsburgh, Pa.; Geo. F. Auld, of Washington, Pa.; Geo. C. Mitchell, of Philadelphia; M. E. Moore and C. H. Hetzel, of Charleston, W. Va.

Victoria, B. C.—By order-in-council the Dominion Government has withdrawn location privileges with respect to a tract of land near the junction of the Muskeg and Smoky rivers in northern Alberta. Large deposits of high grade coals, both bituminous and anthracite, are reported to occur in this area. The coal is only 70 miles distant from railway communication.

Huntington, W. Va.—The Phillips Mining Co., of Huntington, was incorporated with a capital stock of $150,000. The incorporators are R. C. Phillips, E. J. Phillips, B. L. Douglas, J. Boman, W. Williams of Huntington.

New York, N. Y.—The Chesapeake Iron Works, of Baltimore, Md., manufacturers of the Chesapeake electric traveling cranes, has recently announced the opening of its New York office in the Woolworth Building. The office will be in charge of H. L. Mode.

Birmingham, Ala.—The Tennessee Coal, Iron and Railroad Co. recently opened to the public their new hospital building at this place. The structure is modernly equipped throughout with its own power house and ice-plant. Dr. Lloyd Noland is the chief surgeon.

Louisville, Ky.—The Hazard Coal Operators Association held a meeting in Cincinnati on Oct. 25, to discuss general conditions, this being a quarterly meeting. Operators reported that the Hazard field is not organized, and that no strike is to be expected.

Pinckneyville, Ill.—The Illinois Sixth Vein Coal Co. has installed a 75 k. w. Westcyn Electric generator, direct-connected to a Chuse single valve engine. Other equipment recently purchased includes a Sullivan short-wall cutting machine.

Charleston, W. Va.—The Posler Coal Co., of this place, was incorporated with a capital stock of $120,000. The incorporators are: T. E. Silor, R. E. McCabe, C. G. Peters, J. L. Siler, F. C. Blue, all of Charleston.

Odin, Ill.—Odin Coal Co., has purchased a Jeffrey fan, driven by an adjustable valve Ridgway engine. The installation will be completed as soon as the engine is delivered.

Percey, Ill.—Willis Coal Mining Co. are installing a new shaking screen and steel supporting structure. The new apparatus will have a daily capacity of 2000 tons.

Sesser, Ill.—The Southern Gem Coal Co. are adding two Sterling boilers to their equipment. An additional 10-ton locomotive has been purchased from the General Electric Co

Freeport, Ohio—The Crab Orchard Mining Co., organized some time ago and with headquarters in Columbus, will soon start operating on its property on the Baltimore & Ohio railroad, near this place. The property has two workable seams of coal, No. 7 and No. 7-A. A tipple has been erected and a railroad connection built. E. E. Learned, formerly sales manager of the Hisylvania Coal Co., is secretary and manager; R. C. Hastings, president of the International Telephone Co., is president.

Columbus, Ohio—The announcement is made that E. M. Poston, president of the New York Coal Co., has purchased a controlling interest in the Ohio Electric Securities Co., which operates a large power plant at Floodwood, Ohio, supplying many mines in the Hocking Valley field with electric current. The deal was closed by C. G. Hanes, representing English holders. The company also operates a similar power plant at Pomeroy and Middletown in the extreme southern Ohio field.

Scranton, Pa.—It is stated that the Von Storch mine of the Delaware & Hudson Coal Co., in this city, was sold recently to the Mid Ridge Coal Co., $2,000,000 figuring in the transaction. New York and Philadelphia capitalists are said to be interested. The mine is considered one of the fine producers of this part of the anthracite field. L. H. Conklin and Warren Acker, of Scranton, are the principal members of the Mid Ridge concern.

Columbia City, Ind.—Several thousand acres of land have been leased in Washington Township of Whitley County (in northern part of state), south of this place, by a Terre Haute coal concern. This company has a drill on the Ingram Merriman farm and will drill at other places soon in a search for minable coal.

Beallsville, Pa.—Charles Miller, of this place, recently closed a large coal deal in West Pike Township. Mr. Miller sold to J. H. Hillman, Jr., of Pittsburgh, the Pittsburgh seam of coal underlying two tracts of land in the township noted; the first was a tract of 389.865 acres and the other of 10.875 acres. The consideration was $371,000.

Charleston, W. Va.—The Wayne Steam Coal Co., of Philippi, was incorporated with a capital stock of $75,000. The incorporators are: G W. Newcomer, Connellsville, Pa.; A. G. Newcomer, Dawson, Pa.; Lou Cunningham, Bellevernon, Pa.; H. R. Hurst and R. H. Parker, both of Scottdale, Pa.

Charleston, W. Va.—The Concord Coal Co., which has just been organized by Charleston men, will have its principal works in Nicholas and Clay counties of West Virginia, with headquarters at Charleston. The concern is capitalized for $100,000.

Baltimore, Md.—The Phyllis Coal Mining Co. has been incorporated with a capital stock of $600,000 by John C. Lewis, Wm. E. Ferguson and Chas. B. Bosley. The principal office of the concern is given as 16 E. Lexington street, Baltimore.

Charleston, W. Va.—The Hepzebah Coal Co., of Clarksburg, W. Va., has been incorporated to operate mines in Harrison County; capital stock, $100,000; incorporators, George H. Hoffheimer, E. Bryan Templeman, Robert B. Stotler, Thomas R. Craig and Nellie Costall, of Clarksburg.

Charleston, W. Va.—Capitalists of Buffalo, N. Y., have chartered the Davenport Coal Co. here for developing coal land in this state. The capitalization is $300,000, and the incorporators include M. E. Preich and W. H. Farnsworth.

Philadelphia, Pa.—Philadelphia and New York capitalists are said to be interested in a proposal to form a corporation to take over part of the coal and oil holdings of E. B. Carr, of this city, in Morgan County, Kentucky. The property includes about 76,000 acres.

Charleston, W. Va.—The Fairmont City Gas Coal Co., of Fairmont, has been incorporated with a capital stock of $300,000. The incorporators are Thomas R. Cunningham, Connellsville, Penn.; A. J. Salzer, Weston; S. V. J. Barts, Pittsburgh; H. H. Staggers, Chas. E. Hawkes and Rollo J. Conley, all of Fairmont.

Grafton, W. Va.—Within two months the Jenkins Coal Corporation expects to have a mine in operation in Wilson district, of Upshur County, this company having just been organized with a capital of $25,000. The plant will ultimately have a capacity of 100,000 tons a year. The company announces it will be in the market for a quantity of 20-lb. steel rail, a steam, gasoline or kerosene locomotive and loading aprons. Operations will be superintended by Earl Jenkins. Principally interested in the new company are: Captain F. F. Rease and Earl B. Jenkins of Belington, W. Va.; Martha E. Jenkins and G. H. Kunst, of Grafton, W. Va.

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Ligonier, Pa.—Coal and timber land totaling 833 acres, located in Westmoreland County, near here, have been sold by F. E. Thomas of Beaver County, to W. F. Blair, senator from Waynesburg, Pa. The consideration was $650,000; this represents about $780 an acre.

Cleveland, Ohio—The Astel Coal Co. has been chartered with a capital of $100,000, by E. W. Astel, C. N. Fiscus, M. R. Burridge, E. L. Perkin and C. F. Taplin.

Personals

Colonel Hartey B. Ferguson, United States Engineer in charge of the Pittsburgh district, is now engaged in gathering information for the survey of the Monongahela River. It is hoped that Congress will at once act and appropriate a sufficient sum of money to begin and complete the improvements asked for by river interests.

E. W. Blower, who served with the American Expeditionary Force, has returned and assumed the position of sales manager of the Hisylvania Coal Co., a position recently made vacant by the resignation of **E. E. Learned.** The latter has taken up the operating end of the business of the Crab Orchard Mining Co.

Obituary

William Beury, a prominent coal operator of southern West Virginia, died at his home in Philadelphia on Oct. 28. Mr. Beury was born May 19, 1844. He was one of the New River and Pocahontas pioneers in the coal business, starting in the former field in 1878. He had large coal interests in Fayette and Mcbowell counties. He was a brother of C. C. Beury, of Charleston, W. Va., and also of the late Colonel Joseph Beury, of Fayette County, W. Va.

Trade Catalogs

Air Lift Pumping—Ingersoll Rand Co., New York. A 6-page folder; 3¾ x 8½ in.; illustrated. Illustrating an air lift installation.

The Clutch That Clutches—Medart Patent Pulley Co., Inc., St. Louis, Mo. Booklet. Pp. 16; 3⅞x8⅞ in.; illustrated. Describes the Medart friction clutches.

Typical Graphic Records—The Esterline Co., Indianapolis, Ind. Pp. 24; 8½x11 in.; illustrated. Description of Esterline instruments and comments on some typical records.

Portable Outfits for Oxy-Acetylene Welding and Cutting—Davis-Bournonville Co., Jersey City, N. J. Pp. 8; 8½ x11 in.; illustrated. Description of the three types of apparatus made by this company.

Air Lift Compressors—Ingersoll Rand Co., New York, N. Y. A 3-page folder; 3¾x8½ in.; illustrated. Gives a few facts why it "'tis a Good Investment" to buy the best air compressors.

Centrifugal Pumps—Sales Service Data. The Goulds Manufacturing Co., Seneca Falls, N. Y. Pp. 35; 7¾x10 in.; illustrated. Information on the theory, design and testing of centrifugal pumps.

Roberts & Schaefer Complete Coal Mining Plants—The Roberts & Schaefer Co., Chicago, Ill. An 8-page folder; 8½x11 in.; illustrated. Views of plants constructed by the R. & S. company.

Production of Explosives in the United States, by Albert H. Fay. For the year 1918. Technical Paper 231 Unillustrated; pp. 21; 5⅞x9⅛ inches.

Miscellaneous Applications of Electrical Heat—The Cutler Hammer Manufacturing Co., Milwaukee, Wis. Folder 479. Pp. 4; 8½x11 in.; illustrated. Description of space heaters.

Electrical Operation of Gate Valves, by P. F. Dean. Booklet distributed by The Cutler Hammer Manufacturing Co., Milwaukee, Wis. Pp. 8; 8½x11 in.; illustrated. Description of the Dean system.

An Analytical Method of Detecting Blown-Out Shots in Coal Mines, by G. F. Hutchinson and Jacob Borah. Department of the Interior. Bureau of Mines. Technical Paper 210. Unillustrated; pp 22; 5⅞x9⅛ inches.

Peat in the Dismal Swamp, Virginia and North Carolina, by C. C. Osbon Bulletin 711—C. Department of the Interior. U. S. Geological Survey. Illustrated; pp. 41-59; 5⅞x9⅛ inches.

Dangerous and Safe Practices in Bituminous Coal Mines, by Edward Steidle. Department of the Interior. Bureau of Mines. Miners' Circular 22. Practically all illustrations; pp. 110; 5⅞x9⅛ inches.

Why and How Coke Should Be Used for Domestic Heating, by Henry Kreisinger and A. C. Fieldner. Department of the Interior. Bureau of Mines. Technical Paper 242. Unillustrated; pp. 20; 5⅞x9⅛ inches.

Abatement of Corrosion in Central Heating Systems, by F. W. Speller. Department of the Interior. Bureau of Mines. Technical Paper 236. Illustrated; pp. 12; 5⅞x9⅛ inches.

Coke Oven Accidents in the United States, compiled by Albert H. Fay. For the year 1918. Unillustrated; pp. 26; 5⅞x9⅛ inches.

Recent Coal and Coke Patents

Mechanical Stoker—R. E. Jackson and B. O. Yearwood, Princeton, W. Va. 1,319,004. Oct. 14, 1919. Filed Dec. 18, 1918.

Coal—C. W. Kinter, Wellsburg, W. Va. 1,317,755. Oct. 21, 1919. Filed April 4, 1917. Serial No. 160,555.

Feeding Apparatus for Pulverized Coal—C. W. Kinter, Wellsburg, W. Va. 1,319,348. Oct. 21, 1919. Filed April 4, 1919. Serial No. 287,382.

Mining and Loading Machine—N. D. Levin, assignor Jeffrey Mfg. Co., Columbus, O. 1,319,156. Oct. 21, 1919. Filed Oct. 22, 1910. Serial No. 588,471.

Mining and Tunnel Shoveling Machine—E. A. Hurtley, Negaunee, Mich. 1,319,220. Oct. 21, 1919. Filed Dec. 14, 1916. Serial No. 588,471.

Excavating Machine for Mining—C. H. Funkey, Ramsey, Mich. 1,319,578. Oct. 21, 1919. Filed Nov. 12, 1917. Serial No. 201,707.

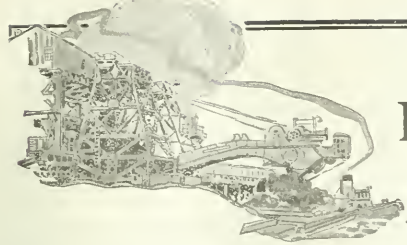
Recovery of Coal Distillation Products—H. H. Dow, assignor to Dow Chemical Co., Midland, Mich. 1,317,359. Sept. 30, 1919. Filed Jan. 14, 1918. Serial No. 211,726.

Mine Hoisting Apparatus—W. E. Grenough and S. B. Davie, Spokane, Wash., and A. Kragtrop, Mullan, Idaho. 1,317,366. Sept. 30, 1919. Filed April 13, 1918. Serial No. 229,427.

Mining Machine—R. E. Noble, assignor to Morgan Gardner Electric Co., Chicago, Ill. 1,317,812. Oct. 7, 1919. Filed Feb. 26, 1914. Serial No. 821,138.

Soot Cleaner—F. W. Linaker, DuBois, Penn. 1,318,293. Oct. 7, 1919. Filed May 4, 1917. Serial No. 166,352.

Automatic Distributor Mechanism for Stokers—N. E. Gee, Altoona, Penn. 1,318,067. Oct. 7, 1919. Filed Jan. 21, 1914. Serial No. 813,507.



MARKET DEPARTMENT

EDITED BY ALEX MOSS

WEEKLY COAL PRODUCTION.

The largest tonnage of coal loaded in the history of the country was reported during the week ended Oct. 25. Preliminary returns indicate that the 123 principal carriers originated 238,759 cars of soft coal, compared with 213,729 cars during the preceding week. This extraordinary increase in the tonnage of coal loaded (11.7 per cent) was in part offset by the decrease in the tonnage of coal coked at the mines, a decrease which attended the steel strike. In spite of this handicap the total estimated production of bituminous coal (including lignite and coal made into coke) rose to 12,118,000 net tons. Final figures are expected to show that the total output approached, if it did not surpass that of the week of July 13, 1918, which has hitherto been the greatest on record.

The exceptional production was achieved through the united efforts of miners, operators, railroads and the public. Consumers purchased eagerly in anticipation of the impending strike. The miners, with few exceptions, worked loyally and faithfully. The efforts of the railroads to improve car distribution begun last August, culminated in the largest supply of empties ever provided the mines, a supply which in many districts exceeded 100 per cent.

Anxiety felt by consumers over the impending bituminous strike was reflected in the demand for anthracite, production of which reached a new high level for the year. The week's shipments were 38,793 cars, equivalent to a total productoin of 1,992,000 net tons. This was an increase over the preceding week of 76,000 tons and a much more substantial increase over the corresponding week last year when the influenza epidemic was raging in the anthracite region. The week's output was, however, less than the rate maintained for some months during the summer of 1918, when production averaged 2,080,000 tons for a full-time week.

The fact that the output of anthracite responded so little to the stimulus of increased demand afforded by the strike shows the inelasticity of the anthracite supply. It indicates that any increase to be expected from the production of anthracite would avail but little to replace the capacity closed down by a general strike in the bituminous mines.

The rapid recent recovery of the beehive coke market did not continue during the week ended Oct. 25. Production is estimated at 565,556 net tons, a decrease of 1.6 per cent, when compared with the preceding week. The decline centered in Pennsylvania and Ohio. All other districts except Colorado, Oklahoma and New Mexico reported an increase.

The fifth week of the strike recorded a larger output than any other except the fourth. Production, however, is still a sixth below normal.

Shipments to the Lakes as measured by dumpings at lower Lake Erie ports declined slightly during the week ended Oct. 18. The tonnage of bituminous coal dumped (including vessel fuel) was 737,000 tons, a decrease of 94,000 tons when compared with the preceding week, but a substantial increase over the weekly average prior to the issuance of the strike order.

Total dumpings since the beginning of the season are now 20,743,000 tons, a figure less by four and a half million tons than during the corresponding period of the war year 1918.

Total shipments of bituminous coal to Atlantic Coast ports (New York, Philadelphia, Baltimore, Norfolk, and Charleston) were 3,842,900 tons during September, an increase of 11 per cent. over August, and of 6.7 per cent. over September, 1918. Cumulative shipments to tide during the first nine months of the year were 25,173,295 tons, some 4,000,000 below those of last year during the same period. The decrease is due to a decline in the coastwise movement to New England.

Coastwise shipments to New England during September are reported as 748,778 tons, almost exactly the same figure as for the month before. Compared with last year, however, the month's shipments were small, amounting to little more than half those of September, 1918.

The total tidewater movement of bituminous coal to New England from Jan. 1 to Sept. 30, was 5,670,849 tons. Compared with the shipments for the same nine months of 1918, there was a decrease of 4,838,000 tons, or 46 per cent. The decrease is believed to point less to a shortage in New England than to competition of fuel oil, decline in demand following the cancellation of munitions contracts, and the large stocks caried over from last season.

Atlantic Seaboard

Boston

New England steam-users not alarmed by strike. Stocks ample for the present. Railroads in this territory not yet confiscating coal. Priorities rule will assist more urgent cases. Too early to gauge effects of restored fuel regulations. Hampton Roads market unchanged. No spot demand in any volume. Anthracite factors manage to keep up with present demand, but are anxious over future.

Bituminous—One of the interesting sidelights on the current disturbed situation is the indifference of a large number of New England steam-users. Most of the large consumers have made every effort since early summer to keep coal coming in quantity sufficient for seasonable reserves, and whether or not coal in transit is seized by the railroads there is a much more comfortable feeling on the part of buyers generally than would have been the case some years ago when it was not customary to carry such large stocks. While there have been feeble attempts the past few weeks to pyramid prices there has been little encouragement in this territory for anything even approaching a runaway market. Buyers have not "scared" for a cent, and if, as generally assumed, the situation in the central states grows acute during November there is a distinct feeling here that some arrangement will be made that will permit the mine-workers to go back and produce coal until the beginning of another coal year.

Based upon more or less accurate data there has been a statement recently that New England industries have at least a 60 days reserve. In our judgment this would be putting it small, for the average winter stock in anything like a normal year is four months, and the number of consumers who now have on hand less than that amount must be small. The larger railroads the certainly in that position, in New England, and among those in touch with the market here there is practically no evidence of any alarm over the prospect of light production during November and December.

So far as can be learned, at this writing, the railroads here have not actually converted to their own use any comercial coal in transit. A large quantity of steam coal has been held at destinations, the railroads refusing they receive further instructions. There have been exceptions to this when it could clearly be shown that the coal was for a utility or other requirement high on the priority list.

It is strongly reminiscent of early 1918 as certain industries come promptly to the fore and insist that they are entitled to preference. There are a few smaller plants that were encouraged during the early fall to buy from time to time on the market, and what anxiety is heard is mainly from such sources. The priorities rule will doubtless be invoked considerably during the next fortnight or so, and if there are any really urgent cases they will be taken care of in that way. There is reason to expect that a large number of operations will keep at work in central Pennsylvania, but of this we shall know with more certainty in a week's time. Three holidays within the week make it especially difficult to measure the early effects of the strike.

It is also too soon to estimate the results of the restored regulations of the United States Fuel Administrator, effective from Oct. 31. Up to that time there were quotations on fair grades from central Pennsylvania all the way up to $4.50, but the larger number of operators were insisting upon moderate quotations as more befitting the disturbed situation. Such offerings were quietly absorbed, however, through customary channels and the movement all-rail, in consequence, the past week was heavier than at any time since August. All quotations in excess of the Government set prices are now illegal, but at this writing the trade is practically deadlocked and there is little or nothing that can be said on the subject of current prices.

Shippers over the New York and Philadelphia piers are mainly awaiting developments. Those having credits in the Tidewater Coal Exchange frequently find that there is no coal available for dumping, and for the present no cars will be dumped for needs that are clearly on the priorities list. A good deal of confusion has resulted, with no little hardship to those who have boats under charter and subject to severe demurrage charges, but it is felt that things will be straightened out this week. One result was the effort of speculators to realize on coal already loaded into boats, but little has been heard of such instances since the President's proclamation.

The longshoremen's strike had already affected the volume of coal sent to the New York piers, the tie-up of stevedores having caused even loadings at Philadelphia and at Norfolk. Several ships due at New York were diverted to other ports for that reason, and this has made bunker coal much in demand at Philadelphia especially. For overseas trade the bunker price for good grades was $6.75 and $7.25.

There has been no particular change in the Hampton Roads situation. Practically all shipments can be made to come within the preferred requirements, and at last reports coal from the smokeless districts was coming to the piers in good volume. The more

urgent requirements are for bunker and export trade and until the output of the Southern fields is materially reduced it is likely that these loadings will continue as heretofore.

At distributing piers in this territory there is practically no spot demand. A few small buyers are anxious to get coal, but aside from these it is hard to discover any uneasines over the outlook. Consignees whose barge transportation has been held up because of the striking tugboat engineers anticipated their wants all-rail and for the most part the coal has already been received.

Anthracite—The demand for domestic sizes continues urgent. The weather has been mild and there is not the immediate pressing demand we are likely to see later. The different distributors, both retail and wholesale, are managing to keep up with curent demand in most localities, but there is much anxiety over requirements for December and January. A great deal depends upon the weather. Already the lower temperatures have been felt in eastern Maine and there are considerable areas in that region that are today practically bare of coal.

The situation with regard to ocean tugs and the strike of engineers continues without change. Ocean tugs operated by the Railroad Administration and the Shipping Board are still tied up, pending a settlement. Meanwhile the shippers are struggling as best they can to get a normal tonnage forward. Movement all-rail has been increased, and dumpings over the New York piers somewhat accelerated, and these efforts together with a number of coastwise steamers located for the movement of anthracite have made it possible to keep up New England receipts, although the coal is by no means as well distributed as when barges were moving from Philadelphia as well as from New York. Were some basis agreed upon for operating the tugs it would relieve much apprehension in New England, especially in those places where neither all-rail nor by steamer can the population be served without greatly increased cost.

New York

Strike in bituminous mines creates confusion in the New York market. With loading stopped and reinstatement of Government prices and priority lists shippers are uncertain as to operations. Demands for anthracite steam coals becomes stronger. Pea coal hard to get with demand for the domestic sizes continuing strong.

Anthracite—The pressure for hard coal is stronger because of the strike in the bituminous mines. This in conjunction with the usual requirements for this season has created a demand for the domestic coals which cannot be met, even though the mines are being worked to capacity.

The trade has been favored with ideal weather conditions and comparatively light consumption, enabling most retail dealers to store a fair supply but the demand has been steady and constant which has kept stocks down far below normal. However, consumers are in a better position than they have been, with one or two exceptions in previous years.

Shipments from the mines were not as heavy as they might have been, because of the Federal order diverting every car possible to the soft-coal fields in anticipation of the trouble there. Loading at the piers was stopped on Saturday which prevented local dealers from obtaining a full week's supply of coal. However, no one appears to be suffering from the lack of fuel.

Stove, chestnut and egg are mostly wanted in the order named, with a good call for broken which is not generally used in this market.

Pea coal has been almost entirely out of the local market, due to the increased call here and from inland dealers.

Local salesmen report a good demand from outlying sections for all domestic sizes but few reports are heard of premiums higher than the 75c differential permitted for independent coals being paid.

As was to be expected the demand for steam coals grew stronger when it became apparent that the bituminous strike could not be averted. Many consumers of the latter who formerly used the hard coals will, it is believed, take this opportunity of returning to the use of the anthracite steam sizes. The companies are adhering strictly to their usual schedule of prices while some independents are said to be asking slightly increased prices for their product, much depending upon the supply on hand at the time inquiry is made.

During the seven day period ended Oct. 31 there were 5,465 cars of anthracite dumped at the local docks as compared with 5,507 cars during the previous seven days. There were 24,818 cars of anthracite dumped at the local piers during October as compared with 22,433 cars in September, last, and 26,616 cars in October of last year.

Bituminous—The situation in bituminous here is one of confusion. Almost up to the last minute the trade to a large degree believed the Government would be able to avert the tie-up. Demand had dropped and quotations for the various grades at the mines and for the pools at the loading ports which had been much stronger had eased off considerably. With the Government order reinstating the priority list and the Fuel Administration price list shippers were unable to do anything and business was temporarily suspended. In addition loading at all the piers was stopped and unless shippers were fortunate enough to have loaded boats in transit their deliveries were likewise stopped.

The harbor is filled with loaded boats many of which, unless the Administration intervenes, are likely to be held until the strike is ended, at which time there will be a ready demand for coal. Empty boats are a searcity.

Shippers during the early part of the week were able to get more coal to the loading ports because of the removal of the restrictions placed by the Railroad Administration to prevent over-stocking at the ports.

Large consumers, as a rule, have heavy stocks of coal on hand and will be able to face present conditions for a few weeks without experiencing great difficulties in obtaining fuel.

There was a report current on Saturday of last week that while the former price list of the Fuel Administration had been reinstated that a new price list showing slight increases would be issued. No one, however, seemed willing to indicate where this report started or what the difference in prices would be.

There were 5,123 cars of bituminous dumped at the local railroad docks during the week ended Oct. 31 as compared with 6,267 cars the previous week and 24,797 cars dumped during the month as compared with 23,367 in the previous month and 28,568 cars in October of last year.

Philadelphia

Anthracite consumers stirred by soft coal strike. Fear that hard coal mes might be affected. No easing off in demand for egg, stove and nut. Pea demand gradually increasing. Little improvement in receipts. Car supply adequate. Buckwheat coal picks up some. Rice and barley continue plentiful. Bituminous trade upset by reason of strike. Coal in transit seized. No spot market. Tide business held up.

Anthracite—As was to be expected the strike in the soft coal region has affected the hard coal trade. The public, at least that portion of it that has not yet been able to lay by its full stock for the winter, is giving the retailers considerable trouble in insisting upon prompt delivery of orders. Despite the anxiety for fuel the majority of the customers are insisting on the large domestic sizes and even though the dealers tell them that there will not be enough of such sizes to go around, they continue to ask for the favored grades, although they are willing to take a proportion of pea.

More than one dealer has had the experience of customers who never burned any other size than pea prior to the war, who now will not have that size, but want egg, stove or nut. The difference of $2 in price is not sufficient inducement to cause them to accept pea coal. It would seem that after having once tried the larger size, which many of them did during the extreme shortage, they have now become converted to the use of the big sizes.

To make the situation worse, there has not been any increase in the shipments of domestic sizes to this market The dealers cannot understand that after waiting all this time, that they do not receive better shipments. The rumor still persists that the New England trade is still being favored, and one report is that during the past week over 2,000 cars of large sizes were shipped into the state of Massachusetts alone.

While recently there was some tendency of a car shortage in the anthracite region, it is believed that the soft coal strike quickly remedied this situation, as from last accounts there are plenty of cars to be had.

While pea coal is not selling in the volume expected at this time of the year, the dealers report that it is picking up all the time and it is felt that with the arrival of more seasonable weather they will receive as much business on this size as they can take care of. They also expect the demand to increase from those customers who have been holding off waiting for the larger sizes, for the feeling is now growing that even though the anthracite miners have agreed to continue work, there is always the possibility of a sympathetic strike.

One of the large companies this week announced an increase of 40c a ton in the price of broken coal. This size has been selling right along at $5.95 per ton, whereas egg coal, a size which is often used in the manufacturing trade as a substitute for the larger size reached its maximum winter price on Sept. 1 of $6.35. With the 40c increase broken is now on a parity with egg. There is little domestic demand for broken coal, and quite a little tonnage is under contract at the old price of $5.95, and it is thought the increase was made more to equalize conditions than for any other reason.

There is some stir in the steam sizes, which may probably be due to the strike situation. There is nothing like a rush to procure coal, but inquiries are beginning to come in from new sources and the companies are having no difficulty lately to move their buckwheat coal. It has also been said that in at least one instance this size has been taken out of storage at a moderate extent. While rice and barley are still extremely plentiful, the demand is yet below production.

Bituminous—At this time the bituminous trade is badly upset. With the walk-out of the men production has praetically ceased. Fortunately local industrial plants are pretty well fortified with stocks of fuel, and it has been estimated that this district could get along fairly well for the next two months. Many of the plants had heavy tonnages in transit at the time the trouble broke, but because of the ruling of the Railroad Administration all of this coal has been confiscated and all users of bituminous have been so notified by the railroads.

At this time the trade is in a chaotic condition, as with the fixing of the prices by the Fuel Administration all competition has been taken out of the market and there is no business in the spot trade. At this time it looks as though the only produce likely to reach here for the next week or so will be from the wagon mines, which are fast resuming the activity enjoyed by them during the war.

All tide business has practically ceased for the time being, as orders have been issued to stop loading boats for export. As a matter of fact a number of vessels which had left their piers were recalled before they had passed out of the bay and were ordered to return to port.

Lake Markets

Pittsburgh

Leading coal operators holding prices down. Brokers secure fancy prices. No strike in Connellsville region.

At this writing the latest news in

connection with the coal strike is that Federal Judge A. B. Anderson, at Indianapolis, on Oct. 31 issued a temporary order restraining officials of the United Mine Workers from calling their strike, set for midnight, Oct. 31. This morning President Wilson signed the Fuel Administration order setting maximum coal prices at the last Government figures. Philip Murray, president of No. 5 district (Pittsburgh) says he will ignore the injunction.

In the past week Pittsburgh district coal has brought some very high prices, but the total turnover at fancy figures is asserted to be small. Large operators state that they have not charged extra prices and assert that if high prices are charged to consumers it is by jobbers. Some of the jobbers admit making large margins, but claim that operators have also charged high prices.

A number of sales by jobbers are reported at about $5 for prepared sizes of gas, while mine-run steam coal has brought $4 and higher. Large operators claim to have sold at much lower prices and on the basis of their position the market of the past few days may be quoted as follows: Slack, $2.20 and $2.30; steam mine-run, $2.30 and $2.40; gas mine-run, $2.50 and $2.70; prepared sizes gas, $2.90 and $3.10, per net ton at mine, Pittsburgh district.

While at this writing the extent of the strike, if any, is problematical one thing of importance to this general district is that the union miners will be unable to get the Connellsville region, which has always been nonunion, to strike, as Federal protection will prevent that. The Connellsville region now ships about as much coal as it converts into coke in the region, and lately the proportion has been abnormally large through coke production being restricted on account of the iron and steel strike making a number of blast furnaces idle.

Buffalo

More and more quiet in bituminous. Not much trade expected during November, whether a strike occurs or not. Heavy stock on hand. Anthracite moving heavily by lake. Not much locally.

Bituminous—The demand is light, the supply is not only light, but growing lighter and more uncertain every day. The railroads are taking it in quantity and the manufacturers do not want much more right away. They have, as a rule, several months' supply in yard. The shippers have made it plain to them that it was to their advantage to keep a supply on hand and they have done so. Now they are feeling quite independent of a strike and will wait awhile before buying in any amount.

At the same time quite a good amount is coming from the mines, but the roads are taking it so fast that the Lake trade is feeling the shortage and there are already more than 40 big steamers laid up for the season. There are enough left to take care of the business offering. Grain does not promise to move at all freely and if it should the giving out of the ore supply early would make tonnage plenty for any sort of down cargoes. All the coal, both hard and soft, will be shipped to the Lakes that can be got to the docks for loading.

The situation is, a short bituminous supply to the Lake trade, but a large anthracite supply. The railroads are securing orders from government authorities for coal to be delivered to them. The absence of war-time emergency conditions seems to make no difference to the roads, but the shippers do not see it that way and much prefer to fill their regular orders. If the strike comes to little the roads will not long ask for privileges of that sort.

It is not easy to state the price conditions. A few shippers are asking 50 cents to $1 premium on their coal over former prices. Many of them are not even doing that. With this in mind it is thought best to continue former quotations, as follows: $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lum, $4.65 for three-quarter same, $4.20 for mine run, $4.10 for slack, $4.60 for smokeless, $5.75 for Pennsylvania smithing, all per net ton, f. o. b. Buffalo.

Anthracite—The trade does not change materially. City consumers are asking for more all the time, but the distributors and retailers say they are promised a good supply when the Lakes close and in that way are able to reduce complaint to the lowest. It is likely that more coal is in cellar now than there was last year at this time. The mild winter made it quite unnecessary to put in an average supply. All the wise ones are predicting a warm winter, but they did also two years ago, so no dependence can be given them.

The independent anthracite shipper is asking all the way from 75 cents to $3 premium on his supplies, but the regular prices remain just what they were when the last advance was made on Sept. 1, as follows:

	On Cars, Gross Ton.	At Curb, Net Ton.
Grate	$8.55	$10.20
Egg	8.80	10.65
Stove	9.00	10.85
Chestnut	9.10	10.95
Pea	7.45	9.30
Buckwheat	5.70	7.75

The lake shippers of anthracite are still increasing their loadings, but the Upper-Lake docks want more and more. The surplus over last season is large and last increasing. For the week the mount was 145,300 net tons, of which 88,100 tons cleared for Duluth-Superior, 17,400 tons for Milwaukee, 15,800 tons for Chicago, 11,200 tons for Fort Williams, 5,400 tons for Marquete, 3,600 tons for Manitowoc and 2,800 tons for Hancock. Rates are unchanged.

COKE.

Buffalo—The coke market will hardly be brisk again this season, for all branches of trade in connection therewith are decidedly dull. Too many Lake steamers have been put into the iron-ore trade, till the Lower Lake docks are piled high with it. Coke therefore remains dull at former quotations: $8 for 72-hr. Connellsville foundry, $7.50 for 48-hr. furnace, $7 for off grades, $7.75 for domestic sizes and $5 for breeze, all per net ton f. o. b. Buffalo.

Toronto

Market conditions unsettled—Prices of bituminous advanced. Shipments taken over by railroads. Use of anthracite by industrial plants prohibited.

Conditions in the coal trade are considerably unsettled owing to the strike of bituminous coal miners in the United States. Prices for soft coal have substantially advanced and many industrial consumers who had been buying from hand to mouth, are now ordering freely, so that supplies on hand may shortly be exhausted.

During the last few days, shipments of bituminous from the mines have been taken over in transit by the American railroads, so that future supplies are very uncertain. H. A. Harrington, of the Ontario Fuel Administration, announces that the industrial plants will be restrained from using anthracite except with the written consent of the administration. Shipments of anthracite are still coming through, but in quantities insufficient to meet the demand.

Quotations for short tons are as follows:

Retail—Anthracite: egg, stove, nut and grate, $12.50; Pea, $11.00; bituminous steam, $8.95; slack, $7.95; domestic lump, $10.00; cannel, $11.50.

Wholesale—f. o. b cars at destination: three-quarter lump, $8.00; slack, $7.00.

Cleveland

Coal fields from which Cleveland and northern Ohio draw their supplies are so well organized it is expected shipments will be entirely cut off in a few days. For three days now practically no receipts are reported, while the Lake trade has been cut off to the point of denying Great Lakes freighters fuel coal.

Bituminous—Since Thursday practically no bituminous coal has been received in Cleveland, the carriers standing between the consumers and the mines. Cleveland normally receives about 25,000 cars of coal a day, of which 90 per cent is bituminous. About 5,000 cars a day are required by public utilities and such other essentials as hospitals, the street railway, and the like. It is estimated that the larger electric light corporation of the two here has from four to six weeks' stock on hand. Domestic consumers are said to have laid in 85 per cent, of their winter supply.

Iron and steel works have just begun to resume, and are now operating at about 20 per cent of the district's capacity, but as they have practically no stocks on hand early closing for them is seen. The by-product coke plants in this district are amply stocked, and it is claimed they can operate long after coke-using plants will be forced to close. Most industrial consumers cannot operate longer than two weeks, if the strike is made anywhere near effective.

Operators have been quite successful in their attempts to hold down coal prices, and while a few bituminous grades have doubled supplies have not, the main reason for this has been to put them on a parity with grades advanced a week ago.

Public opinion in Cleveland appears unanimous against the strike. Operators are claiming that Monday will show not nearly so many men out as union leadere claim. Several of the iron and steel plants here that have their own coal mines say their miners have declared their intention of staying on the job.

Pocahontas and anthracite—While some cars have filtered through the blockade of the railroads in the last three or four days demand for these grades have double while supplies have virtually been cut in half. Some dealers have stopped handling Forked Pocahontas. Most dealers still are taking orders for these grades, but are not promising delivery as they fear a tie up in the bituminous fields will also affect the Pocahontas and anthracite mines.

Lake Trade—Under orders from the railroad administration absolutely no coal is permitted to be placed for the Lake trade. It was expected that shipments to the head of the Great Lakes would be cut off, but the ban on bunker fuel was a surprise. Unless lifted immediately—and many in the Lake trade believe a mistake has been made—Great Lakes freighters must be taken out of commission at their last port of call. This will tie up the iron ore and grain trade, the latter being especially heavy toward the end of the season. Friday saw only 5,047 cars of bituminous coal at the lake front, with loadings totalling only 1071 cars and less than 1800 cars in transit. This means that Saturday sees virtually the last coal loading in the Lake trade. The movement of late has been only about half of normal, and unusually heavy demands will be made later on the all-rail movement from Indiana and Illinois to the Northwest.

Prices of coal per net ton delivered in Cleveland:

Anthracite—Egg, $11.75 to $11.90; Chestnut, $12 to $12.20; Grate, $11.75 to $11.90; Stove, $11.90 to $12.10.

Pocahontas—Forked, $10 to $10.50 Shoveled lump, $10; Mine-run, $8.

Domestic bituminous—West Virginia splint, $9; No. 8 Pittsburgh, $6.60 to $6.90; Massillon lump, $8.25 to $8.50; Cannel lump, $10.50; Coshocton lump, $7.50.

Steam coal—No. 6 slack, $5.25 to $5.50; No. 8 slack, $5.10 to $5.50; Youghiogheny slack, $5.25 to $5.50; No. 8 ¾- in., $6 to $6.25; No. 6 mine-run, $5.25 to $5.50; No. 8 mine-run, $5.75 to $5.90.

Columbus

With all miners out in Ohio the coal trade is at a standstill. Demand for domestic grades is strong, while there was a reaction on steam grades. Considerable uncertainty is apparent in the strike situation.

Practically all Ohio coal miners went out Nov. 1, closing all of the mines in

the state. This was in accordance with the strike order issued by the officials of the miners' organization. Previous to the suspension there was a general buying movement, mostly on the part of domestic users. The strong demand for steam grades, apparent several weeks ago had subsided to a certain extent. The suspension had been discounted on every hand and it is not believed that there are prospects for any marked coal shortage within the coming 30 days.

Domestic trade has been the strongest point in the market. Retailers have been placing large orders and have been urging immediate shipment. Retail stocks are not large, although there has been a steady accumulation during the past few weeks. Many of the dealers have been following a plan of cutting orders down in tonnage in order that all consumers have a chance for some coal. Retail prices are firm at former levels, as the new price-fixing notice had not yet taken effect. An announcement as to Ohio prices is expected soon.

The steam trade is active, although the rush of buying noted several weeks ago has passed. There has been enough orders, however, to absorb all of the available tonnage. Prices on steam grades were boosted under the influence of better buying and remained at the higher levels until price fixing became effective.

A canvass of the situation shows that most of the steam users have fuel supplies for a month to six weeks and many are even better supplied. Public service concerns are pretty well looked after and the same is true of public institutions. Rubber plants have ample supplies and general manufacturing will not suffer immediately. The railroads are expected to confiscate much of the coal now awheel in order to provide a fuel supply.

The Lake trade has been active and a considerable tonnage is being moved to the Northwest. This movement is expected to cease soon, not only because of the suspension but also because of the close of navigation. Practically all of the desired tonnage has been moved to the Upper Lake regions.

Production during the last week of operation was at a high rate. With a better car supply in all mining districts there was a large tonnage produced on all sides. The new orders concerning the unloading of cars stimulated the production and it is estimated that the Hocking Valley produced about 85 per cent. of capacity with other fields showing up with slightly lesser percentages.

Louisville

Price control meeting with much disfavor in Louisville. Kentucky mines operating at nearly half time as a whole. Retailers out of coal. Railroad Administration holding supplies.

Kentucky operators, jobbers and retailers are much concerned over price regulation, which it is claimed will wreck some of the operating companies unless many changes are made. Operators point out that such action is unconstitutional, and decidedly unfair. One operator in discussing this point said: "If the administration can force maximum prices on all coal sold, it should also arrange for us to secure the same maximum prices on coal sold under contract last spring. We took heavy tonnage orders with the Railroads and other industrial consumers on steam coal at far under the market in order to force movement of such grades, and put up domestic prices to equalize the low steam prices. Now we are expected to sell our block coal at prices much lower than had been figured on, and in selling steam at contract prices and old administration prices we will be unable to exist in some cases. The war is over and there is no reason for controlling prices. A readjustment is bound to come, or a lot of mines will be forced under."

The action of the Railroad Administration in seizing all grades of coal and holding them is also severely criticized. The railroads are seizing all block, steam and screenings under orders, and clogging sidings, yards, etc., holding coal under load, whereas it should be moved as rapidly as possible so that the cars may be unloaded, and placed back in service. Mines at the present time are securing full car supplies, but this can not last long if the roads are to be glutted with loaded cars, and the supplies of empties reduced. In fact there will not be room on sidings to accommodate the coal, and trouble is bound to come when an effort is made to get this coal moving.

Louisville retailers at a meeting on Monday found that 19 dealers had just 7,000 tons of lump or back coal in their yards, all of which was sold. A few thousand tons of steam coal was on hand, a considerable portion of which was also sold. It was reported that cars delivered to retailers on Saturday and Monday were later removed by switching crews before they could be unloaded. Forty-two cars consigned to retailers are held in local yards, and it is known that 157 cars shipped from Kentucky mines to local retailers are being held. Retailers are taking practically no orders as they haven't coal to fill orders, and are not sure of prices.

The strike situation in Kentucky is not considered serious, and it is believed that most districts will be operating again within a week or 10 days. In northeastern Kentucky many union mines in the Elknorn and Big Sandy district are running. Hazard operators report practically full operations. The Harlan district is down tight, as is most of the Southern Appalachian which is well organized. In the Harlan district operations are running full at Lynch, Ky. The owning company is said to be paying higher wages than the union scale, as it is not a commercial development in any sense of the word, and not controlled by any wage agreements of the Fuel Administration period. The Wisconsin Steel Co. mines at Benham, Ky., will probably be running full within a day or so.

In western Kentucky the miners refused to go out in violation of a wage agreement made when the mines were organized in September, and 47 mines, mostly union operations, in Hopkins, Christian and Webster counties are running full. These mines have a big production and are said to be operating profitably, as they hadn't contracted much coal, and prices were not much above former administration figures. These mines are now producing coal at $2.60 for lump, $2.35 mine run, and $2.05 for screenings, and are reported to be working full with a full car supply.

The effect of the big operations in these counties is resulting in miners in Henderson, Muhlenburg and other counties being anxious to get back to work. A union meeting at Henderson, Ky., on Monday was postponed, as union leaders feared the men would go back to work on a vote. Evansville, in southern Indiana reports that miners are dissatisfied with the strike, claiming that they didn't have a say, and should have been given a vote.

Federal troops have been moving freely from Camp Taylor for several days to mine districts in West Virginia, and it is reported that a big detachmenet is at Knoxville, to keep peace in both street car and mine strikes. Everything has been quiet and orderly in Kentucky so far, as the miners as a rule don't appear to be enthusiastic over the strike, and apparently merely answered the union call. In Bell and Harlan counties, it is reported that the strike is firmer than in any other section of the state, and that these counties will probably be the last to surrender in event the strike is broken.

So far as the strike is concerned operators appear to be optimistic, and feel that it will only be a few days until troubles are adjusted. However, the price-control plan is causing a great deal of uneasiness in every branch of the coal trade.

St. Louis

Strike finds St. Louis with about 10 days supply of coal ahead for domestic uses among dealers. Steam plants average 30 days. Railroads average 10 days. Situation will be appalling if strike lasts more than two weeks. Railroads holding all coal under orders from the Government. Country without fuel in many cases.

Situation in St. Louis proper is allright for the present, but at the expiration of 10 days the situation will be extremely critical, for then many of the householders will be out of fuel, some steam plants, and there will be no coal available from the retail dealers. About 25,000 to 30,000 tons are in storage, but this will last but a day or two. The average domestic consumer in St. Louis has enough coal to hold him for 60 days. The average steam plant has 30 days supply.

A large element of poor people have but little coal and thousands of people who are obliged to move on account the high rent, etc., are without fuel.

Nearly all the coal shipped the last two or three days in the month is being held by the railroads before being delivered, so that the Government may appoint fuel administration officials to distribute it according to priority rulings. Thus at the end of the week the situation is somewhat uncertain.

There are thousands of cars of coal in and around the St. Louis terminals. The ten days supply held by the railroads will probobly require that a large part of this be confiscated.

B. F. Bush, regional director of the southwestern region for railroads, has his committee appointed Saturday but would not make an announcement until he ascertained who would co-operate with them from the Fuel Administration. This committee will regulate the distribution of coal according to the priority rulings.

In the last few days from the Carterville field little coal was shipped to this market. The Iron Mountain held nearly all of the coal loaded on its rails. The tonnage of railroad coal from the entire field was the heaviest on record. The same applies in a way to the Duquoin field, where the car shortage was somewhat severe.

In the Mt. Olive field the railroads took the greater portion of coal mined in the past week. The car supply also held the tonnage down, but a fairly good volume moved into the St. Louis market and some into the country.

In the Standard district the railroads, as usual, got the bulk of the coal. The mines worked better the last week than they have for some time as far as the eqfipment is concerned and every mine came close to producing its daily capacity.

The latter part of the week the announcement of the Government price caused some uneasiness and uncertainty in the wholesale market. The retail price, however, is unchanged and will likely continue that way on all of the coal shipped that will be delivered to the dealers.

Public sentiment is strongly against the miners and the feeling in the coal trade is that something will happen in the course of a week to ten days that will likely bring about a resumption of work in the course of two weeks.

There is little Carterville moving in. It is all going at the regular price, with few exceptions. Cars are somewhat short on the Missouri Pacific and on the Illinois Central

In the Duquoin field cars are short, about three days a week being the supply. Some of this coal is being held at the circular price and some of it is being sold at whatever it will bring.

In the Standard field there has been much profiteering on the part of a few unscrupulous operators. The big operators are holding a circular price that is within reason. Two-inch lump coal has sold as high as $4.50, mine run from $3@$3.50, and screenings at about $2.50.

On Friday W. J. Jenkins, of the Consolidated Coal Co., called the operators together and in co-operation with the Chicago operators, who are co-operating with the Government, decided that a maximum price of $3.25 on domestic sizes, $3 on mine run and $2.25 on screenings should prevail, with a 25c commission to jobbers over and above that price, the 25c to be the limit on the jobbing business, regardless of how many hands it passed through. This has stabilized the market and although there is a shortage of coal and nothing is offered free, there is an easier feeling and the public is not incensed.

There has been an advance of 50c a ton this week on the retail price of all soft coal in St. Louis, making Carterville $6.50, Mt. Olive $6, and Standard $6.50.

COAL AGE

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Even Country Storekeepers May Strike

By R. DAWSON HALL

IT is reported that the mine worker, who has struck against the production of coal for the use of the storekeeper and others, is much incensed that the storekeeper refuses to give him goods on credit. A man with unwarped judgment would be disposed to expect that the storekeeper would strike against all and sundry who went on strike against him.

The merchant in the mine village is not so clearly conscious that the strike is directed against his interests, and he is willing to sell his goods to the strikers so long as they have the money to pay for them, and to leave "politics", as he would term it, entirely alone. He does not see his way clear however to help the strike by selling goods on credit, especially as the credit has often been found bad.

By purchasing goods at the village store the mine worker has patronized the storekeeper and he lays great stress on the favor he has conferred upon him. Now in high dudgeon, he says that he will do so no more. Has not the mine operator patronized the workingman for years by purchasing his labor, and is not the mine worker bound to the operator by this fact in just the same manner as the storekeeper is bound to the mine worker?

If buying goods of a store is conferring a favor on the store, buying the labor of a man, often the only thing he has to sell, is conferring a favor on that man. If the miner is justified in striking, so is the storekeeper; for the moral obligation to continue the relation of mutual service is equally binding in both cases.

The promise of the mine worker that he will build a rival store as soon as the strike is over and so ruin the storekeeper who will not back the mine worker's strike by unlimited credit is also interesting. The striker, by hiring men to run a coöperative store, puts himself in the position of hiring strike breakers. He would blacklist the storekeeper and put him off the job because he ventured to strike and so inconvenienced his master, the mine worker.

All this is extremely human. In common with some great statesmen, here and abroad, the mine worker enunciates great principles, but fails to follow all that they imply. If he would receive justice, he should himself be just. But perhaps this is only right and not necessary. He may be among the Great Privileged who no longer must do as they are done by.

To the party on the side lines it is sometimes interesting as well as highly enlightening to observe how quickly and thoroughly some people's views change with a variation of circumstances or conditions. The pedestrian who "cusses" every auto driver for his recklessness maligns with equal vehemence the careless person on foot who inadvertently gets in his way, as soon as or at best shortly after, he invests in a "flivver". The rankest of fire eating socialists, Bolshevists, anarchists, who insists that all real estate is a gift of Providence and should be held in common by all humans becomes a law-abiding citizen with pretty fairly clearcut notions about the rights of property as soon as he purchases, we will say, a house and lot or a small farm.

In the "storekeepers' strike" the miner is receiving a small dose of his own medicine. From his wry face we may reasonably assume that he does not relish the concoction.

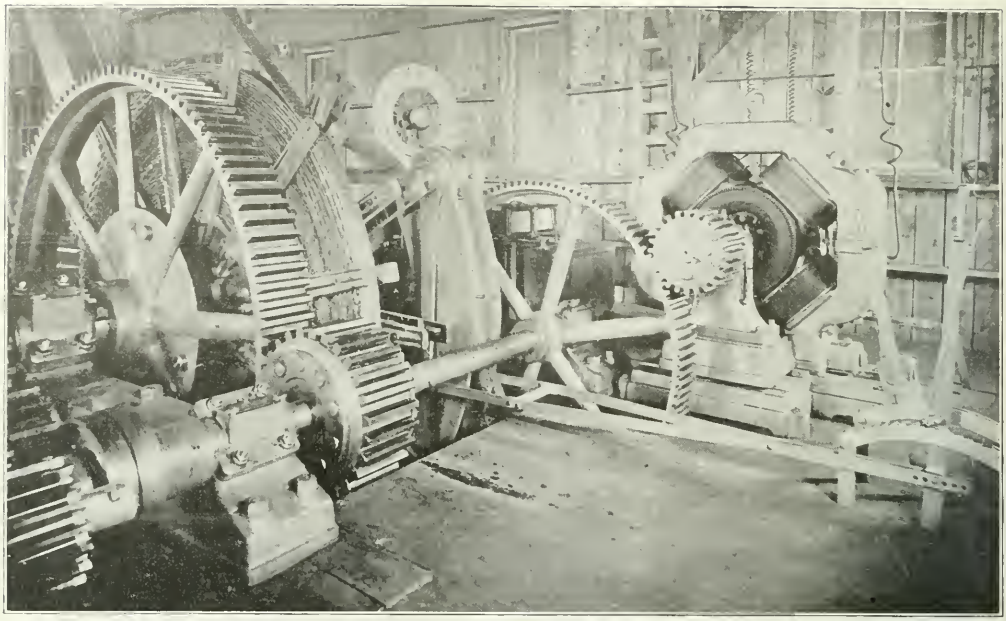


FIG. 1. EARLY ELECTRIC MINE HOIST INSTALLED AT FREE SILVER SHAFT, ASPEN, COLO., IN 1895, AND AT THAT TIME THE LARGEST IN THE WORLD

Progress in the Electrification of Mine Hoists

By R. S. Sage
Schenectady, N. Y.

SYNOPSIS — *The electrification of mine hoists proceeded slowly for many years, chiefly because of their intermittent operation and the high peak loads to which they were subject. The difficulties encountered in their operation have been so successfully overcome, however, that at present over 85 per cent. of new installations are electrically driven.*

AS THE natural occurrence of mineral deposits is usually such as to require their elevation from various depths to the surface, some means of accomplishing this transfer constitutes an important operation at almost all mines. In many cases, particularly with coal, it is possible for the material to be brought out through a tunnel driven either on a horizontal or on such an inclination as to permit the use of cars drawn by mules or electric locomotives. For the most part, however, both with coal and ores, it is necessary to bring the material to the surface by hoisting, either through a vertical shaft or on inclines too steep for the employment of locomotives.

There are therefore so-called "main" hoists for bringing the material to the surface (or as is occasionally the case in metal mines, to lift the material to the main tunnel out of which it is brought in cars), and in many cases auxiliary hoists, generally referred to as "man and supply" or "chippy" hoists, chiefly used in handling men and materials. Underground, small-powered hoists are often used for hauling cars up steep inclines from one level to another, and less frequently the main hoist itself is installed underground.

Until comparatively recent years the steam engine was used almost exclusively for operating these various mine hoists. Compressed air, however, was also used to a considerable extent, the most notable example of the latter being the group still in operation at the Anaconda Copper Co.'s mines at Butte, Mont. It was many years after electricity had come into general use in the railway field and elsewhere before the utilization of electric motors for driving "main" hoists began to receive serious consideration in this country, although considerable development work had been done in foreign countries, especially in Germany and in the gold fields of South Africa.

Electrification naturally began with the smaller hoists used in underground work, it being early found convenient and advantageous to operate these with electric motors from the direct-current mine circuit supplying lights, pumps, and later electric locomotives, thereby eliminating long steam and air pipe lines. The practice, however, did not extend rapidly beyond these small equipments, for many reasons.

Mine operators, as a rule, were more or less unfamiliar with electric power except in the small quantities supplied by the usual direct-current circuit for the

purposes previously mentioned. Central station power did not reach many mining localities, and where available often could not be had in sufficient quantity at attractive rates or with assurance of reasonable continuity of service. On the other hand, the highly fluctuating character of the mine-hoist load was not such as to appeal to the moderate-capacity central station.

There was also a certain amount of prejudice against the electric drive on the part of the users of steam hoists, due to a feeling of unreliability resulting probably from a knowledge of certain instances of power failure. And further, an idea was prevalent among coal-mine operators that as the coal burned under their steam boilers came from their own mines, the cost of fuel for this purpose was little or nothing and therefore was not taken into account in estimates of the cost of steam power. As a matter of fact, coal that could be used for this purpose had a considerable market value. The exceedingly low all-day efficiency with which the average steam hoist operated and the enormous waste of fuel in supplying power to this and other mining operations was generally unappreciated until made the subject of a special investigation and comparison with results by electrification.

It was therefore necessary that many existing conditions and ideas should undergo a change before hoist electrification became general, headway to this end being slow until the last few years. Much was accomplished by engineering reports of operating conditions at various mining properties which showed in the majority of cases indisputable advantages and economies to be secured by general electrification. As an instance, actual tests of a typical large coal mine hoist indicated that 50 lb. of coal was burned per horsepower-hour of work done on the coal hoisted. With electric power, produced in even a moderate-capacity station, not more than one-tenth this amount of coal would be burned for the same unit of work.

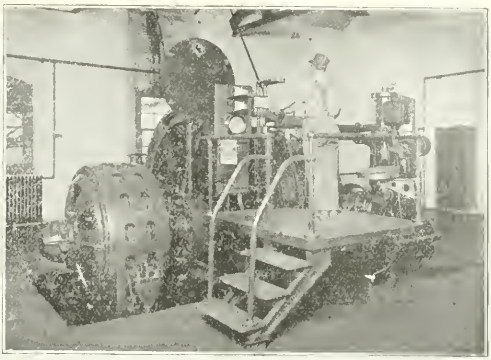


FIG. 2. MAIN HOIST AT PITTSBURGH COAL CO. MONTOUR MINE NO. 2, COWDEN, PENN.

As more economical methods of electric power generation and distribution became known and the necessary apparatus became more highly developed, a number of companies carrying on extensive mining operations installed their own hydro-electric or steam-electric plants and instituted motor drive for all their operations, including hoisting. At the same time electric power became more accessible to other mining localities as the number of central generating stations increased and others were enlarged and their service extended.

With such service available, there existed few instances in which electrification could not be shown justifiable from an operating-cost standpoint alone. Meanwhile many hoist electrifications had been made abroad with great success, proving the many claims of superiority for the electric over the steam hoist. Among these were greater safety, reliability, simplicity and economy. An indication of the possibilities in economy accruing

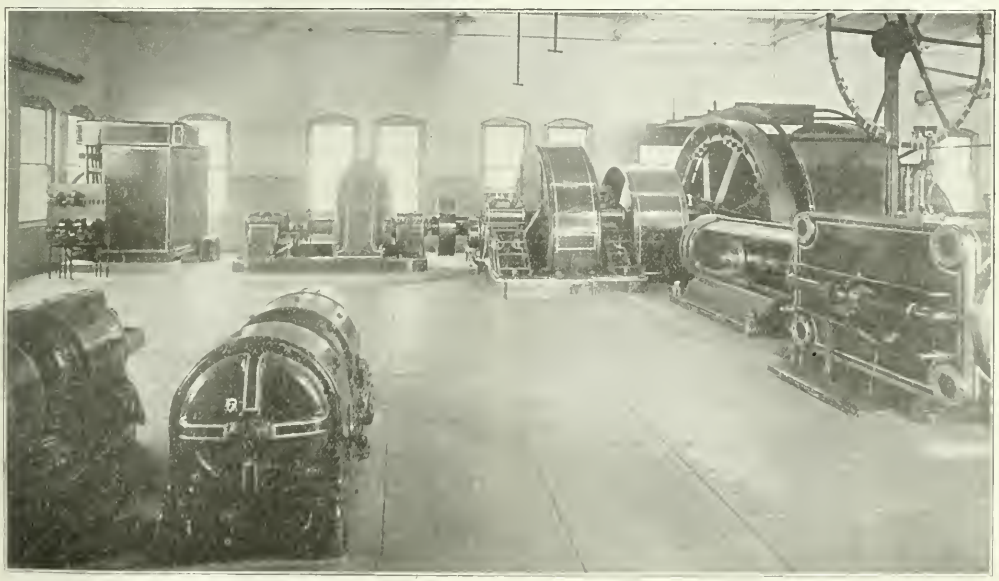


FIG. 3. MOTOR AND GENERATOR EQUIPMENT, TENNESSEE COAL, IRON AND RAILROAD CO., MUSCODA DIVISION, RED ORE MINES, SLOPE NO. 4

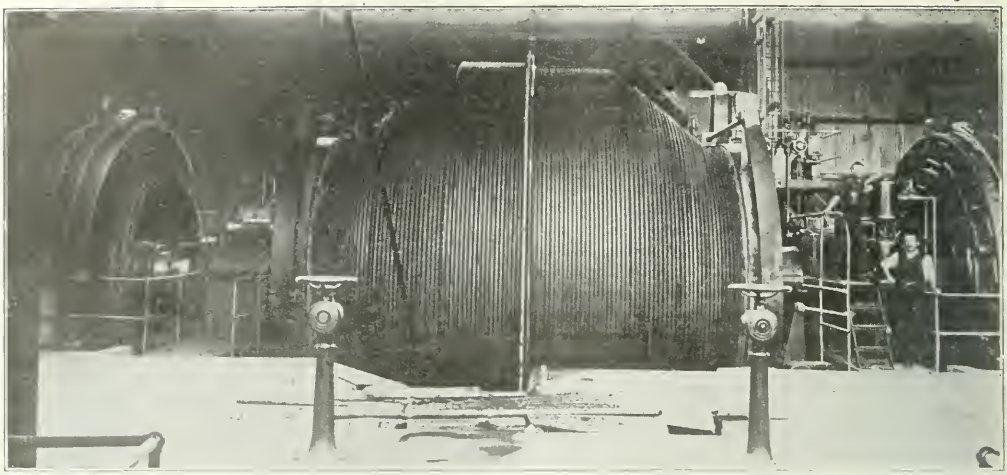


FIG. 4. HOIST AT THE SOUTHLAND SHAFT, CROWN MINES LIMITED, SOUTH AFRICA

from electrification in mining properties is the statement recently made after an investigation, that through complete electrification of the anthracite coal fields the amount of coal used in the production of an annual tonnage of approximately 90,000,000 tons could be reduced from approximately 10,000,000 tons to less than 2,000,000 tons.

Probably the first instance of the application of the electric motor to driving a hoist for mining purposes was the outfit put into operation in July, 1888, at the Aspen Mining and Smelting Co., Aspen, Colo. The manager of the company at that time was persuaded to install 1000 ft. underground a single-drum, flat-friction hoist driven through a single gear reduction by a 10-hp., 440-volt, railway-type motor, the complete outfit being built by the Sprague Electric Railway and Motor Co.

This equipment, which replaced a steam-operated hoist, was used for pulling cars into the tunnel and proved such a success that two similar hoists were installed soon afterward. It continued in operation for many years with the original motor, which has since been replaced by a G-E 800 machine.

In 1895 there was installed at the Free Silver Shaft, also at Aspen, an electrically operated hoist (Fig. 1) of comparatively large capacity, driven through gearing by a 100-kw. railway-type generator. This machine, at that time the largest electrically operated hoist in the world, was designed by D. W. Brunton, mining engineer, and supplied by the Roaring Fork Electric Light and Power Co., a pioneer in hydro-electric power generation. An auxiliary motor of 60 hp. was arranged for throwing in on a second pinion to assist the main motor when necessary to lift the heavy water bailer. Little use, however, has been made of this arrangement.

In the anthracite coal fields the first motor drive for hoist work was installed in 1896 on a 1200-ft. slope at the Maltby Colliery of the Lehigh Valley Coal Co. at West Wyoming, Penn. The hoist, built by the Lidgerwood Manufacturing Co., is driven by a G-E 2000 (approximately 100 hp.), 500-volt, railway-type motor and controlled by an R-15 controller. This machine is in regular operation at the present time, the entire outfit having been in continuous service during the 22 years since its installation.

From these small beginnings the electric hoist has become today the prevailing type of hoisting machine, many steam plants having been converted to motor drive with great advantage. Fully 85 per cent. of all new installations are now electric motor driven. The General Electric Co. alone has equipped many hundreds of mine hoists of various types in this and foreign countries. Considering only those driven by motors having a continuous rating of 250 hp. or larger, there are 240 installations aggregating 121,000 hp. A typical coal mine installation is illustrated in Fig. 2. Of these all but 35 are driven by geared induction motors, the largest being of 1800 hp. continuous capacity, developing during starting approximately 2700 hp. This equipment (Fig. 3) the largest of this type in this country, is installed at the mines of the Tennessee Coal, Iron and R.R. Co. at Muscada, Ala., having replaced a first-motion Corliss engine for operating a single drum slope hoist. This installation, furnishes an excellent example of the ability of the modern central power station to handle widely fluctuating loads of this character.

The direct-current equipments include two of 4000-hp.

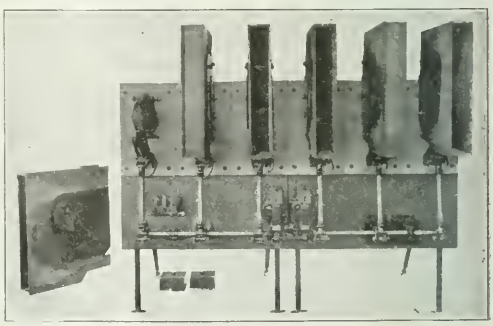


FIG. 5. PANEL SHOWING AIR BREAK CONTACTORS WITH POTENTIAL INTERLOCKING CONTACTOR AND TRANSFORMER

continuous rated capacity, the largest in the world (Fig. 4), which are installed at the plants of the Crown Mines, Ltd., and the New Modderfonte Gold Mining Co., both in South Africa.

An electrification of unusual magnitude indicating the extent to which electric drive for mine hoists has been carried is that of the Cleveland Cliffs Iron Mining Co., Ishpeming, Mich. This company, which was among the earliest to adopt electric power in mining operations, produces its own current in both hydro-electric and steam plants, and has installed some 29 electric hoists totaling over 11,000 hp. rated capacity. Of these hoists, 26 are driven by geared induction motors, 16 of which, identical in every way as to electric equipment, are of 400-hp. capacity at 360 r.p.m., 2200 volts. These installations have been made from time to time as new shafts were opened, the hoists being used with complete

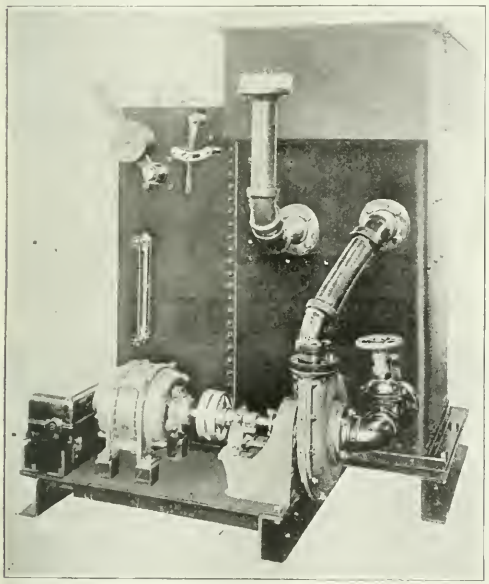


FIG. 6. LIQUID RHEOSAT WITH ADJUSTABLE SILL FOR INDUCTION HOIST MOTOR

success for handling ore and men, and during sinking operations.

There are many similar examples of extensive hoist electrification in both the metal and coal-mining fields, and the number is continually being augmented as circumstances permit.

The broad experience gained in the past has led to many improvements in the design of the apparatus constituting complete equipments. This experience, backed by a thorough understanding of the various elements upon which the successful operation of the electric hoist depends, insures in every specific case the application of apparatus of the proper type and capacity required to meet the conditions of operation. In general, every case constitutes a problem in itself, necessitating for its solution not only a complete knowledge of the duty to be performed, but all other conditions affecting the design of apparatus and system to be employed.

With induction motors, widely used in mine service,

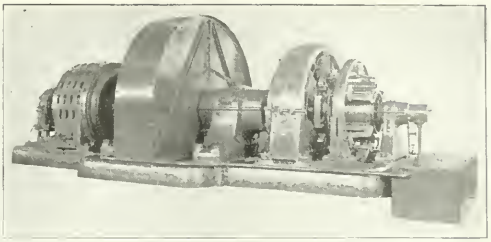


FIG. 7. FLYWHEEL MOTOR-GENERATOR SET

the principal requisite in addition to adequate torque and capacity, good performance characteristics, and rugged construction, is low slip-ring voltage in order to prevent flash-over at the rings in case the motor is reversed at full speed. Under this condition double standstill voltage is developed between the collectors, and should a short-circuit occur the motor would be incapable of developing appreciable torque.

The highly developed art of gear-cutting permits the use of moderately high-speed motors, which is desirable from the standpoint of first cost as well as performance characteristics. With herringbone gears it is not uncommon to use reduction ratios as high as 15 to 1.

As large direct-current motors can be designed to operate with good efficiencies at the low speeds required, they are usually direct-connected to the hoist drums and the necessity for gears eliminated. The use of commutating poles and compensating pole face windings for hoist motors and Ward Leonard generators has overcome all difficulty in handling the heavy peak loads encountered in this service.

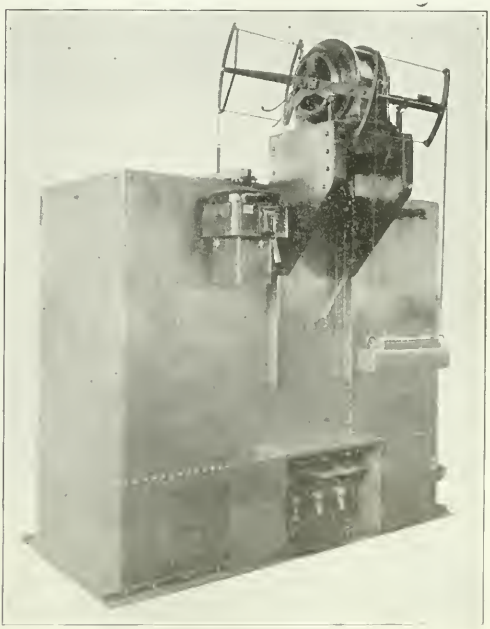


FIG. 8. LIQUID SLIP REGULATOR FOR FLYWHEEL INDUCTION MOTOR-GENERATOR SET
(Shows mounting of oil switch for short-circuiting torque motor)

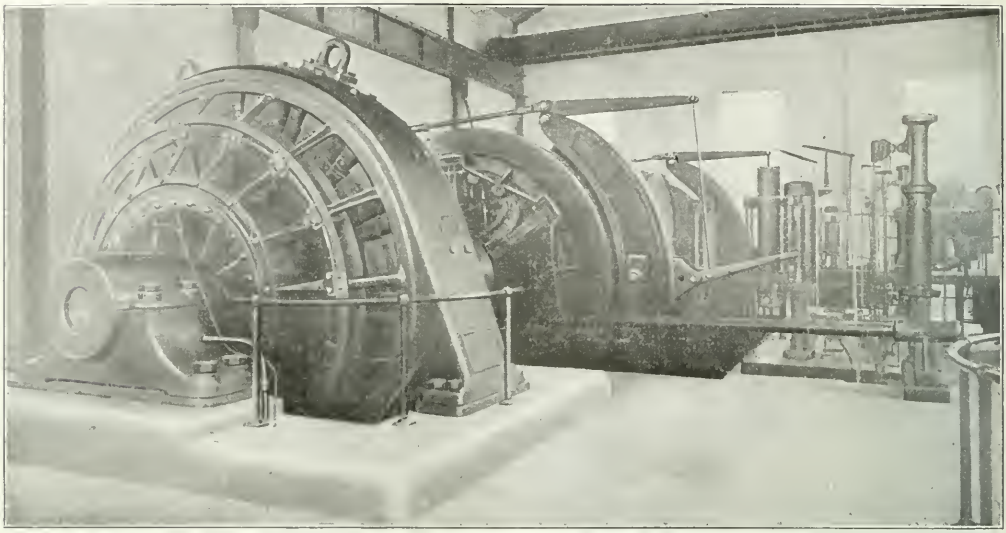


FIG. 9. HOIST MOTOR DRIVING FIRST MOTION DOUBLE CYLINDRICAL HOIST, ELM ORLU MINING CO., BUTTE, MONT.

Difficulty was early encountered in some instances because of insufficient capacity in the resistances used with rheostatically controlled motors. Due to the frequency of starting and the necessity of operating at creeping speeds for shaft and rope inspection, etc., and the liability of occasional reversal at full speed, the resistance for the mine hoist motor must be specially designed with these requirements in view, the resulting rheostat being much heavier than that required for occasional starting duty, or for crane service. For the

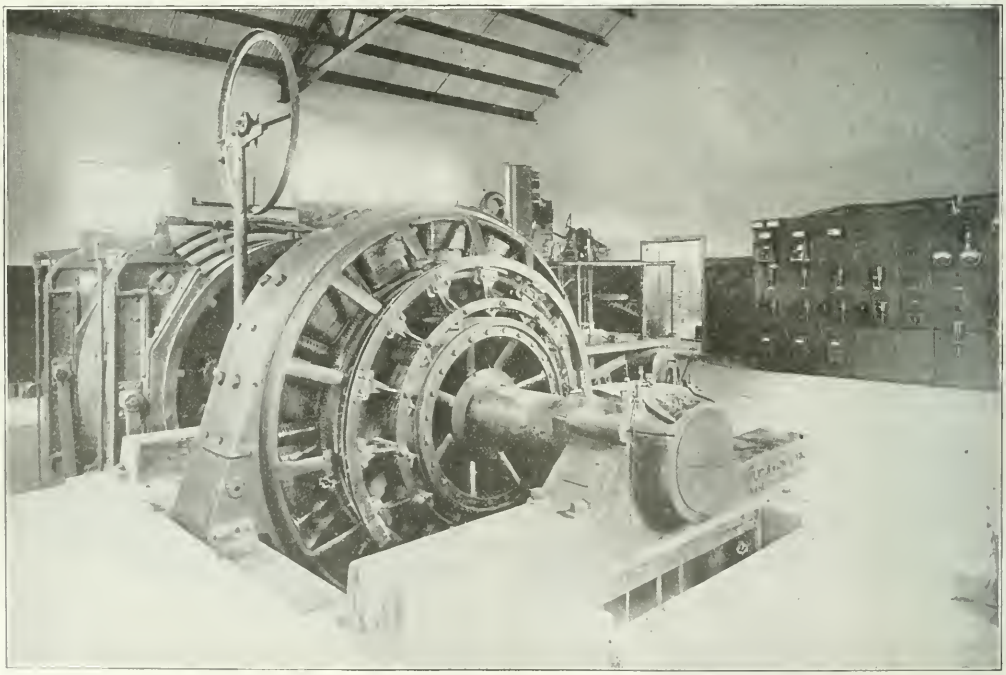


FIG. 9. HOIST MOTOR DRIVING FIRST MOTION DOUBLE CYLINDRICAL HOIST, CONSOLIDATION COAL CO., FAIRMONT, W. VA.; DUPLICATE EQUIPMENT AT MINE No. 87

same reasons the controller must provide, in addition to the steps required for properly accelerating the hoist, a suitable number of points for speed regulation.

Experience indicates that with few exceptions motors of 100-hp. capacity or larger for mine-hoist service cannot be successfully handled by drum controllers because of the magnitude of the currents and the frequency with which the circuits must be made and broken. These requirements have been met successfully, by the use of magnetically operated switches (so-called contactors) for both the primary and secondary circuits. With this type of control the motor currents can be interrupted as frequently as necessary with only an occasional renewal of tips, and the operator's controller need be only large enough to handle the small current required for operating the contactors. At the same time, automatic acceleration of the motor is attained, thereby protecting it from abuse and the power supply from excessive current demands.

Because of advantages in transmission, wiring, etc., it became desirable to use primary potentials of 2200 volts for induction motors for hoist service, especially in medium and large capacities. This necessitated the development of contactors for interrupting the currents in air for reversing the primary connections of the motor, as practice had demonstrated the unsuitability in this service of switches breaking currents under oil. This type of contactor has been built in large numbers and has been successfully applied to hoist motors up to and including 1800 hp. continuous capacity at 2200 volts.

Although for most induction motor-driven hoists of less than 500-hp. capacity, control using contactors and grid resistance providing not less than eight balanced and properly graduated steps for both directions of rotation have proved entirely successful, it has been found desirable for larger motors, and to a lesser extent for smaller sizes, to use a rheostat utilizing a liquid as the resistance medium. A design was developed that has met all the requirements of successful operation. The chief feature of this rheostat is the use of two separate resistance sections, whereby a high initial resistance is provided for slow-speed running at light loads and a low final resistance for operation at full speed. Rheostats of this design were supplied in considerable numbers for the replacement of those of foreign manufacture in the South African mines, and have been widely applied to hoists in this country, the largest being used in connection with an 1800-hp. induction hoist motor.

While the large majority of electric hoists in this country are driven by induction motors, the extreme nicety of control and high degree of safety of operation obtained with direct-current motors operating on the Ward Leonard system commends its use for high-speed shaft hoists.

It is often impossible for the power-supply system to operate under the heavy peak loads imposed by large hoists without seriously affecting the voltage regulation and interfering with the operation of other apparatus supplied from the same station. In such cases some form of load-equalizing equipment is necessary, whereby the extremely fluctuating hoist load may come on the supply lines as a more uniform demand. This is commonly effected by combining with the Ward Leonard power set a flywheel and regulating device to permit the wheel to supply all energy required by the hoist above the average value over the complete cycle.

There are numerous installations using this system both in this country and abroad, among the more recent being the 1800-hp. equipment at the Elm Orlu Mining Co. at Butte, Mont., and the duplicate 1400-hp. coal hoists at the Consolidation Coal Co., Fairmont, W. Va. Flywheels built up of rolled steel plates permitting of high stresses and consequently of high peripheral speeds can usually be made much lighter than cast wheels. Wheels of laminated steel plates up to 50 tons weight have been built for this service.

Important improvements have been made recently in the automatic regulating device used in connection with the flywheel equalizing equipments previously mentioned.

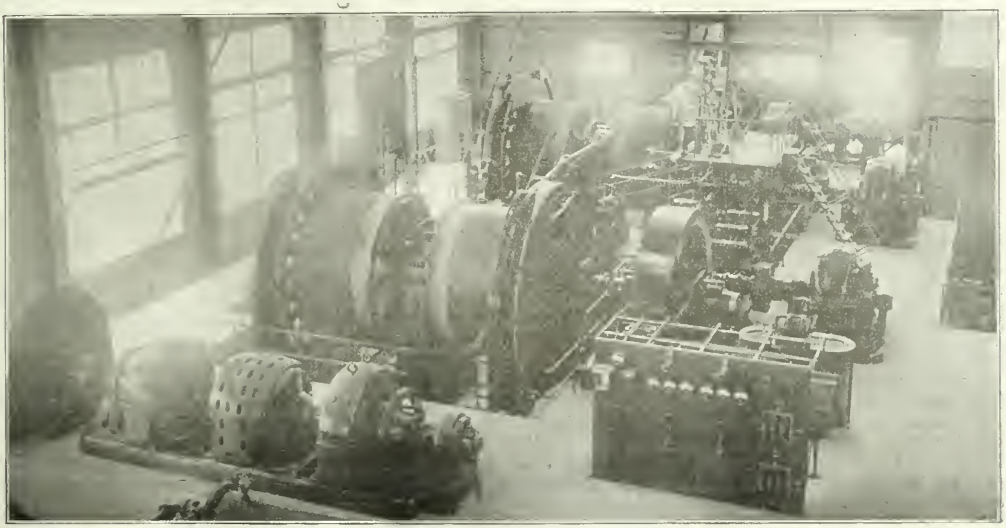


FIG. 11. AUTOMATIC MAIN HOISTS, INSPIRATION CONSOLIDATED COPPER CO., MIAMI, ARIZ.

In all forms of this device, commonly called a liquid slip regulator, use is made of tiles or earthenware cylinders for separating the electrodes. Difficulty has been experienced from leakage and frequent breakage of these barriers. With the newest type the design is greatly simplified and both of these troubles have been eliminated.

The matter of safety in the operation of mine hoists has received much attention. Electrical power is preeminently suited to the application of safety methods. Devices may be simply applied for protection against overwinding and various other emergency conditions which may develop in the electrical equipment itself or in the system as a whole. As electrical braking is available, the mechanical brakes are relieved of much use and consequent wear and tear, their use on hoists operating with Ward Leonard control being confined almost entirely to holding the loads. With this system, loads of any value can be lowered at any partial speed and brought to rest without resorting to the mechanical brakes. The power developed by the descending load may be returned in part to the power system.

The degree of safety and accuracy of control which may be secured in the operation of direct-current mine hoists is well exemplified in the installation at the Inspiration Copper Co., Miami, Ariz., of two automatic main hoists which operate entirely without regular attention from an operator. In these two hoists, which have been in successful operation since 1915 and have a combined capacity of 1000 tons per hour from a depth of 630 ft. the loading, starting, dumping and stopping are all accomplished automatically, although by the simple throw of a lever switch the equipment can be instantly put under manual control.

Commercial Recovery of Pyrite from Coal*

By S. H. Davis,
Baxter Springs, Kansas.

The supply of pyrites used in making sulphuric acid in the United States has been largely imported from Spain and Canada, the Spanish imports amounting to nearly 1,000,000 tons per annum in the pre-war period. The greatly increased use of sulphuric acid and the cutting off of these Spanish imports, incident to war conditions, brought a threatened shortage of sulphur supplies during the war period.

The bituminous coal mines of certain districts have, for many years, furnished a small tonnage of pyrite in the form of coal brasses. A mechanical concentrator at Danville, Ill., for a number of years, has been treating hand-picked lump pyrite and coal from the picking belt and from the mines, and a small plant near Gillespie, Ill., for a few months has been recovering pyrite from washery refuse. Many mines throughout Illinois, Indiana, Western Kentucky, Ohio and Pennsylvania have shipped an occasional car of the hand-cleaned lump pyrite. However, a very small percentage of the available pyrite has been recovered in this way, as the miners usually throw such lumps into the gob with slate and other impurities. It has been estimated that the western Indiana coal field could furnish more than 100,000 tons of pyrite per annum. The present production is very small. The possibility of furnishing the domestic trade with pyrites recovered as a byproduct from coal-mining operations appears attractive but there are certain features difficult to overcome.

Pyrite, to be used in acid making, must meet with certain requirements as to size and purity. Lump for grate burners should be under 3 in. and over 1 in. in diameter. Fine for use in mechanical roasters should be under quarter mesh. The material should be high in sulphur, free from arsenic and phosphorus, and as low in carbon as possible. The pyrite obtained from coal can be made to meet all the above requirements, but it is difficult to remove all the carbon. The pyrite in coal occurs as bands and nodules of varying thickness and size and of comparative purity, but mixed with this is more or less web sulphur. The web sulphur carries with it admixed coal, which may make the concentrate run up to several per cent carbon. This makes the concentrates subject to firing, causes heavy consumption of niter, and lowers the acid-plant capacity, owing to a dilution of the gases. The hand-cleaning methods and the present plants have failed to entirely overcome this difficulty, hence it may be necessary at the acid plant to mix this coal pyrite with other ore.

A large tonnage of pyrite is annually being thrown into the waste areas of coal mines, but there seems little opportunity to correct that unfortunate loss of valuable mineral as there are many difficulties in making this material available. Hoisting the crude pyrite from the coal mines in most instances seriously handicaps coal-mining operations; the chutes and screens are injured thereby and this fact necessitates separate loading facilities. In treating washery refuse, no serious difficulties are encountered, but there are few washeries at which the refuse contains sufficient pyrite or where the refuse is in large enough quantity to make the preparation of its pyrite content for market attractive.

The recovery of pyrite from coal will not meet with any great expansion, it is felt, so long as the Louisiana brimstone can be obtained at present or pre-war prices. The acid plant that uses pyrite must have a greater investment in burning and dust-settling equipment than were brimstone is used. It is true, however, that in certain locations farthest removed from the source of supply of brimstone and near the coal fields coal pyrite can be advantageously used.

*Article presented at the Chicago Meeting of the American Institute of Mining and Metallurgical Engineers, September, 1919.

Minecdotes

Was He a Hebrew?

In the lower anthracite coal region where the seams are thickest and pitch at a very steep angle, it is nothing unusual for a miner after firing a blast to find the chutes and the manways leading to the face of his chamber blocked with coal, being unable to reach the face of his chamber until hundreds of tons have been loaded out.

It was in one of these places not so long ago that a miner was shut off from his fellow workmen while he was in the act of trying to dislodge a shot that had been too deeply laid. The coal at the face began to run and before he had time to reach a place of safety he was carried down the chute together with hundreds of tons of coal.

Through a miracle he was not badly injured but found himself entombed behind a mass of coal.

After a large force of men had been working four days trying to rescue him, the first thing he said when they found him was:

"Say, fellers, you put my tickets on them cars you load."

Mine Accidents: English Speaking vs. Non-English Speaking Employees.*

By Albert H. Fay
U. S. Bureau of Mines

THE employment of non-English-speaking labor in American mines has been brought about by reason of the rapid expansion of the mining industry, beginning in the early 80's. The Americanization of this great body of labor, and its relation to accidents in the mining industry, are two problems of prime importance—the first as affecting citizenship and the growth of this republic, and the second as an economic problem in mining costs. The former exerts an influence upon the latter, for the former implies education, social welfare, civic pride and a general uplift to the ideals that America stands for. Ignorance, dirty and filthy living conditions, ill-health, disregard for law and order, discontent and lack of civic interest, lead to indifference and carelessness, which are perhaps the greatest of all accident causes.

TABLE I

FOREIGN-BORN MINE EMPLOYEES BY NATIONALITIES, SHOWING AGRICULTURAL AND MINING EXPERIENCE PRIOR TO ENTERING THE UNITED STATES.

Nationality	United States			Pennsylvania Bituminous			Ohio.-Ind.-Ill.			Kans.-Okla.			West Virginia			Mich. Copper			Lake District Iron		
	Number	Per Cent.		Number	Per Cent.		Number	Per Cent.		Number	Per Cent.		Number	Per Cent.		Number	Per Cent.		Number	Per Cent.	
		Mines	Agri.		Mines	Agri.		Mines	Agri.		Mines	Agri.		Mines	Agri.		Mines	Agri.		Mines	Agri.
Bohemian and Moravian	408	57.6	16.4	188	41.0	22.9	196	72.4	10.7	....	....	....	....	....	....	....	....	....	....	....	....
Bulgarian	158	9.5	75.3	.....	...	...	....	...	...	....	...	...	115	2.6	89.6	....	....	....	....	....	....
Canadian (Fr.)	.....	...	...	.....	...	...	....	...	...	....	...	...	....	....	....	208	....	56.3	....	....	....
Croatian	1,212	3.6	84.7	804	3.4	85.0	155	7.1	81.3	....	....	....	242	2.5	85.9	485	5.2	59.0	247	6.1	72.9
English	1,277	82.6	2.6	525	78.5	2.3	547	87.8	1.5	129	87.6	5.4	....	....	....	727	60.2	7.6	147	53.7	6.8
Finnish	.....	...	...	.....	...	...	....	...	...	....	...	...	....	....	....	1,408	2.7	74.8	916	0.4	71.2
French	352	72.2	6.8	181	56.9	9.4	....	...	...	144	90.3	3.5	....	....	....	.....	...	...	....	....	....
German	1,423	55.0	18.6	663	49.9	19.2	575	59.7	17.6	114	65.8	14.9	....	....	....	84	13.1	40.5	....	....	....
Irish	321	59.2	25.9	169	53.8	24.3	....	...	...	....	...	...	....	....	....	.....	...	...	....	....	....
Italian, North	4,840	13.7	57.2	2,083	5.3	62.0	1,561	22.8	52.0	853	21.6	46.8	353	3.7	77.6	515	5.2	63.7	600	14.7	52.3
Italian, South	2,883	7.7	66.5	1,131	4.8	63.9	361	23.3	62.6	319	9.4	40.1	1,072	5.1	78.4	....	....	....	223	9.4	75.3
Lithuanian	1,570	4.3	79.2	398	4.5	79.9	1,023	3.6	79.7	109	11.0	65.1	....	....	....	.....	...	...	....	....	....
Magyar	2,423	10.9	68.5	1,472	9.2	65.8	581	17.7	69.7	....	...	...	322	5.0	78.3	108	5.6	78.7	....	....	....
Mexican	98	71.4	17.3	.....	...	...	....	...	...	98	71.4	17.3	....	....	....	.....	...	...	....	....	....
Montenegrin	118	4.2	91.5	.....	...	...	....	...	...	....	...	...	....	....	....	.....	...	...	....	....	....
Polish	3,771	9.8	68.9	2,578	7.2	68.5	741	14.2	70.9	175	33.1	44.6	277	7.2	82.3	....	....	....	383	9.4	62.1
Roumanian	97	7.2	82.5	.....	...	...	....	...	...	....	...	...	....	....	....	.....	...	...	....	....	....
Russian	1,389	7.8	79.8	890	7.3	78.8	344	7.3	86.9	88	13.6	67.0	....	....	....	.....	...	...	....	....	....
Ruthenian	151	15.9	66.2	130	13.8	68.5	....	...	...	....	...	...	....	....	....	.....	...	...	....	....	....
Scotch	561	88.2	1.8	187	84.5	1.6	237	92.4	1.3	90	87.8	3.3	....	....	....	.....	...	...	....	....	....
Slovak	5,378	10.7	68.4	4,237	8.7	67.7	684	15.1	75.3	122	54.1	34.4	335	10.4	75.5	.....	...	...	164	5.5	70.1
Slovenian	1,248	20.0	57.6	1,013	14.4	61.4	86	34.8	45.3	99	53.5	35.4	....	....	....	142	5.6	67.6	321	3.7	69.2
Swedish	142	15.5	57.7	.....	...	...	....	...	...	....	...	...	....	....	....	104	18.3	47.1	154	10.4	48.1
Welsh	178	87.6	1.7	.....	...	...	92	91.3	1.1	....	...	...	....	....	....	.....	...	...	....	....	....
	*31,325	20.7	58.0	*17,246	14.4	61.2	7,173	30.5	53.2	2,340	43.0	34.6	2,716	10.4	73.9	3,781	14.6	55.8	3,155	8.5	62.3

*The above figures include only races with 100 or more miners reporting. The totals are for all foreign-born.
NOTE—Compiled from "Immigrants in Industries," a report of the Immigration Commission, 1911. Senate Document No. 663, Sixty-first Congress, Second Session. Vols. 6, 7 and 16.

During the decade previous to 1880 (as well as in earlier years) the greater part of the employees in the coal and metal mines were Americans or representatives of the English, Scotch, Welsh, German and Irish races. The majority of the men of foreign birth had been in this country for some years previous to the great expansion of the mining industry which began about this time. English-speaking miners continued to immigrate and to find employment in the mines in large numbers until about 1890. Since that year comparatively few immigrants from Germany and Great Britain have entered this industry, although Swedes and other Scandinavians have been constantly employed since the early eighties.

The employment, in the mining industry, of immigrants from southern and eastern Europe began about 1880. The Slovaks were the first arrivals and immigrated in considerable numbers. They were followed within a year or two by a few Magyars, and the number of immigrants of this race gradually increased each year. The Polish immigration began about 1890, although individual members of the race had been coming for a period of nine or ten years. After the year 1890 Poles and Slovaks arrived in great numbers. A few Italians were employed before the year 1895, but the immigration of this race did not begin upon a large scale until about 1900. They were at first engaged in railroad construction and maintenance-of-way work and gradually drifted into the mines. Croatians were employed in some sections before 1890, and Servians began to arrive in small numbers in the early nineties.

The great bulk of all the immigration from southern and eastern Europe, however, has occurred within the past 18 years. Russians, Bulgarians, Roumanians, Ruthenians, Syrians, Armenians, Macedonians, Croatians, Servians, as well as Poles, Magyars, Slovaks and Italians, have been among the recent arrivals.

The races of southern and eastern Europe have continued, up to the time of the war, to find employment in the mines in increasing numbers in almost every important mining district in the eastern states and the Lakes district. Many of these recent immigrants have found their way to the central and western states. As a result of the rapid expansion of the mining industry, many mining communities have been founded, the population of which are largely made up of immigrants who have arrived during recent years.

The pioneer American, English, Irish, German, Scotch and Welsh miners are thus outnumbered and their positions filled by the more recent immigrants. It is not difficult to account for this racial change which is still going on. The former

*Paper presented before the eighth annual safety congress of the National Safety Council, Cleveland, Ohio, Oct. 1 to 4, 1919.

operatives and their descendants had opportunities to secure more congenial and safer work in other industries. Many of them advanced in the industrial scale, becoming foremen and attaining other responsible positions. A large number have abandoned the occupation of miner for positions as day or shift men. Many also migrated and located in the Middle West and Western States.

Many of the former miners who left the industry entirely because of change in mining methods or the employment of immigrants, entered mercantile, clerical, mechanical and more "pleasant" work of other kinds. Many of the business and professional men in the mining towns were formerly mine workers. Their places were filled without difficulty with recent immigrants who were content with the wages and working conditions which prevailed at the mines. The wages paid in American mines are highly attractive to the recent arrivals of agricultural laborers from southern Europe.

TABLE II

PERCENTAGE OF EMPLOYEES BY OCCUPATION AND ENGLISH SPEAKING AND NON-ENGLISH SPEAKING RACES. *

OCCUPATIONS	Americans and western Europeans		Southeastern Europeans	
	Number	Per cent	Number	Per cent
Superintendents	10	.78	.....	.....
Foremen	14	1.10	.....	.....
Bosses	76	5.96	6	.28
Inspectors	10	.78	15	.70
Engineers and motormen	50	3.92	12	.56
Firemen	29	2.27	10	.47
Electricians and helpers	12	.94	7	.33
Black mith s and machinists	33	2.59	13	.61
Carpenters and Masons	46	3.61	9	.42
Track and roadmen	64	5.02	21	.97
Car runners, droppers, etc.	47	3.69	49	2.28
Drivers and teamsters	124	9.73	67	3.12
Machine runners and helpers	75	5.88	148	6.90
Pick miners	428	33.57	1,107	51.61
Loaders and scrapers	45	3.53	379	17.67
Trappers	16	1.26	20	.93
Pipe and pumpmen	20	1.57	7	.33
Laborers	176	13.80	271	12.82
Total	1,275	100.00	2,141	100.00

*Represents ten typical bituminous coal mining companies of Pennsylvania.

The conclusion from the limited data at hand, therefore, seems to be that while the foreign-born males of more than 16 years of age, whenever employed, work in the mines, the persons native-born of native father, together with the second-generation immigrants, are entering the mines only to a limited extent. This inference bears out in a large measure the experience of the mine operators, who state that the native-born and the second-generation immigrants are not entering the mines in the same numbers as formerly and that the industry is receiving a constantly decreasing number of employees of these classes.

There exists a prejudice against recent immigrants, which also operates to an important extent in the displacement of former employees. Many Americans, English, Germans, Scotch, Irish and Welsh did not and do not desire to be associated in the mines with the recent immigrant, and the feeling has become prevalent that a sort of reproach attaches to an intimate working relation with the foreigner. The races of former immigraton have, therefore, left the industry and have entered other work, which they feel is more dignified and congenial.

The relatively small number of American miners who remain in the industry must work side by side with the recent immigrant. To a greater or less degree the standard of safety in the mine is set by the demands of the ignorant and inexperienced immigrant, not by the more intelligent American, and the standard of life is decided by those conditions which will be accepted by the same recent arrival. In short, in order to work in the coal-mining industry, the American must compete with the recent immigrant, who, as a rule, is not very particular as to living and working conditions. These conditions, however, are in most cases far better than in factory towns where congestion prevails.

Another effect of recent immigration from central and southern Europe has been the preventing of the English, Irish, Scotch and German immigrant entering the mining industry. As already noted, these western European races were coming to the industry in large numbers prior to the early 80's, but began to decline toward the end of the decade and practically

FAILURE OF NATIVE-BORN TO ENTER THE INDUSTRY

Another noteworthy tendency is seen in the fact that the racial displacement has occurred not only through the departure from the industry of the former employees, but also through the refusal of their children to enter the industry and the attitude of the parents themselves, who frequently discourage it. Of the total native-born, of fathers who were miners, a large percentage enter occupations other than mining.

TABLE III

NUMBER OF EMPLOYEES IN BITUMINOUS COAL MINES AND METAL MINES BY NATIONALITY, SHOWING PERCENTAGE WHO CAN SPEAK ENGLISH.

Nationality	BITUMINOUS COAL MINERS								METAL MINES							
	Pennsylvania		West Virginia		Ohio, Ind. Ill.		Kans Okla.		Copper Michigan		Iron Minnesota		Iron Alabama		Iron Michigan	
	Number Employed	Per Cent Speaking English	Number Employed	% Speaking English	No. Employed	% Speaking English	No. Employed	% Speaking English	No. Employed	% Speaking English	No. Employed	% Speaking English	No. Employed	% Speaking English	No. Employed	% Speaking English
Bohemian and Moravian	451	69.4	.....	.....	247	77.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Canadian (Fr.)	.....	.....	.....	.....	.....	.....	.....	.....	291	95.5	.....	.....	.....	.....	40	100.0
Croatian	1,945	54.2	255	71.0	180	78.9	.....	.....	484	44.0	178	70.8	.....	.....	158	32.3
Finnish	.....	.....	.....	.....	.....	.....	.....	.....	1,498	37.9	405	76.3	.....	.....	661	60.5
French	328	71.6	.....	.....	190	68.4	206	74.3	.....	.....	.....	.....	.....	.....	.....	.....
German	1,511	91.0	110	90.0	841	89.4	177	91.0	113	100.0	.....	.....	.....	.....	.....	.....
Italian, North	3,323	58.8	391	65.5	1,685	68.0	1,129	62.4	533	58.0	134	57.5	.....	.....	541	45.3
Italian, South	2,197	60.3	1,157	63.9	416	50.2	418	66.0	56	62.5	77	50.6	121	61.2	54	48.1
Lithuanian	630	71.1	41	92.4	1,080	75.9	119	88.2	40	22.5	.....	.....	.....	.....	.....	.....
Magyar	3,489	50.8	337	63.5	596	50.0	48	75.0	79	13.9	.....	.....	.....	.....	.....	.....
Montenegrin	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	46	47.8	.....	.....	.....	.....
Norwegian	.....	.....	.....	.....	.....	.....	.....	.....	41	97.6	.....	.....	.....	.....	.....	.....
Polish	5,900	50.3	294	65.0	787	57.3	249	65.1	65	69.2	86	73.3	.....	.....	393	51.1
Russian	1,265	56.9	73	68.5	371	67.9	101	70.3	.....	.....	.....	.....	.....	.....	.....	.....
Slovak	9,853	57.1	382	63.1	778	73.5	124	65.3	.....	.....	52	76.9	.....	.....	127	81.9
Slovenian	1,534	59.6	51	54.9	94	72.3	185	68.1	157	65.0	298	79.5	.....	.....	65	50.8
Swedish	216	97.2	.....	.....	67	92.5	.....	.....	104	80.8	.....	.....	.....	.....	160	89.4
	32,612	58.2	3,091	63.6	7,332	69.7	2,716	69.1	3,461	52.7	1,276	70.5	121	61.2	2,199	57.3

NOTE—Compiled from "Immigrants in Industries," a report of the Immigration Commission, 1911. Senate Document No. 663, Sixty-first Congress, Second Session. Vols. 6, 7 and 16.

Another noteworthy tendency is seen in the fact that the racial displacement has occurred not only through the departure from the industry of the former employees, but also

stopped about 1893 or 1894. There can be no question but the immigration of the Slovaks, Poles, Magyars and other races operated to prevent the further coming of these older immigrants to the industry, precisely as it operated to drive out of the industry those already employed, together with the native Americans. There is therefore no incentive for the English or German miner to migrate to the mining regions and compete with the Slovaks, Croatians, Italians, etc.

CITIZENSHIP

A point of general interest is the tendency on the part of the different races of foreign birth working in the mining industry to acquire citizenship, and their general interest in public and civic affairs. The recent immigrant manifests little real or intelligent civic interest. This may be ascribed to his ignorance of our political methods, his inability to read or speak English, the social and political aloofness of these races in the more or less remote mining villages, and their desire to avoid taxation.

Those who reside in or near the cities seem to exhibit more interest than do those of the isolated communities. It seems that the Bohemians and Moravians, 94 per cent. of whom can read some language, take a much more active part in civic affairs than any other race of recent immigration in the bituminous districts of Pennsylvania. Among the other Slavic races, the Slovaks (82 per cent. read) and Poles (77 per cent. read) lead in this regard, while the Croatians (87 per cent. read) make the poorest showing. It is almost the universal statement that this latter race shows but little civic interest, and that only few become naturalized.

The Italians (81 per cent. read) both North and South, are more active than the Slavic races in their efforts to become citizens, and appear to take a more active part in civic affairs. In cases where there seems to be encouraging civic activity it is nearly always due, not to their own intelligent efforts to attain citizenship and exercise its privilege, but to the influence of interested politicians, who in many cases may be a leader of their own race; for example, an intelligent banker and steamship ticket agent. It seems true of all the later immigrating races that they take far less interest in civic affairs than did the German (97 per cent. read) and English (98.5 per cent. read) immigrants.

The foreigner should be taught that the laws of America were made to protect, and not harass, every good citizen, rich and poor alike, and it is the duty of well-informed Americans to make this understood. If well-meaning foreigners, the making of good citizens, are left entirely to their own devices, they fall an easy prey to the designing I. W. W. and the Bolsheviki. Somebody who understands their language fully, and in whom they have confidence, should explain to them that they are being deceived so long as they listen to anti-American propaganda.

RELIGIOUS ORGANIZATIONS AND THE IMMIGRANT

The association between the native Americans and the southern and eastern European immigrants is limited. The general attitude of many members of the native churches toward the immigrants is one of indifference and there is a strong inclination in many communities to shun association with the immigrant in religious activities. In many cases where missionary efforts are made, religious services for the immigrants are frequently held in barns, stores or other unattractive places, thereby lessening the interest in them. The races from the southern European countries, which compose a large portion of the mining population, have been reared where there is no social caste in religious organizations, and have worshiped in buildings which are unsurpassed in beauty and grandeur. When these people are offered services held in stores, barns and similar buildings, their interest in the services naturally is small and they become indifferent. Lack of interest in religious affairs tends to decrease activities in civic affairs. The various organizations can be important agents in teaching these immigrants the rudiments of the English language and pointing out to them their duties as American citizens.

LACK OF MINING EXPERIENCE ON THE PART OF RECENT IMMIGRANTS

Men of the races of the old immigration (western Europe) have been employed in the mines of the United States for many years. As a result of their experience both in this country and abroad, they are far better qualified as miners than are the southern and southeastern Europeans. The older immigrants

TABLE IV

PERCENTAGE OF EMPLOYEES WHO READ, BY GENERAL NATIVITY AND RACE.

General Nativity and Race	Michigan Copper Mines		Michigan Iron Mine		Oil Refining	
	Number	Per Cent. who read	Number	Per Cent. who read	Number	Per Cent. who read
Native-born of native father:						
White	145	99.3	51	100.0	37	100.0
Native-born, of foreign father, by country of birth of father:						
England (includes Canada)	486	98.5	56	100.0	....	....
Finland	64	100.0	....	....	....	....
Germany	188	99.5	....	....	....	....
Ireland	78	98.7	....	....	113	100.0
Slovak	....	....	....	....	31	100.0
Swedish	....	....	46	100.0	....	....
Foreign-born, by race:						
Canadian, French	291	75.3	44	86.4	....	....
Canadian, Other	77	98.7	....	....	....	....
Croatian	485	82.3	156	98.1	....	....
English	820	98.7	135	99.3	....	....
Finnish	1,509	99.5	656	98.8	....	....
German	114	99.1	....	....	....	....
Irish	40	87.5	....	....	108	95.4
Italian, North	537	94.4	529	94.7	....	....
Italian, South	57	89.5	54	90.7	182	48.4
Lithuanian	....	....	....	....	62	88.7
Magyar	81	92.6	....	....	....	....
Norwegian	41	100.0	....	....	....	....
Polish	65	90.8	385	85.2	221	90.0
Ruthenian	....	....	....	....	90	72.2
Slovak	....	....	123	88.6	130	88.5
Slovenian	156	98.7	70	98.6	....	....
Swedish	105	98.1	160	100.0	....	....
Grand total *	5,557	95.4	2,800	94.9	1,116	84.2
Total native-born of foreign father.	927	99.0	215	99.5	214	100.0
Total native-born	1,072	99.1	268	99.6	251	100.0
Total foreign-born	4,485	94.5	2,532	94.4	865	79.7

*This table includes only races with 40 or more males reporting. The totals, however, are for all races.

NOTE—Compiled from "Immigrants in Industries," a report of the Immigration Commission, 1911. Senate Document No. 663, Sixty-first Congress, Second Session, Vols. 6, 7 and 16.

speak English either as their native tongue, or, as in the case of the Germans and Scandinavians, because of long residence in this country. They may be treated in almost every respect upon the same basis as the American miners.

The members of the races of the recent immigration, on the other hand, have been in the United States for so short a period of time that even though it be assumed that they have been employed in mining ever since their arrival, they must have had at most but a brief experience in the mines of this country. The data further show that extremely few of their number had mining experience abroad. Table I shows that, for example, over 80 per cent. of the Scotch and English miners had mining experience in their native country before entering the American mines, while for the south Italian and Croatian less than 5 per cent. have had mining experience. Most of the latter were farm laborers in their native countries, as indicated by this table.

Upon coming to the United States they decided to follow the occupation of mining because the work was better paid than any other obtainable, although many of them had been here only a few months and many more but a year or two.

TABLE V
PERCENTAGE OF EMPLOYEES WHO READ, BY GENERAL NATIVITY AND RACE.

General Nativity and Race	ANTHRACITE				BITUMINOUS COAL MINES							
	United States Bituminous		Penna. Anth.		Penna. Bitum.		Ohio-Ind.-Ill.		Okla.-Kans.		Ala.-Va.-W. Va.	
	Number	Per Cent. who read	Number	Per Cent. who read	Number	Per Cent. who read	Number	Per Cent. who read	Number	Per Cent. who read	Number	Per Cent. who read
Native-born of native father:												
White	18,097	96.9	23	100.0	6,406	97.2	5,833	97.4	1,616	97.5	4,242	95.1
Negro	6,479	75.3	.....	.....	900	87.9	566	91.1	374	90.1	4,639	69.7
Native-born of foreign father by country of birth of father:												
Austria-Hungary	813	96.4	.....	.....	584	95.7	172	98.8	.....	.....	.....	.....
Belgium	50	98.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
England (Includes Canada)	1,822	93.5	.....	.....	954	98.1	581	99.1	174	99.4	66	97.0
France	168	97.6	.....	.....	62	98.4	67	100.0	.....	.....	.....	.....
Germany	2,134	99.1	.....	.....	1,188	99.0	848	99.4	100	100.0	48	93.8
Ireland	1,340	98.3	.....	.....	802	98.1	318	98.4	135	100.0	85	96.5
Italy	182	94.0	.....	.....	62	90.3	53	96.2	53	96.2	.....	.....
Lithuanian	.....	.....	42	100.0	.....	.....	.....	.....	.....	.....	.....	.....
Polish	.....	.....	61	95.1	.....	.....	.....	.....	.....	.....	.....	.....
Russia	171	95.9	.....	.....	87	93.1	56	100.0	.....	.....	.....	.....
Ruthenian	.....	.....	62	100.0	.....	.....	.....	.....	.....	.....	.....	.....
Scotland	906	99.6	.....	.....	423	99.5	279	99.6	138	100.0	66	98.5
Slovak	.....	.....	64	100.0	.....	.....	.....	.....	.....	.....	.....	.....
Sweden	64	100.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wales	462	98.5	.....	.....	210	98.6	208	98.1	.....	.....	.....	.....
Foreign-born, by race:												
Bohemian and Moravian	737	94.6	.....	.....	451	93.1	249	97.6	.....	.....	.....	.....
Bulgarian	176	78.4	.....	.....	.....	.....	.....	.....	.....	.....	123	87.8
Croatian	2,404	66.9	.....	.....	1,957	65.5	182	70.9	.....	.....	251	73.7
Dutch	104	98.1	.....	.....	55	98.2	.....	.....	.....	.....	.....	.....
English	2,478	97.7	.....	.....	1,310	97.1	803	98.1	248	99.6	117	96.6
Finnish	70	95.7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
French	765	91.0	.....	.....	334	88.9	190	90.5	205	94.1	.....	.....
German	2,659	96.8	.....	.....	1,522	95.3	849	98.6	179	98.9	109	100.0
Greek	113	65.5	.....	.....	75	57.3	.....	.....	.....	.....	.....	.....
Irish	924	93.5	.....	.....	660	93.0	126	92.9	94	97.9	44	93.2
Italian, North	6,584	87.8	.....	.....	3,346	86.3	1,700	93.0	1,149	90.9	389	68.9
Italian, South	4,197	65.7	50	62.0	2,219	67.2	417	63.0	412	81.6	1,149	58.1
Italian (not specified)	112	89.3	.....	.....	98	88.8	.....	.....	.....	.....	.....	.....
Lithuanian	1,878	79.5	284	67.7	638	74.5	1,081	80.4	120	93.3	.....	.....
Magyar	4,515	89.2	.....	.....	3,508	88.5	617	93.8	49	81.6	341	88.9
Mexican	107	81.3	.....	.....	.....	.....	.....	.....	105	80.9	.....	.....
Montenegrin	134	69.4	.....	.....	.....	.....	.....	.....	.....	.....	91	62.6
Polish	7,293	77.3	263	68.4	5,991	76.9	798	76.3	208	85.6	296	80.7
Roumanian	154	74.7	.....	.....	102	69.6	.....	.....	.....	.....	.....	.....
Russian	1,826	70.8	.....	.....	1,271	69.0	373	73.7	105	77.1	77	76.6
Ruthenian	303	59.4	202	65.8	281	58.0	.....	.....	.....	.....	.....	.....
Scotch	1,148	99.1	.....	.....	561	98.8	346	99.1	141	100.0	100	100.0
Servian	130	77.7	.....	.....	85	75.3	.....	.....	.....	.....	.....	.....
Slovak	11,238	82.4	185	73.0	9,945	81.8	784	86.0	129	91.5	380	86.6
Slovenian	1,877	83.6	.....	.....	1,539	83.1	96	81.3	185	95.7	57	61.4
Swedish	305	100.0	.....	.....	214	100.0	67	100.0	.....	.....	.....	.....
Welsh	396	94.7	.....	.....	189	94.2	160	95.6	.....	.....	.....	.....
Grand total*	86,908	86.7	1,239	71.7	48,747	85.2	18,333	92.6	6,785	93.6	13,043	80.8
Total native-born of foreign father	8,240	98.3	231	98.3	4,497	98.0	2,649	99.1	753	98.4	341	96.5
Total native-born	32,818	93.0	254	98.4	11,803	96.8	9,048	97.5	2,745	96.8	9,222	82.5
Total foreign-born	54,090	82.9	985	64.8	36,944	81.6	9,285	87.8	4,040	91.4	3,821	76.0

*This table includes only races with 40 or more males reporting. The totals, however, are for all races.
NOTE—Compiled from "Immigrants in Industries," a report of the Immigration Commission, 1911. Senate Document No. 663, Sixty-first Congress, Second Session. Vols. 6, 7 and 16.

Under these circumstances it is not surprising that they know little or nothing of rock formations, of fire-damp, of the properties of coal dust, and of the handling of explosives—matters about which every coal miner should be thoroughly informed. To determine whether a piece of slate or roof is or is not likely to fall often requires a considerable degree of experience, and the majority of the Slavs, Magyars and Italians have not this experience.

IMMIGRATION IN ITS RELATION TO MINING ACCIDENTS

The mines are presumably less safe than they would be with native American, English, Irish, Scotch, Welsh or German labor, because recent immigrants often accept more dangerous working conditions than the first-named employees. Furthermore, the later immigrants are ignorant and untrained, and are a source of danger to themselves and to the other workmen. Among the older mine workers the feeling is strong that the employment of non-English-speaking races has complicated the problem of safety in the mines. They assert that carelessness on the part of recent immigrants, and the ignorance of those who are suspected of having obtained their places without having had the required experience as miners, have tended to render the mines less safe and thus increase accidents.

A large portion of the deaths and injuries reported for the coal mines of the United States occur among the non-English-speaking miners. The employes, consisting of the races of southern and eastern Europe, having had little experience in mining either in this country or abroad, are particularly liable to accidents, and as the responsibility for accidents rests in many cases with the men injured, to say that they are particularly liable to accidents is in effect to say that they are responsible for a considerable proportion of all the accidents occurring in the mines.

The mine accidents for which the workmen are themselves responsible fall naturally into two classes—those due to carelessness and those due to ignorance. As regards the first of

these, it is probable that the foreigner is no greater offender than the person of native birth. Many of the Americans and other English-speaking miners are undoubtedly reckless, and a large proportion of all the accidents occurring among their number seems to be due to this cause. Grave risks are often incurred for the sake of avoiding a little extra labor. Props are left unplaced, open lamps are used instead of closed lamps, cars are driven in a careless manner, explosives are handled recklessly—all in defiance of the most elementary rules prepared by men of long experience in the industry.

Among the recent immigrants, on the other hand, many of the accidents are unquestionably due to ignorance, for by reason of their lack of experience they do not see nor realize the dangers that confront them; nor do they readily comprehend the necessary precautions that must be taken to make their working places safe.

Lack of experience in the mines has a marked effect upon the high accident rate, as indicated by a study of accidents among the immigrants whose experience in mines, before coming to this country, was known. The fatal, serious and non-fatal injury rates in the coal mines of Pennsylvania and West Virginia are approximately 14.5 per 1000 for those of whom 10 per cent. had mining experience prior to coming to the United States. The accident rate for those of whom 10-20 per cent. had mining experience is about 12 per 1000, showing a rapid decrease as mining experience increases. It would seem from this that while experience is limited, these immigrants soon gain sufficient knowledge to use a certain amount of caution, thus giving a decline in accident rate.

EXPERIENCE DECREASES ACCIDENT RATE

As contrasted with the decrease in accident rates among those of whom 5 to 30 per cent. have had mining experience, the accident rate based on similar data for those of whom 50 to 60 per cent. have had mining experience prior to coming to this country is 10.5, whereas the rate is 12 for those of whom 80 to 90 per cent. have had experience in the mines. This shows a marked increase with the extra experience.

This is largely due to the tendency of those with considerable experience to become more or less careless or reckless and to think that they can slight certain features of work without an accident. A new man entering the mine would not consider for a moment crimping a cap with his teeth, whereas many of the men who have been in the mines for 8 to 10 years would not hesitate and do not hesitate to so crimp them.

Other instances of carelessness might be cited. The available data, therefore, seem to indicate that inexperience is responsible for many accidents, and that a little experience begets much caution on the part of the recent or new employee. As indicated above, there is thus a tendency toward a rapid reduction in accident rates to a point where between 30 to 40 per cent. of the employees have had mining experience. Beyond this percentage, caution wanes and is replaced by carelessness with a resultant increase. The green miner may be overcautious, but he lacks experience. The seasoned miner has the experience, but too often caution is replaced by carelessness. Caution combined with experience will go far toward accident reduction.

Another element of danger is contributed by the fact that few of the recent immigrants speak or understand English (Table III.), while almost none are able to read or write the English language. Placards of warning thus do not reach them. It is probable that the instructions of the mine bosses and inspectors are, because of this fact, frequently misunderstood. An inspector, for example, tells an immigrant miner, in English, of course, that his roof needs propping. The miner seems to understand, but does not, and a fall results.

In some mines printed signs are used to indicate the presence of gas or other peril. These signs are quite unintelligible to most of the foreigners. A common language is absolutely necessary in every safety-first campaign. Accident rates are much lower in England, France, Belgium, Germany, Austria and Japan than in the United States. In these countries but few foreigners are employed, a common language being used in each country. The difference in fatality rates cannot be entirely attributed to the lack of mixed languages, but certainly a large percentage of the accident reduction may be attributed to the "common-language" mines.

A comparison of accident rates with the ability of the miner to read some language or to speak the English language, shows that the ability to read, although it may not be English, has a greater influence on accident reduction than the ability to speak English. This may be accounted for by the fact that ability to read develops a higher degree of intelligence and places the employee in a better position to realize dangers more readily than one who cannot read. Furthermore, if he is able to read, he is more likely to heed danger signs put up in certain places.

TABLE VI—PERCENTAGE OF EMPLOYEES BY OCCUPATION AND ENGLISH-SPEAKING AND NON-ENGLISH-SPEAKING RACE.*

	Americans and Western Europeans		Southeastern Europeans	
	Number	Per Cent	Number	Per Cent
Superintendents	10	.78	....	....
Foremen	14	1.10	....	....
Bosses	76	5.96	6	.28
Inspectors	10	.78	15	.70
Engineers and Motormen	50	3.92	12	.56
Firemen	29	2.27	10	.47
Electricians and helpers	12	.94	7	.33
Blacksmiths and machinists	33	2.59	13	.61
Carpenters and masons	46	3.61	9	.42
Track and roadmen	64	5.02	21	.97
Car runners, droppers, etc.	47	3.69	49	2.28
Drivers and teamsters	124	9.73	67	3.12
Machine runners and helpers	75	5.88	148	6.90
Pick miners	428	33.57	1,107	51.61
Loaders and scrapers	45	3.53	379	17.67
Trappers	16	1.26	20	.93
Pipe and pumpmen	20	1.57	7	.33
Laborers	176	13.80	271	12.82
Total	1,275	100.00	2,141	100.00

*Represents ten typical bituminous coal mining companies of Pennsylvania.

The recent immigrant, because of his lack of experience, his inability to speak English and his keenness for earning money, is often willing to work in places where more experienced or more intelligent men would refuse to work. For the same reasons he will frequently be satisfied with and accept mine equipment too defective for safety.

OCCUPATIONS OF ENGLISH-SPEAKING AND NON-ENGLISH-SPEAKING RACES

Table VI. shows comparative figures by occupations, based on the pay roll of ten typical coal-mining companies in Pennsylvania. These figures show that about 33 per cent. of the English-speaking employes are employed as pick miners as compared with about 52 per cent. for the southeastern Europeans. As a matter of fact, from trackman to loader, the English-speaking employes represent about 61 per cent. of the total, as compared with 82 per cent. for the southeastern Europeans. These figures, therefore, indicate that the non-English-speaking foreigner is employed in the most hazardous of the mine occupations, hence one reason for the higher accident rate.

For comparison of accident rates between the two groups of employes, the figures given in Table II. are representative. In the Pennsylvania anthracite mines 43 per cent. of the employes are English-speaking, and this number is charged with only 28.8 per cent. of the fatalities, whereas the other 56 per

cent. (representatives of continental Europe) sustained 71 per cent. of the fatalities. Likewise, in the Pennsylvania bituminous mines the English-speaking employees represent 35 per cent. of the total and are charged with 27 per cent. of the fatalities, whereas the other 65 per cent. (representatives of continental Europe) are charged with 73 per cent. of the fatalities.

As regards the figures for West Virginia, the English-speaking employes represent 67 per cent., and notwithstanding the fact that this includes 17 per cent. of colored employees only 53 per cent. of the fatalities are charged to the English-speaking employes, whereas the other 33 per cent. or the men employed sustained 47 per cent. of the fatalities. Almost the same ratio holds for non-fatal injuries in the three groups of mines cited.

Had the fatality and injury rate for the English-speaking American been maintained throughout the three groups of mines, there would have been a saving of 716 fatalities and 900 serious injuries. This is a strong argument for Americanization and education of the miner.

Bituminous Coal Operators Reply to McAdoo by Telegram

Below is a copy of the telegram which was sent on November 25 by Bituminous Coal Operators to William G. McAdoo:

Hon. William G. McAdoo,
New York, N. Y.

Inasmuch as your message of November 24 was released for publication and thus became a message to the public, we take the liberty of answering it in the same manner. The mine owners are opposing a wage increase at this time for the reason that they believe no increase in wage rates is necessary to permit any industrious man who wants to work to earn sufficient money to maintain a decent American standard of living. This point, together with all others, they have offered to submit to arbitration or investigation.

Upon what current facts and figures are you convinced that the increased rates of wages proposed for the mine workers are just and reasonable? Upon what current facts and figures are your grave doubts based as to whether the mine owners are entitled to increase the price of coal to the consumers? If you have current facts and figures to substantiate your conviction and doubts, you will make a good witness for the miners before a board of arbitration or tribunal of investigation which thus far they have firmly declined to agree to. If you have not these current facts and figures your mere personal opinion has no weight.

Your admission that conditions in 1917 were abnormal is agreed to. When the world goes to war conditions are certainly abnormal. So far as the mine workers were concerned this abnormal condition was recognized by two abnormal increases in wages during the year 1917, and the United States Government promptly put an end to abnormal coal prices. It would be interesting to have your recollections regarding the tax reports made by other industries which were not so restrained. As you proceed to admit your ignorance of conditions in 1918 and 1919, that portion of your message carries no weight and requires no answer.

You suggest a careful examination of income tax returns before an additional price for coal is allowed. This would be included in the investigation which the mine owners agreed to more than a month ago and have been urging ever since, but thus far the mine workers have been unwilling to agree either to arbitration or investigation. Either procedure will disclose not only the current tax returns of the mine owners but of the miners as well. The figures are here in Washington and can be readily produced if you can get the mine workers to agree. The bituminous coal operators will welcome the publication of just as full current tax returns for the bituminous coal industry as are published for any other industry.

In the last two paragraphs of your message you again suggest investigation and also that the mines resume operation. Either your newspapers are not reaching you, you are not reading them, or you have deliberately ignored the published facts. Upon October 24, in Washington, the mine owners promptly and without reservation agreed to the proposition made by President Wilson that the mines be continued at work and the entire matter be submitted to a board of arbitration. Upon October 31, in Cleveland, the mine owners agreed to President Wilson's later suggestion that the whole matter be left to a tribunal to be appointed by him to investigate the facts. Upon Thursday, November 20, in Washington, the operators offered three resolutions to the sub-scale committee of miners and operators each referring the entire matter to arbitration, and they were all voted down by the miners.

McADOO APPARENTLY MISINFORMED

Upon November 19, in Washington, Federal Fuel Administrator Garfield, based upon the statistics collected by his officials, stated "That the average realization upon 579,385,820 tons of bituminous coal mined in 1918 was $2.61 per ton, that the average cost of production during the same period was $2.15 per ton," leaving an average margin of 46c per ton to the operators. Mr. Garfield was then careful to state that "This margin of 46c per ton includes profit but does not represent profit only, inasmuch as interest charges, selling expense, Federal taxes, both normal and excess profit, as well as certain other items not allowed in computing costs of production, were paid out of it." The average income and excess profits taxes paid "were upwards of 30c per ton in 1918." From the remaining 16c per ton, after deducting interest charges, selling expense, as well as certain other items not allowed in computing costs of production, come the net profits to the operator which are so shocking and indefensible to you.

If this message had not come from a former prominent official, supposedly accurately informed, it would not deserve the notice of a reply, but its misleading statements and insinuations are the kind of stuff which Bolshevism breeds upon. Whatever your purpose it is in exceedingly bad taste for you, a former member of the cabinet of the present Administration, to inject yourself into the present tense situation in a manner which can only embarrass and handicap those officers of the Government who are now bending every effort to work out a solution of the mine wage controversy in a manner which will do justice to all parties concerned.

Respectfully,

For the bituminous coal operators:

T. T. BREWSTER,
A. M. OGLE,
T. W. GUTHRIE.

New Coal Order Issued

Effective Nov. 24, 1919, an order was issued by Dr. Garfield, which states that coal dumped into barges, scows, boats and other vessels, on lakes, rivers and other inland waterways, shall be subject to diversion in like manner and to the same extent as bituminous coal loaded in cars of a common carrier, under his orders now in effect relating to the diversion of coal in transit, and coal diverted under the authority of this order shall be paid for by the party receiving the same, in accordance with the provision relative to the payment for diverted coal contained in his order dated Nov. 12, 1919.

No. 1 Plant of the Mather Collieries

By Donald J. Baker
Pittsburgh, Penna.

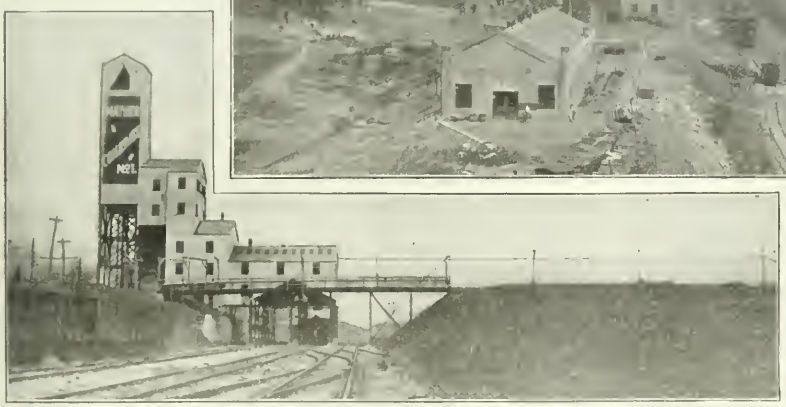
The plant, which is designed for a capacity of 5,000 tons in eight hours, was begun in August, 1917, and for a considerable time all material had to be hauled some five miles overland. General construction of the plant is first class in every respect, while the design of the surface equipment is compact and convenient.

ONE of the coal-mining plants of western Penn. that will doubtless play an important part in the development of Greene Co. is the No. 1 plant of the Mather Colleries, at Mather, Pa. Pickands, Mather & Co., of Cleveland, O., are the operators and the entire output of the mine will go to the byproduct ovens of this company at Toledo and Canton, O., or to the furnaces of the Steel Co. of Canada or the Cleveland furnaces of Allied Steel Companies. More than 4500 acres of the Pittsburgh bed are available. This has a general thickness of 7 ft. Some 500 acres of surface property are owned by the company, which includes the present plant and town and leaves room for expansion on a large scale. The town of Mather lies about five miles overland from Rice's Landing, on the Monongahela River, and is reached by the Monongahela Division of the Pennsylvania R. R. out of Pittsburgh.

It is doubtful if any plant of recent years has had the quick growth that will allow it to compare with this operation from the standpoint of development under trying circumstances and what at first appeared to be insurmountable obstacles. Ground was broken for the first shaft on Aug. 7, 1917, on the old Moredach farm, near the rural village of Jefferson. Rice's landing was the nearest railway connection, and all of the materials that went into the construction of this large bituminous operation had to be hauled overland from that point.

To visit the plant now and note the completed construction of the surface equipment, the 140 occupied buildings, with 60 more in various stages of completion, is to learn what it is possible to do by dint of hard effort in conjunction with a constructive spirit that recognizes no difficulties. All of the work was accomplished during the high tension period of the war and simply brings to light another instance of unalloyed Americanism as practiced in an out-of-the-way district, where duty to country overshadowed any one outside motive.

GENERAL VIEW OF THE TIPPLE SHOWING ARRANGEMENTS FOR HANDLING SLATE



BIRDS EYE VIEW OF THE SURFACE BUILDINGS AS SEEN FROM THE TIPPLE

There are two shafts at Mather, one being used for coal while the other is used exclusively for air and materials. Five main entries lead away from each shaft bottom, three of which are for haulage purposes. The butt entries are driven 310 ft. apart while the rooms are being developed on the panel system on 100-ft. centers. An average dip of the bed of 1½

per cent. is found throughout the tract. With the development of the mine on the upgrade of the slope, the haulage of loaded cars is facilitated and the water drained from the workings more easily. Little water has been encountered as yet, and this has been allowed to collect at a small sump at the bottom of the main shaft whence it is voided to the surface by the periodical operation of a small triplex Deming pump electrically driven from a 20 h.p. motor.

Trolley type, 15-ton Jeffrey locomotives are in use on the main haulageways, with 7-ton, storage-battery, Jeffrey locomotives in operation as gathering motors. The gage of the track is 44 in. with 60-lb rails on the main haulage roads, 40-lb. rails in the sub-entries and 25-lb. rails in the rooms. A complete telephone system has been installed underground with connection to all officials on the surface. At the bottom of the shaft the haulage entries are double tracked, and concrete-arched for several hundred feet on either side. Storage tracks at the bottom of the shaft can accommodate 75 loaded cars, from where they are caged by a gravity run to the shaft. On the opposite side of the shaft there is a storage yard for empties with a capacity for 100 cars. The mine cars are of 2½-ton capacity and are equipped with Hyatt roller bearings.

SOME OF THE BUILDINGS THAT COMPOSE THE PLANT AT MATHER . UPPER: LAMPHOUSE AND TEMPORARY HOSPITAL. LOWER LEFT: THE MACHINE SHOP AND SUPPLY HOUSE. LOWER RIGHT: FAN-HOUSE. ALL BUILDINGS ARE OF THE SAME TYPE OF CONSTRUCTION

Edison storage-battery lamps are used, although the workings have been singularly free from gas. Cutting the coal at the face is accomplished through the operation of Sullivan shortwall machines, after which it is drilled by the hand auger method. Permissible explosives are employed in the shooting.

The two shafts are of the three compartment design and identical with each other in respect to depth, this being 350 ft. They are also similar in general construction. Each has outside dimensions of 34x12 ft. and is concrete-lined with steel bunton support. Over 140 tons of steel are contained in each head-frame. These are of the same design and were manufactured by the Morris Iron Works of Wheeling, W. Va. Both have heights of 104 ft. Self-dumping cages in the main shaft are operated by a Vulcan hoist in the adjacent hoisthouse.

The hoisthouse is of brick construction with cement flooring and tile roofing, and is 39x30 ft. in size. Direct connection is made from the engine to a 1000-hp. Allis-chalmers induction motor working on 2200-volt alternating current. This gives the hoisting apparatus a capacity of 5,000 tons in eight hours. A small room contains a liquid control which governs the speed of operation as well as the length of cable payed out by the drum.

The power and boiler rooms are under the same roof and are of brick construction with tile roofing and cement flooring, which is characteristic of all the plant buildings, except the tipple. Three 350- k.v.a. transformers located on the outside of the building reduce the current from 22,000 volts to 2,200, power being received over the high-tension line of the West Penn Power Co. The transformers here used were manufactured by the Pittsburgh Transformer Co. From the transformers, the current enters the power-house, which is 64x36 ft., and passes into two 250-kw. Westinghouse motor generator sets where the 250 direct current voltage used within the mine is produced.

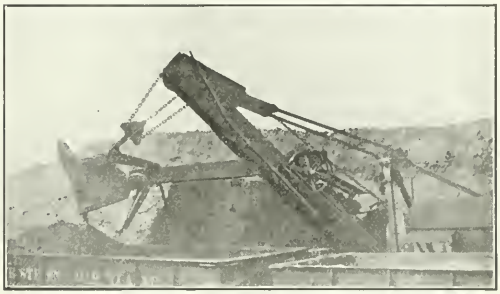
A Vulcan hoist for the material shaft is directly connected to a 300-hp. Westinghouse induction motor operating on 2,200 volts. A daily capacity of 2,000 tons of material can be handled at this shaft. Another unit of the power-house is a 250 k.v.a. alternating current Westinghouse generator directly connected to a Ball engine which forms part of the auxiliary power plant.

Separated from the power, or dynamo room by a brick partition is the boiler-room, 36x30 ft. containing a 300-hp. Babcock & Wilcox boiler which produces steam for the operation of the alternating-current generator in the adjacent room. This boiler is equipped with a Cochrane feed-water heater. For the operation of drills within the mine and about the surface plant a steam-driven Sullivan air compressor has been installed. Distilled water for the storage batteries of the locomotives and the safety lamps is procured from a Rochlitz water still, manufactured by the W. M. Lalor Co., of Chicago.

A spacious tipple is situated at the main shaft and is of steel framework with corrugated asbestos siding, supplied by the Keesby & Mattison Co., of Pittsburgh. The steel framework was supplied by the Lackawanna Bridge Co. Cement floors throughout allow for the building to be kept fairly clean at all times. As the cars on the cages are dumped, the coal drops into a hopper which feeds onto two rows of picking tables through steel chutes. C. R. Miller & Son, of Scottdale, Penn., manufactured the picking tables, which are about 20 ft. long, giving the pickers ample opportunity to prepare the

coal before it enters the loading boom, from which it passes to the cars underneath.

Through the action of a steel door which is operated at the dump, mine cars containing rock and refuse are unloaded into a rock bin with a capacity of 60 tons. This also collects the refuse from the picking tables by a conveyor leading from them. The rock is automatically loaded into 10-ton slate larries of the trolley type. The larries are driven to the rock dump, located to the fore of the tipple. The arrangement is shown in one of the photographs. Mather Siding is the name given to the railroad connection, which leaves the Monongahela Division below Rice's Landing and has just recently been completed.



TWO VIEWS OF THE STEAM SHOVEL AT WORK LOADING THE STORED COAL

From the beginning of operations in 1917, up to the time that the railroad spur was completed, the mine was under development and the coal brought to the surface and removed to a nearby cut adjacent to the roilroad then under construction. Before the siding was completed, the coal had accumulated until a pile that reached considerable proportions had been built up. This coal is now being loaded directly into railroad cars by means of a 70-ton Bucyrus steam shovel. More than half of the original pile has been removed to date. This feature, along with the tipple, will keep the daily output at a respectable figure until such time as the plant will be working to its capacity of 5,000 tons in eight hours. In conjunction with the steam shovel a standard-gage locomotive is employed by which the loaded cars are placed on the siding below the tipple.

The shop and supply-house is situated midway between the power plant and main hoisthouse. On the outside of the building, the 2200-volt line running to the main hoist is tapped and the current further reduced to 110 and 220-volt alternating current by three 25 k.v.a. Pittsburgh transformers. Direct current at 250 volts is also carried into the building to be utilized with the alternating current for testing, etc.

Three brick partitions divide the building, the over-all dimensions of which are 138x39 ft. The fore part serves as a blacksmith shop and contains two forges, an electric power hammer and a gas furnace for the heating of machine bits. Adjoining this is the carpenter shop, which contains among other things an electric bandsaw, a circular saw and a hacksaw. The room is well lighted by many windows. Another compartment of the building is taken up as a machine shop and contains lathes, bolt and pipe machines, radial drill, hacksaw, emery wheel, punch and shears, etc., all of which are electrically driven. A 20-hp., 220-volt Allis-Chalmers motor is situated in one end of the room and drives a shaft running lengthwise through the building. All of the different machines in the shops are operated by belt drive from the shaft, with the exception of the saws in the carpenter shop which are operated by separate motors.

A fourth room of the building is utilized as a supply-room and contains equipment, spare parts and general supplies which are arranged in tiers of bins and classified according to use. This simplifies the finding of any article. Part of the supply-room is a toilet and wash-room that is available for the use of all men in the building.

Another unit of the surface plant is a building, 41x24 ft., that is utilized as a combination lamphouse, temporary hospital, mine foreman's office and first-aid room. A small Westinghouse motor-generator set is contained in the lamphouse, from which 400 Edison safety lamps are recharged through rheostats. To permit of their being more easily handled for recharging, the customary arrangement in shelving is made.

Situated to the side of the power plant is a brick fan-house, 60x30 ft. in size, that contains a 15-ft. reversible Jeffrey fan which is belt-connected to a 100-hp. alternating-current motor with a 30-hp. motor in reserve. The intake to the mine is in the air and material shaft already mentioned.

One of the features of the underground construction is a sand and oilhouse that is located in a room between the two shafts. A borehole from the surface will be utilized for transferring oil and sand underground, and results are expected that will mean the saving of much time that would ordinarily be consumed in moving these materials down the shaft. At the same time the easy accessibility of this room to locomotives switching for a train of empty cars is no small consideration.

GENERAL AIR OF CLEANLINESS PERVADES PLANT

The general cleanliness and lack of noise around the entire plant gives a lasting impression. With the exception of the tipple, the surface buildings are closely grouped together in a manner that is quite pleasing and should go far toward establishing a general unity of purpose among the men as well as simplifying the different operations. To allay any possibility of dust and dirt reaching the plant in general, the tipple is situated a short distance from the other buildings. A brick constructed filtration plant is at present being built. Water from a nearby reservoir will pass through a W. B. Scaife purifying apparatus. From the reservoir the water will be pumped to a tank located on the hillside, from where it will be available for the town by gravity.

An attractively designed office building of stucco construction completes the main units of the surface plant. This building has but one door and dimensions of 70x25 ft. All the plant buildings are heated by Hecler Bros. pipeless furnace method.

Community and welfare work under the direction of the general superintendent, W. L. McDonald, has progressed to a high degree and is reflected in the building of the town. As previously mentioned, there are 140 occupied dwellings in the village and 60 more are in various stages of construction. The houses are of different designs and of frame and stucco construction. They contain from two to six rooms with cellars, electric lights and running water. Eight-room dwellings with baths, toilets and all modern appointments are avail-

TYPES OF BUILDINGS THAT MAKE THE TOWN OF MATHER DISTINCTIVE
UPPER LEFT: STREET SCENE. RIGHT: TWO ATTRACTIVE HOMES. LOWER LEFT: THE CLUB-HOUSE. RIGHT: GENERAL OFFICE BUILDING. MANY OF THE HOUSES AT MATHER ARE OF STUCCO CONSTRUCTION

able for those desiring greater conveniences. Macadam streets have been laid throughout the town, and the usual muddy roads are conspicuous by their absence.

Two eight-car community garages have been built and are used by the employees. They are heated during the winter months by Wasco heaters. Present plans call for an additional building of the same type.

A moving-picture theater is nearly completed. The fore part of this building will be taken up with one room as a drug store and another as a restroom and library. The building has two floors, the basement of which contains bowling alleys and pool tables. Situated directly across the street from the theater is a commodious hall that will furnish space for dancing and basket-ball during the cooler months. Forming part of the group of buildings that make up the civic center of the town is a modern schoolhouse which is of characteristic stucco construction, as are all of the community buildings. Space for a completely equipped playground is available in a nearby lot.

A company store completes the main group of community buildings. A portion of the building contains a Johns-Manville Co. refrigeration plant. It is electrically operated and will supply ice for the town as well as that needed for the store.

UNIFORMED POLICE FORCE IS PRESENT

An innovation for a town of this size and age is a uniformed police force. Whether the uniforms tend to create a better morale cannot be proved, but little disorder is ever encountered in the town. Perhaps the greatest benefit that has resulted from the police force is the keeping of the alleys of the town free from obnoxious garbage and unsightly tin cans.

A graduate nurse does community visiting, during which talks on domestic science are given as well as on sewing and other kindred subjects. In the summer months also, one day each week is given over to a picnic for the younger element, at which time instruction is given on cleanliness and discussions take place that lead to better Americanism. Cases of sickness within the community are under the direct supervision of the nurse.

First-aid work among the men is encouraged and classes are graduated at regular intervals. No formations into teams have been made to date, although this will be done in the near future. Meets with surrounding mines will then be held and a general competitive spirit aroused. There are 12 Government-trained mine-rescue men employed at the mine. They are a unit of the Orient central rescue station. In case of an accident in the district of which Mather is a part, all apparatus from adjacent mines is pooled for the common cause. Five sets of Gibbs self-contained breathing apparatus are kept at Mather for immediate use.

The officials of Mather Collieries are Frank Armstrong, general manager; W. L. McDonald, general superintendent; G. Herbert Evans, superintendent, and R. K. Newhouse, mine foreman.

Legal Department

WHAT CONSTITUTES DOING BUSINESS IN A STATE—A sporadic or occasional sale made by a non-resident coal company in a state will not constitute such doing business there as will subject the company to suit on a summons served upon one of its managing officers found in the state. But doing business within the state does not require that it be done persistently and continuously, in order to authorize such service of process. The mere fact that the general manager of a West Virginia coal company resided in Cincinnati and kept a file of company matters there for his convenience in corresponding with his company did not constitute a "doing business" in the state of Ohio. Other evidence in the case, however, is held sufficient to show that the company transacted business generally in the state, making it proper to serve summons on the general manager in Ohio in a suit brought against the company there. (United States Circuit Court of Appeals, Sixth Circuit; Lyons vs. Empire Fuel Co., 257 Federal Reporter, 890.)

Primary Considerations in Hydraulic Stowing*

By C. A. John Hendry, F. R. G. S., A. M. I. M. E.

THE flushing of anthracite coal mines with silt and fine rock or slate has been carried on in the United States for many years with great success. In fact the idea originated in the United States, and the method has been adopted with certain modifications by various other countries. British engineers term the process "hydraulic stowing," and the following article notes conditions prevailing at various mines in India where stowing is practiced. Certain factors should be taken into consideration before a definite plant is decided upon in introducing hydraulic stowing in a mine and suggestions are here made as to the lines along which such preliminary investigations should be conducted.

Looking at the matter from a purely hydraulic standpoint, the delivery of stowing hydraulically through a pipe is subject to the following elmentary rules: (1) The loss by friction is proportional to the length of the pipe; (2) it varies roughly as the square of the velocity; (3) it varies inversely with the diameter of the pipe; (4) it increases with the roughness of the pipe surface; (5) it is independent of the pressure. The introduction of some lubricating element in the stowing material, such as nodules of clay, is possibly well worth consideration for it would reduce wear on the pipes carrying the stowing material.

The coefficient of friction naturally varies with the velocity of flow and the diameter of the pipe. With a comparatively short pipe it may be necessary to consider losses due to elbows or bends in the pipe line. Where (as is usually the case) the length of the pipe is greater than 1000 times the diameter, the velocity head and the loss of head at the entrance need not be considered, for it is so small in comparison to the frictional losses as to be quite negligible.

Loss of Efficiency in Pipe Lines

Generally speaking, in long pipes we may ignore losses due to entrance, bends and variations in the pipe sections. The effect due to bends is of small importance compared with other frictional losses, and it is with these other frictional losses that we are chiefly concerned. If sand stowing, or packing, is to be carried out on definite lines, it will be necessary to find out the relation of head to length of pipe line, the ratio of sand to water and the velocity to the size of the pipe.

All these things will have a definite relation one to the other, and if the system is to be carried out on a large scale then it is desirable to collect information and to experiment so that a basis may be established for common use. It may be an exhaustive matter to derive suitable coefficients for all conditions, still there is no reason why the behavior of certain mixtures, such as one part of sand to three of water, should not have certain coefficients of friction worked out for them. Then the velocity (and therefore the rate of supply) can be determined; or the maximum length to a certain head can be derived and the cost of an installation and its capabilities can be worked out with some exactness prior to the commencement of the work.

*From a paper read before the Geological and Mining Society of India.

Rough experiments have shown that the ratio of sand to water varies in direct proportion to the head and the length of the pipe, while the frictional coefficient is doubled when sand is introduced to the maximum carrying capacity of the water. Such results should be checked with pipes of a greater head and length: then we will find that the effect of a bend at the entrance will be less evident and the flow steadier. Roughly speaking, where the proportion of the head to the length is 1 to 5, then the proportion of sand to water will be about 1 to 3; or where the proportion of the head to the length is 1 to 3, then the sand to the water will be about 1 to 15. However, the capacity of an installation will depend upon the size of the pipes and the velocity of flow in them; it would be an advantage if experiments as previously suggested could be carried out in instances where systems were in actual use so as to determine the proportionate results with some degree of accuracy.

Planning a Stowing System

To determine the size of a pipe for use under certain conditions it will be necessary first to decide upon the rate at which stowing (flushing) is to be done. Furthermore, the velocity of discharge will bear a definite relation to the diameter of the pipe and its length. Hence, the first problem will be to determine the most economical proportion of the head to the length of pipe underground. The problem is to determine whether it would be more economical to put down a series of boreholes direct to the various portions of the workings to be flushed, or whether it would be better to establish one or two main points of flushing supply pipes from the surface to the mines and use long lines of pipe underground.

This problem will be influenced by the following considerations: (1) The rate at which the flushing must be done; (2) nature of the strata to be bored; (3) quantity of water available: (4) grade of the underground pipes; and (5) the velocity of flow of the flushing mixture. It should be remembered that there is a limit or the minimum velocity at which the mixture will flow; at velocities below this minimum the sand held in suspension will gradually increase frictional losses until movement of solids practically ceases. On the other hand, high velocities of mixtures result in abnormal and costly wear of pipes.

The wear on the pipe due to friction would vary with the proportion of sand to water—the more water used the less the friction. However, it should be considered that the more water used the greater will be the expense for pumping out the water after it had been used for flushing. It would be a nice balance of costs to determine which would be the most economical mixtures.

Having determined upon the output and velocity, it will be a simple matter to gage the head required, to work out the most convenient flushing or feeding point at the surface and to calculate the dimensions of pipe required. Where the head is inconsiderable it would possibly be an advantage either to put down two or more boreholes, or to supplement the head by the introduction of a pumping unit.

The disposal of the flush water and its clarification are important. In certain mines where the pitch of the seam is steep enough, it may be cheaper to flush the sand to the workings through a flume or trough. This method can be used when the pitch is 15 deg.; or even at a less pitch if the proportion of sand to water is high. It may be necessary to bring the flushing water from a distance; this might be offset by the greater availability of river sand in a dry season. If the distance to move the mixture on the surface is considerable, and the grades favorable, then an open flume may be more economical than a pipe-line.

Regarding the character of the pipes to be employed we may consider: (1) Cast iron; (2) wrought iron; (3) wood; (4) terra cotta; and (5) porcelain lined. The shape in comparatively small installations would be circular, but ovoid pipes may be considered in special cases. In general it will prove economical to employ thicker cast-iron pipes for flushing lines than is usual in the case of pipes used for water only; in no case is it advisable to employ them under ½ in. in thickness, as the tensile strength is low and uncertain.

If, for economic reasons, cast-iron pipes must be employed, it is advisable to have them as thick as practicable. For instance, assume the outer diameter of a pipe is 7 in. and the inner 6 in., then the cross-section area of pipe metal would be 10.21 sq.in. If we increase the outer diameter of the pipe to 7½ in., and keep the inside diameter 6 in., then the section area would be 15.904 sq.in.; there would be an increase of 5.694 sq.in. in section. Thus, for scarcely more than half as much more metal, the life of the thicker pipe will be double as long as in the first case; this is true provided we assume the pipe will give trouble and have to be discarded when its thickness get below, say, ¼ inch.

Materials Used in Stowing Pipes

Wrought-iron pipes are not particularly suitable for use on longitudinal lines, as their cross-section is comparatively small; they have, however, the advantage of considerable length, resulting in fewer joints, and their fibrous structure (if unriveted) offers less resistance than granular sections.

For underground pipe lines wood might be profitably employed in special cases; the pipes consist of a number of staves, their edges bevelled at an angle radiating to the center of the pipe and bound around at intervals with steel ties arranged with a take-up block to insure efficient tightening. The staves would be 1 to 3 in. thick, depending upon the size of the pipe. The pipe would be bulky and not generally adaptable. Pressures up to 200 lb. per sq.in. are possible, though 150 lb. would be a satisfactory maximum. With higher pressures it is likely that water would be forced through the pores of the wood.

The porcelain-lined pipe is possibly debarred by its high cost from adoption in cases where coal is mined and sold at a particularly low figure. It is possible that vitrified terra cotta may be suitable for underground use, as when vitrified it is coated with an impervious vitreous lining on which acids and alkalies make no impression. This is an important point, as in some cases a good proportion of the wear of pipes is due to the acidity of the water. It may be possible for interested concerns in India to devise means of materially increasing the vitreous lining to suit the peculiar conditions of use. The average pipe can be made to stand a reasonable pressure, say, 100 lb. per sq.in. The joint will, of course, be somewhat difficult and tedious to make. In Pennsylvania half-section glazed-tile pipe has been used on the surface for carrying silt and water to great advantage; this transportation line constituted an open trough.

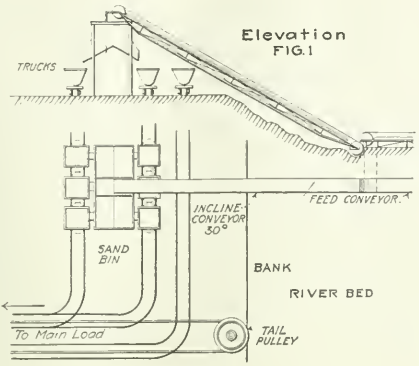
In all cases it will be advisable to arrange so that the pipe can be turned around, if desired, as the wear will be greater on its lower portion. Continental experiments have shown that steel pipes must be changed or turned over when 97,446 cu.yd. (74,500 cu.m.) of stowing material, made up of waste from the washeries, broken boiler cinder, etc., had been flushed through them; while the same attention was necessary after 56,506 cu.yd. (43,200 cu.m.) of sand had passed through the pipes. With cast-iron pipes it was necessary to turn them over after the flushing through of 68,016 cu.yd. (52,000 cu.m.) of waste from the washeries, or 59,906 cu.yd. (45,800 cu.m.) of sand. The steel pipes in this case had a thickness of $\frac{5}{16}$ in. (8 mm.) and an internal diameter of 7¼ in. (185 mm.). The cast-iron pipes had a thickness of ⅜ in. (10 mm.) and an internal diameter of 5⅞ in. (150 mm.).

Considerations Influencing Materials Used

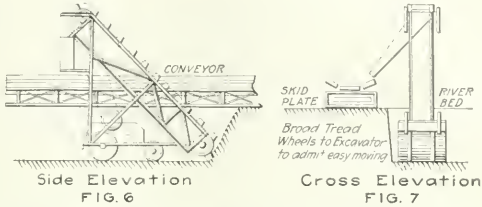
In the Jharia, India, coal field the proximity to sand areas renders one apt to overlook other sources of packing nearer at hand. It might, for instance, be more economical to remove the overburden (surface) covering coal on the outcrop and utilize this if suitable; or even put it through crushers in the case of hard or lumpy material in order to reduce it to its requisite fineness, before using it in the mine. There might be cases where local material which requires crushing may prove more economical than obtaining something from a distance; at the Rand mines in Africa the whole of the tailings is often utilized for this purpose.

The following points require attention when considering the question of transporting sand from its source of supply to the mines: (1) Accessibility of the sand; (2) cost of transportation to the mines; (3) method of packing. In the case of India, whether the sand is required for the Dishergarh or Jharia field, the accessibility of supply is practically the same; but in the case of transport there are two entirely different problems to be dealt with—one in which mines are near enough to the river to draw their supply of sand, and the other where mines are at such a distance as to render the capital outlay prohibitive without coöperation between adjacent mines.

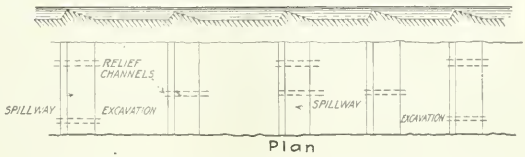
The packing may be deposited in a bin or reservoir adjacent to the mine or above the workings, and be washed down a pipe, the head being sufficient to drive the sand up to the required position. There will also be cases where it is possible to sink a borehole in the river bed and feed with sand direct; in this case the pipe should be fitted with valves at the surface and also (as an additional safeguard) at the foot, in order that they may be closed during flood periods. Otherwise the loading from the river bed will, in a measure, depend upon the method of transportation adapted to the mine. In any case it is safe to assume a severe gradient will have to be negotiated from the river bed to the bank. The work on the bed will in a majority of cases have to be of a temporary nature suitable for rapid removal and therefore a separate unit to the main pipe line. For this, light belt conveyors may be suggested, one



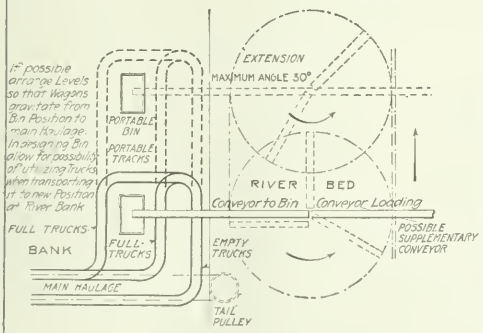
METHOD OF RAISING SAND FROM RIVER



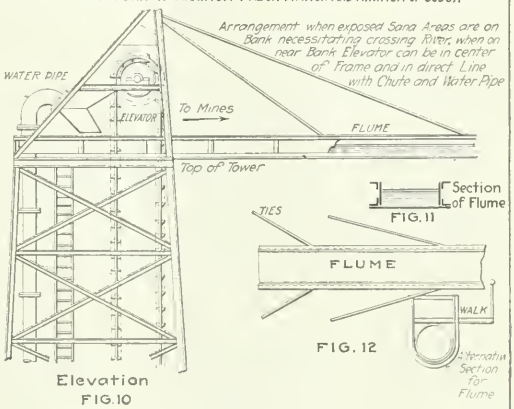
EXCAVATOR FOR LOADING CONVEYORS



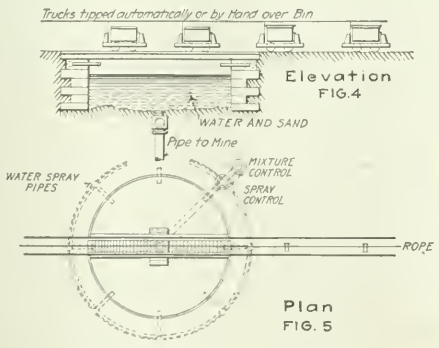
LONGITUDINAL SECTION OF RIVER WITH SUGGESTED EXCAVATION LEAVING SPILLWAYS TO ADMIT OF MAXIMUM PRECIPITATION AND MINIMUM OF SCOUR



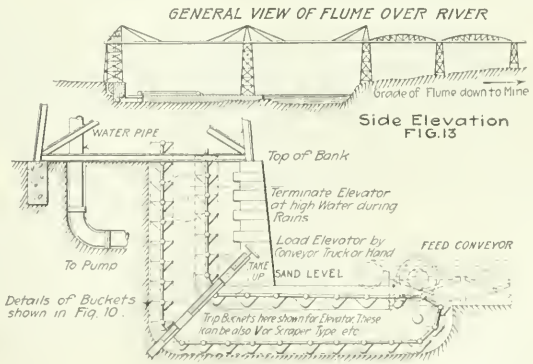
ARRANGEMENT OF SUPPLEMENTARY CONVEYOR



BANK TOWER FOR FLUME



SAND RECEIVING BIN OVER MINE


GENERAL VIEW OF FLUME OVER RIVER
Grade of Flume down to Mine
Side Elevation
FIG. 13
WATER PIPE
Top of Bank
Terminate Elevator at high Water during Rains
Load Elevator by Conveyor Truck or Hand
FEED CONVEYOR
To Pump
TAKE UP
SAND LEVEL
Details of Buckets shown in Fig. 10.
Trip Buckets here shown for Elevator. These can be also Vor Scraper Type etc.
Elevation
FIG. 14

BASE OF TOWER FOR FLUME AND SAND FEED IN RIVER BED

ILLUSTRATIONS OF VARIOUS TYPES OF PLANT FOR HANDLING SAND FOR FEEDING INTO MINES IN INDIA. EXCAVATING AND CONVEYING MACHINERY FOR LOADING AND TRANSPORTING SAND FROM RIVER TO MINE

of more horizontal ones on the bed and the other running up the bank (see Figs. 1 and 2).

The maximum angle at which sand can be dealt with would be about 30 deg., although certain patent types and scraper conveyors will, of course, deal with much steeper gradients. The horizontal feed conveyors should preferably be entirely self-contained, driven by a motor and capable of being moved around in a semi-circle with the lower end of the inclined one as a pivot (Fig. 3). It would be necessary to fix it on rollers or skid plates to facilitate its circuitous movement, and it could be provided with a simple motor driving attachment for the purpose if necessary.

Methods of Transporting Stowing Material

A steam shovel is likely to prove too heavy for the purpose of loading and a conveyor appears to be the most suitable. Should an aërial gear be employed for the transportation line another type of gear might be profitably substituted.

Assuming the case of mines adjacent to the river, with possibly plenty of water, the simplest form of transporting sand appears to be an endless haulage in conjunction with three-ply rubber and canvas conveyors. The plant would be practically automatic, and we might assume the following conditions: The sand would be loaded into a horizontal conveyor, and thence to an inclined one leading into a small loading hopper on the bank. From this it is fed into dump cars and these are moved by endless haulage over a bin; as the cars pass over the bin they are automatically dumped. From the bin the sand is washed into the mine (Figs. 4 and 5).

A constant supply of sand is by no means the least important matter when the tonnage becomes considerable. It might pay to have an inclined plane at the bank, have a supplementary haulage to the main one and run the dump cars on tracks on the bed of the river. A series of light tracks provided with flat steel ties could be used. This plan omits the conveyors and bin at the bank (Figs. 6 and 7). Pumping the sand direct through a pipe line may be suggested; but it does not overcome any more successfully the problem of loading, while the effect of sand on anything with which it comes in contact is familiar.

Examples of Stowing Plants

It may be mentioned that the dredging plant at the Port Talbot docks included a sand-pumping unit. This dealt with something like 150,000 cu.yd. of spoil material with a 22-in. pump and discharged it at a rate of 200 cu.yd. per hr., at a point 500 yards from the pump. Possibly further investigations of the suitability of such a unit is warranted under certain conditions.

Another method may be considered where the distance to the mine is comparatively short and the sand area is situated on the far side of the river from the mine; the sand for flushing, under these circumstances, would be (for a certain period of the year) carried across the river. The scheme might be outlined as follows (Figs. 10 to 14):

A tower might be set up at some point on the river bank most conveniently situated for sand excavation. A combined conveyor and elevator possibly could be arranged to run from the river sand deposit to the top of the tower, running horizontally in the river bed so as to facilitate loading. At certain times of the year it could be shortened to avoid flood water and to enable the vertical section still to operate should sand be available. The elevator would discharge sand into a flume at a sufficient height above the receiving point at the mine to allow the material flushed with water to gravitate to the mine. The water for flushing would be pumped up a pipe supported by the same tower. The proposition would necessitate the use of a number of frames or intermediate towers to carry the flume at a suitable grade. The flume towers should be suitably braced to withstand wind pressure and the load, the former possibly proving the most serious consideration. There may be cases where it would prove more advantageous to employ a pipe in the place of the open flume, so that the head necessary to transport the sand may be reduced; this plan would allow water to enter the pipe under pressure, thus preventing the settlement of sand in transit.

The scheme shown in Figs. 10 to 14 would only necessitate power to drive the elevator and necessary pumps. Further, in order to produce the necessary scouring effect the usual proportion of water to sand might be greatly increased. Having completed its work of transporting the sand to the mine, the water could be drained off and led back to the pumps by means of another flume.

Details of Hydraulic Features

Thus the water could be used over again. The sand could be allowed to settle in a bin adjacent to the borehole into the mine and the usual proportion of water added to carry it underground.

In considering a suitable coefficient of friction for flume troughs of various dimensions with varying velocities to suit conditions, it should be observed that the scouring power of a flow of water in an open channel does not at all times bear a direct relation to the velocity and depth. In other words, as the hydraulic radius is increased, it does not follow that in order for the water to impart motion to the sand the velocity of the water will increase proportionally.

The depth of flow is an important factor, as the water first subjects the sand to a motion of dragging, and later the particles are lifted up into the stream, the motion being then converted into one of suspension. The water carries a larger quantity of sand in its lower portion than the upper, and generally it could be assumed that the amount is proportional to the depth. Regarding the wear due to friction of the sand on the pipe, it may be an advantage later to investigate carefully the relationship of this to the velocity. For it may be assumed that in pipes the greater amount of material carried will be along the center portion of the water; it remains to be determined to what economical limit the velocity of the water may be accelerated in order to increase the time of suspension of the particles and reduce the friction due to the dragging effect of sand particles.

Where, however, the sand is washed into a bin and precipitated, while the water is allowed to overflow and run back to the pumps at the river bank, then the proportion of water to sand may be high so that the inclination of the flume or pipe line can be reduced. Further, at the feeding point the tower can be extended to a greater height so as to increase the head, and this would reduce the requisite height of the other towers in the case of a pipe line.

In the open flume it is doubtful whether a coefficient

of friction for sand on iron will be less than one-fifth. Thus, for water to carry 1 lb. of sand a distance of 100 ft. requires 100/5 = 20 ft.-lb.; if the proportion of sand to water is 1 to 10, then 10 lb. of water must fall 2 ft. in 100 to give this energy. However, while the water imparts motion to the sand there is a tendency for the former to run at a higher velocity over the latter, so that the inclination of the flume should be more than 2 ft. in 100. Possibly for feeding the sand, in the place of the flume it would be better to employ a pipe, and we may then roughly assume that the grade will be in proportion to the mixture; if one part of sand be used to 25 of water the grade would be also in this proportion, or 4 ft. in 100. The necessary head might be increased at the feed tower, so as to reduce the height necessary for the intermediate towers. The flume bearing the return water to the pumps could be carried across the river (when necessary) below the supply pipe and on the same supports.

Stowing Plant at the Mine

The area of the receiving bin would in this case have to be of sufficient extent to admit of the requisite precipitation of the sand with sufficient rapidity to allow a large proportion of the water to overflow. For this reason the bin might be provided with a well in its floor and the surface graded to meet this, so that an adequate sand sump would be provided. The feeding pipe from the river should terminate at a comparatively deep point in the bin so as to keep the sand at as low a level as possible to aid its precipitation; from the bottom of the well the sand could be led straight to the mine or a supplementary feeding bin. The flume for taking back the surplus water should emerge from a point near the surface-level of the feed bin. A strainer might be put at the entrance of the flume to assist in keeping out the sand. It might be convenient to have this flume follow directly under the supply pipe though possibly set on the ground until it reaches the river when it can be carried across the stream to the pumps on the same support as the upper pipe. Owing to the low grade required for the return water, it is possible that this flume could meet the feed tower at a point considerably above the level of the river. Thus pumps could be situated at this higher elevation and reduce most of the expense of pumping water from the river below.

It is of course doubtful if this project would always prove economical or convenient. But it is possibly worth consideration, particularly where the location of the sand areas necessitates crossing a river which may need bridging for a good portion of the year. This is a case where the mine is comparatively adjacent to the sand area. In the Jharia field the river is generally at a distance from the mines, and the problem involves considerable capital. This problem may be solved either by the coöperation of a number of collieries or the construction and operation of the main transportation line by a private company.

For transporting the sand, endless haulage appears the most suitable. With this system, if we have a four-mile transportation line and assume each car carries one ton at a speed of two miles per hour, then one car takes two hours to make the round trip. For the sake of illustration we may assume that we have to transport 5000 tons per day of 12 hours, equal to, say, 416 tons per hour. This means 832 full cars and 832 empty ones in transit, or a total of 1664 plus those being loaded at the river bed. Possibly not less than a total of 1800 cars will be employed. Five thousand tons daily means 11,200,000 lb., and at 100 lb. per cu.ft. this equals 112,000 cu.ft. A simple method of loading would be by running the cars on a series of portable tracks as occasion required. The loading, however, would be a difficult problem as a loaded car would have to leave every eight seconds; and if we consider the sand is excavated to a depth of 2 ft., then every day an area equal to 56.000 sq.ft. will be cleared. Therefore, a simple loading device becomes absolutely necessary, the simplest method being to employ a conveyor, which by reason of its length is particularly adapted to work of this kind.

In America sand is often excavated and loaded by portable machines consisting of a frame with a number of buckets fixed to an endless chain running over both head and tail wheels. The buckets are about 18 x 18 in. in cross-section, and the apparatus delivers about one ton per minute. The machine is equipped with a chute and only requires about a 7-hp. motor to drive it, the weight with the motor being about 7000 lb. About eight of these machines would possibly help to solve the difficulty of labor trouble with regard to loading and prove more economical. The excavators at the river bed would then feed into a conveyor, and from experiments it is found that one man can load a conveyor with 6.75 cu.ft. of sand in 12 minutes with the material at a distance of 18 ft. from the conveyor. In practice the conveyor could possibly be moved in such a way that the men would be close to it all the time, and would at the most have to carry the sand about 3 ft. In the condition under review it was found that the 6.75 cu.ft. actually were deposited in the conveyor in 12 minutes, as noted. This represents 675 lb. in 12 minutes, or 1.6 tons per hour.

With a conveyor 500 ft. long and a man every 3 ft., 166 men could be employed each side of the conveyor, and these could load about 500 tons per hour; but for the purpose of calculation it would be advisable to figure on not less than 400 men.

Practical Considerations Affecting Plant

Assuming the conveyor could be moved practically in a circle, we get a superficial area of 783,828 sq.ft.; or excavating to a depth of 2 ft., we would have about 1,567,656 cu.ft., equaling about 70,000 tons, or 14 days' supply. This conveyor then would feed into another one leading up the bank, the latter being 600 ft. long. Since the loading point at the bank is being continually shifted from the bank terminal of the main transportation system, a supplementary haulage would have to be introduced running parallel and close to the bank; a portable bin would have to be provided into which the conveyor running up the bank would feed. As the area was evacuated in the river bed, and the conveyors were shifted, the bin would be moved from time to time to suit conditions. Owing to conveyors being more expensive than a track, the former is not to be recommended for feeding direct to the main haulage. The loading bin would have a capacity of about 100 tons (or 2,240 cu.ft.) and if it was 40 ft. long, would accommodate eight trucks at a time; this would enable loading at the speed required to allow them to leave at their eight-second intervals.

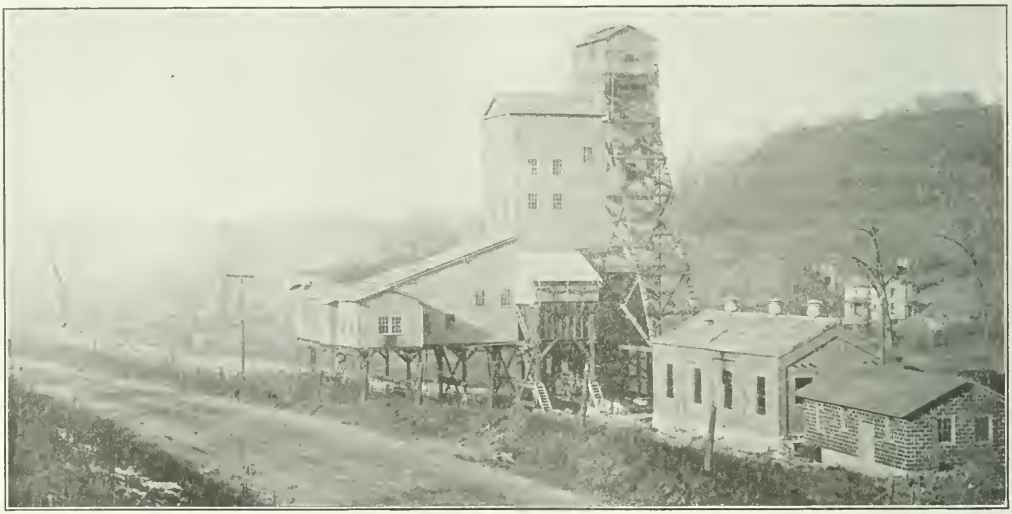
In Jharia, the point for depositing the sand from the

main transportation line would be about 80 ft. higher than the river bank, the grade being 1 in 230 or a pitch of 0 deg. 16 min. The load on the rope equals 832 tons; to handle this load a 1-in. rope may be used weighing, say, 5 lb. per yd. It will possibly be advisable to have a central power station which could either be situated at the river bank, thus saving the poles and wiring to the conveyor motors; or we may assume a power unit with sufficient power to operate, in conjunction with the main transportation line, and endless haulages in mines adjacent to it. The latter is the more expensive arrangement, but is used, as the grade to the mines is favorable to the load, as a rule.

The Amsterdam Mine Disaster

By Special Correspondence

At 9 a. m., Oct. 29, 1919, the new mine of the Youghiogheny & Ohio Coal Co., Amsterdam Mine No. 2, Amsterdam, Ohio, was the scene of the greatest mine disaster in the history of Ohio coal mining. With a death toll of 20 lives and a property loss of thousands of dollars, Amsterdam Mines Nos. 1 and 2 are sealed in an attempt to smother a fire which has been described by experienced mining men as one of the worst ever known.



TIPPLE AND HOIST-HOUSE OF THE NO. 2 MINE AT AMSTERDAM, OHIO.

Amsterdam Mine No. 2 was ventilated by a steam-driven fan located at No. 1 mine. This fan being too small to furnish ventilation for both mines, two booster fans driven by electric motors, were installed at No. 2 mine. One of these fans was located in No. 3 North Quartering Entry, 400 ft. from the main hoisting shaft where the fire started.

It is alleged that quite an accumulation of inflammable material, such as oily waste and hay, had been allowed to collect around this fan and motor. It seems that when this fire started, either from a hot bearing or an electric spark, the attendant in charge had absented himself for a few minutes. Due to the velocity of air at this point, the fire soon gained uncontrollable proportions.

As soon as the fire was discovered an attempt was made to extinguish the flames with buckets. This method was soon abandoned. Two 2-in. pipe lines were then laid, but on account of inadequate pumping facilities, and the steadily increasing size of the fire, the Steubenville Fire Department was appealed to. At 4:30 p. m. one engine arrived and at 5 p. m. two streams of water—700 gal. per minute—were playing on the fire.

Numerous attempts were made from time to time to reach the entombed men who were trapped in 14 and 15 West Butt Entries, but as no rescue apparatus of any description was at hand, no progress was made.

The Ohio State rescue car arrived at 10 p. m., Oct. 29, from Columbus, Ohio, in charge of Chief Mine Inspector Jerome Watson. On Oct. 30, the United States Bureau of Mines car, which was stationed at Brownsville and in charge of William German, arrived. At 6 p. m. of the same day United States Bureau of Mines car, No. 9, arrived from Illinois. Organized attempts were made to reach the trapped miners, but on account of the dense smoke and gas, little progress was made until means had been provided to throw a current of fresh air into 14 and 15 West Butts.

The body of the first man was discovered in 14 West at 8 p. m., Oct. 31, 59 hours after the fire started. The body of the second man was found a short distance from that of the first one, two hours later. The bodies of the other 18 men were found at 2:10 p. m., 79 hours after the start of the fire. They had made a futile attempt to seal themselves away from the smoke and fumes in No. 2 room in 15 West Butt Entry.

The pumping engine of the Steubenville Fire Department broke down at 2 p. m., Nov. 1, after a continuous run of about 70 hours. At this time the fire was thought to be under control and the engine was returned to Steubenville.

An attempt was made for several days to clean up a large fall at the scene of the fire, also to drown out what fire that was thought to remain. Later it was discovered that the flames had spread over a large area. It was then unanimously decided by the officials in charge that the mines would have to be sealed, and this was done, Nov. 12 and 13.

Space does not permit accounts of the splendid individual heroism of the rescue men who worked to the point of exhaustion in water waist deep, men squeezed their way over tops of falls through foot high apertures. They worked for minutes at a time in smoke and fumes where a safety lamp would not burn, and at all times faced the menace of an explosion due to an accumulation of gas in the working places, which continually worked toward the shaft bottom.

Present Fuel Supply From an Engineering Standpoint*

By H. M. Chance
Philadelphia, Penna.

In discussing coal supply from an engineering standpoint, I will not attempt to analyze the conditions bearing upon the supply of anthracite. Anthracite is a relatively small factor in power production except in eastern New York, eastern Pennsylvania and New Jersey. Under normal conditions over 60 per cent. of our anthracite output is sold for domestic use, and it should so far as is possible be conserved for such use. The total output of anthracite is less than 15 per cent. of the total coal mined in the United States.

Coal Age estimated the output for 1918 as follows:

	Short Tons
Anthracite, total output	99,514,334
Used at the mines	9,061,591
Shipments	90,452,743
Bituminous Coal (including coal used at the mines)	590,137,776
	680,590,519

The predominating importance of soft coal as a steam coal is therefore apparent.

H. M. CHANCE

As it is impossible to anticipate the conditions as to fuel supply with which our posterity may have to deal, I shall limit my remarks to the present and immediate future outlook and to those issues which are of greatest interest to engineers and to the consumers whom they serve; namely, to cost, quality and supply.

Will the cost of fuel coal increase or decrease? Will the several qualities or classes of coal be adequate to meet the demand for the several grades? Will the supply of coal of all grades be sufficient to prevent periodic fuel famines? These questions involve matters so closely interwoven one with the other that they cannot be discussed separately, for all of the factors that affect the mining industry have direct or indirect bearing upon each of the issues.

I shall not attempt to discuss the present or future varying costs of transportation, nor the effect of adequate or insufficient transportation service upon the supply, except in so far as these react upon the ability of the operator to mine a maximum tonnage at minimum cost.

ABUNDANT RESOURCES

We are all doubtless fully convinced that in the United States east of the Mississippi River are coal resources sufficient to meet all of our possible requirements for many generations, this having been proved by the work of our State and National Geological Surveys. The Appalachian coal field extends as an unbroken and continuous region from western Pennsylvania and eastern Ohio through Maryland, West Virginia, eastern Virginia, eastern Kentucky and Tennessee, and northwestern Georgia to Alabama; and our Central coal field extends from western Indiana over a large portion of central and southern Illinois southwardly to the western part of Kentucky and westwardly includes large areas in Iowa, Missouri, Kansas, Arkansas, Oklahoma and Texas, with a disconnected district of considerable size in Central Michigan. These coal fields contain all kinds and grades of bituminous coal and also include relatively small areas of coal classed as semi-bituminous and semi-anthracite. Most of these coals are true bituminous coals; that is, they have a relatively high percentage of volatile combustible matter and have caking or coking properties, but only a relatively small percentage of these total reserves will make strong coke of a quality suitable for use in iron smelting. All of these coals are available as fuels for power production, but their value for this purpose as measured in B.t.u. (British thermal units) varies all the way from very low grade coals of 8,000 to 9,000 B.t.u. value up to coals varying from 14,000 to 15,000 B.t.u. value.

A small fractional part of this vast supply consists of strictly high-grade coal—that is, coal with low percentages of ash, of water (moisture) and of sulphur—existing in coal beds close enough to the surface and of sufficient thickness to be mined at reasonably low cost. This is coal the fuel value of which is rated in excess of 14,000 B.t.u. Possibly less than 1 per cent. of our total coal resources consists of this high-grade cheaply mined coal, and of this relatively small quantity only a fractional part is of the refractory ash type, which enables the engineer to use it for forced firing of boilers up to 250 per cent. of their rating.

The readily accessible reserves of coal of this type are being depleted rapidly; no large areas of such coal are in reserve, and with increasing demand the premium commanded by coals of this grade is steadily rising.

By designing and encouraging the building of power plants requiring for their efficient operation coals of this type, engineers are in part responsible for accentuating this difficulty. It seems to me that the time has come when engineers should direct their attention to the development of types of plants designed to utilize coals of lower grade, not only to avoid the steadily rising premium on the high-grade coals but also to conserve these supplies of high-grade fuel for marine and metallurgical uses. We have every reason to believe that the premium commanded by high-grade coals of this class will steadily advance and that it will not be long before plants that are not designed to use fuels of medium grade will be operated only at largely increased cost.

USE OF MEDIUM GRADE COALS

In the East most of our power must be produced by coals of medium (or second) grade, ranging in fuel value from about 12,500 up to 14,000 (or a little more) B.t.u. Of these we have an abundant a vailable supply, and we need not fear that the price of these coals will advance because the deposits are insufficient or inaccessible. In the regions west of Ohio (excepting Arkansas and Oklahoma) the coals are generally of lower (or third) grade and the local (and cheap) supply for power production is limited to coals having a fuel value of from about 10,000 to 12,500 B.t.u.

As necessity is the mother of invention, engineers have striven to develop methods of cheap power production for

*Address delivered at a luncheon of the Engineers' Club of Philadelphia, Nov. 4, 1919.

utilizing low-grade coals in the regions west of Ohio and have been working out improvements in plant design that will doubtless find many useful applications in the utilization of our medium grade coals here in the East.

Now as to conditions affecting cost at the mines, and when I say mines, I use the word to mean mines operating under average conditions, we may say that from 65 to 75 per cent. of the cost of mining coal is the labor cost. The balance is made up of the cost of materials, wear and tear, depreciation and miscellaneous overhead charges.

Irrespective of any fundamental changes in the average rate of wages paid in other industries, the labor cost in mining has been steadily rising and doubtless will continue to rise. One of the causes contributing to increased cost is the larger capital investment necessary for improved housing, casualty insurance and many requirements that come with increasing expansion of the workings to greater depth, greater length of underground haul, increased cost of ventilation and other elecents important in large operations but that could be disregarded in mines opened at and working near the outcrop of the coal.

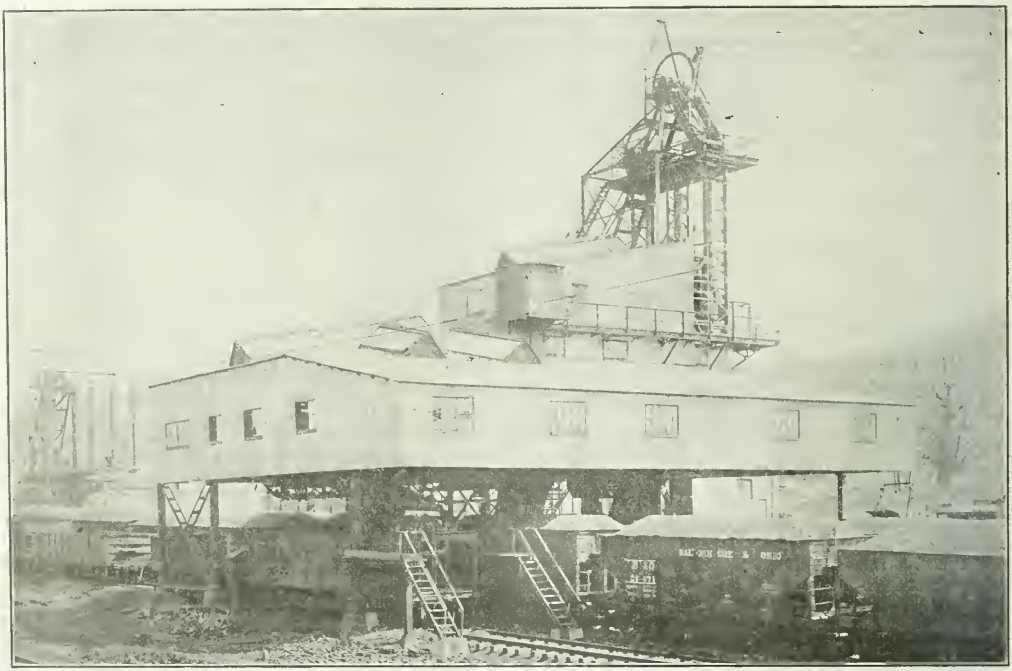
As engineers, or as consumers of coal for power purposes, it would not, in my judgment, be wise for us to base any projects upon an assumption that the cost of producing coal at the mines will in the near future be appreciably less than at present, but on the contrary I believe it would be well to have in mind the possibility, or the probability of increase rather than of decrease in the average cost of mining.

PROFIT OF MINE OPERATOR

The price to the consumer will of course be the cost of mining, plus the profit of the mine operator, the selling cost and the cost of transportation.

I shall not attempt to say anything about freight rates as affecting the cost to the consumer, or about the cost of selling the coal, but I am perhaps competent to express an opinion as to the effect of the profit of the mine operator upon the cost to the consumer. I believe that the profit of the mine operator in the future will be more than in the past. I do not say "greater" or "larger," because the profit in the past has been neither "great" nor "large," but has been ridiculously small. No other large industry has earned such totally inadequate returns upon the invested capital, amounting to so small an interest rate that I hesitate to express it in figures.

Many of the individuals and corporations that in the past have been financially successful in coal mining owe their prosperity to increase in the value of coal land (purchased as undeveloped territory at low cost) and not to profits derived from the sale of coal. However, competition, except in periods of acute shortage, will prevent material increase in cost from an excessive profit demanded by the mine operator. The mine operator is beset with difficulties realized by few who are not personally in touch with mine operation, and these difficulties inevitably increase the cost of mining.



TIPPLE AT MINE NO. 87 OF CONSOLIDATION COAL CO., AT IDA MAY, W. VA.

Courtesy of Mutual Magazine

Having developed and equipped a mine with a daily capacity of, say, 1,000 tons per day, having built houses and secured miners to mine this quantity, the operator can mine only when an adequate car supply enables him to operate. He cannot mine the coal and store it for subsequent shipment. If the railroad cars are not furnished or the allotment is insufficient, his mine is idle for the day or a part of the day. If his sales agent fails to sell the coal his mine is idle, and the railroad cuts down his allotment of cars. If his daily output is appreciably less than his equipped capacity, his mining costs per ton rise rapidly. If the miners, owing to lack of orders or insufficient or irregular car supply are unable to work enough days per week to earn satisfactory wages, they drift away to other mines, and his ability to get out coal is reduced, his railroad car allowance is cut down, his mining costs rise above the price at which his coal has been sold and he is soon bankrupt.

Most coal beds contain layers, commonly called "partings," of slate or rock or fireclay, which may or may not be sulphurous. It has been the practice in many districts to require the miner to remove most of this material from the coal when loading it underground, but when coal shortage requires work under high pressure this cannot be done, and the operator has found it necessary either to ship the coal as mined, or to have these impurities picked out after the coal comes out of the mine. This is slow and expensive and cannot be done thoroughly unless the coal tipples are rebuilt and picking tables installed. This has now been done at many mines, and I do not doubt that picking tables and washers for the proper preparation of the coal will come into general use.

PREPARATION OF COAL

Engineers can help to bring about a general improvement in methods by insisting upon proper preparation, and by refusing to purchase excepting under a form of contract providing for the delivery of properly prepared coal and providing definite deductions in price on all coal that is not up to specifications.

THE BUYER OF "CHEAP" COAL

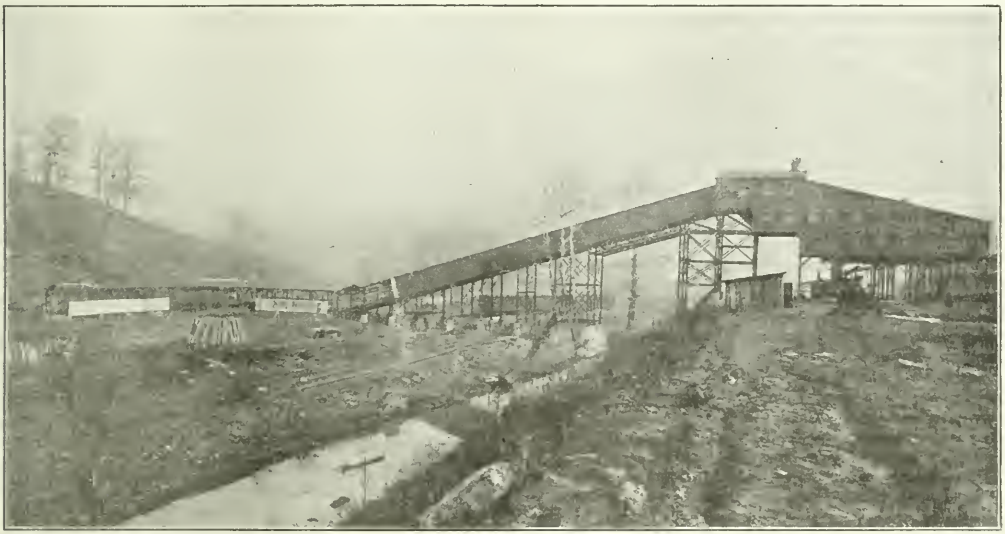
Many of the troubles of the consumer of coal for power production can be attributed to the tendency on the part of many purchasing agents to buy from the lowest bidder and to accept at their face value the statements of sales agents as to the grade and quality of coal to be furnished. The conscientious mine operator is discouraged in his efforts to ship properly prepared coal to his customers if he finds that other operators are obtaining the same price for coal that is shipped as mined and without preparation.

While it may be beyond the power of the engineer to have the coal inspected prior to shipment from the mines, it is entirely within his power to provide specifications that will insure payment, at full prices, only for coal properly prepared, and to see that the coal is inspected and tested as received.

SHORTAGE

And now as to shortage in the supply. No shortage in the supply of coal need be feared because there are not enough mines opened and equipped to produce enough to meet any possible increase in the demand. We have the coal, the mines and the equipment, but we cannot be sure of either labor supply or car supply or motive power to move the product. I will not attempt to say anything about the car supply or transportation problems, but a few words as to the mine labor situation will properly be within the limits of this discussion.

Serious reduction in our coal output may at any time be caused by shortage in mine labor, this term being used to include the miner as well as the laborer who works as his helper. In the readjustments brought about by the war, many miners have found their way into other occupations and will not return to the mines. They cannot be replaced by inexperienced labor, because a man can become an efficient miner only after some form of apprenticeship, usually as laborer or helper, extending over a considerable period. Further, the supply of mine laborers available for this purpose has also been seriously reduced and with no immediate promise of any large increase in this class of labor. If the available miners and laborers are kept steadily at work, as they can be if consumers contract for their supplies in advance and if the railroads furnish regular and sufficient car service, the number available is probably sufficient to produce an output that will meet the requirements; but if consumers do not place contracts for regular delivery far in advance of their immediate needs, or if the railroads fail to furnish a regular and full supply of cars, then it seems to me there will be a more or less serious shortage in the supply, and this condition may be more pronounced in the future than in the immediate present.



TIPPLE AT MINES NO. 88, 89 AND 90 OF THE CONSOLIDATION COAL CO. IN W. VA.

Courtesy of Mutual Magazine

PRICE OF COAL

I do not believe the price of coal would decline to a pre-war basis even if the cost of living were to fall to a low level and a corresponding drop should occur in the average wage scale. In the past we have obtained cheap coal by the intensive working of the best, thickest, most easily accessible and cheaply mined coal beds. The quantity of coal now required to meet the demand can only be had by mining from the thinner coal beds and from those not so easily accessible nor so cheaply worked.

For these reasons it seems to me that no large or rapid decline in the price of coal is likely to occur unless, as a result of financial panic or industrial depression, the consumption should become much less than the output. On the other hand, an actual or prospective shortage may at any time cause the price to advance sharply, but temporarily, and when this co-

curs those who have not contracted for their supplies in advance will naturally be those who will suffer most.

It seems probable, if not certain, that for a few years at least fuel oil will compete with coal as a steam fuel, especially in large consuming centers along the Atlantic Coast, and will possibly displace several million tons of coal now annually used for power production. As the quantity of oil available for such use is, as compared with coal, relatively small, this competition is not likely to bring about a material reduction in the average price of steam coal.

The use of so-called fuel oils for this purpose is from an engineering standpoint deplorable, because these oils should be conserved for marine use either under the boilers or steamships or for dirct power production by internal combustion engines. Attention has already been invited to the use of high-grade coals, especially the so-called "smokeless coals," as steam fuels, and to the early exhaustion of our coal beds furnishing coal of this grade; and if our available fuel oils are to be improvidently used, a similar exhaustion of our liquid fuel supplies will soon become evident.

CAUSE OF HIGH PRICES

The average price of any product which is not controlled as a monopoly but is subject to the free and unrestricted operation of the law of supply and demand will be the cost of production, transportation and distribution plus reasonable profits to the producer and transporting and distributing agents. But we are not so much interested in the average price as in the high and low peaks shown by the price chart. The high peaks threaten the prosperity of the community and the low peaks bring bankruptcy to the operator. Neither party finds any consolation in the assurance of the political economist that the operation of the law of supply and demand will bring about a proper readjustment, for while ultimately this may be true, it promises no immediate relief. High coal prices naturally result from high cost of production (transportation) and distribution. Excessively high prices are usually due to an excess in the demand over the available supply—that is, to shortage in the supply.

Political economists long ago accepted as exioms that with increasing demand or decreasing supply prices rise, and with decreasing demand or increasing supply prices fall, but they have not been able to give us any measure of the percentage of rise or fall in price that will follow a certain increase or decrease in either the demand or supply. A relatively small shortage, say 5 per cent., may cause the price to double or triple, and conversely a relatively small surplus may cut the market price in half.

THE VICIOUS CIRCLE

During 1916, 1917 and 1918, when bituminous coal at times sold for from $4 to $6 per ton at the mines, we had examples of how a relatively small shortage will quickly double the price. The actual shortage during the worst period was estimated at about 5 per cent., and was principally due to railroad car shortage or to motive power shortage. During this period it has been estimated that an excess of 5 per cent. above the normal quantity of refuse (slate, fireclay, rock) was shipped with the coal. If these figures are correct, it is evident that had the coal been properly prepared, the quantity transported by the railroads would have been equal to the demand, there would have been no shortage and the abnormal jump in prices from $2 or $3 up to $4 to $6 would not have occurred. Under these conditions the consumer, while paying twice the price for his coal, was getting coal that was worth as a steam fuel only 90 to 95 per cent. of the value of properly prepared coal, and he was therefore forced to increase the quantity ordered from 5 to 10 per cent. or more to keep his plant running, thus adding an increased demand to the already deficient supply.

CAUSES AND REMEDIES

Every consumer who fails to insist on proper preparation of the coal or who is unwilling to pay a reasonably larger price for the better prepared fuel forms a segment of the "vicious circle" which constitutes the basis underlying abnormal prices and periodic shortages in the supply.

Every operator who fails to propertly prepare his coal for shipment, or who does not insist on reasonable compensation for the cost of preparation, contributes to the demoralization that results from abnormal fluctuations in price due to periodic shortage in the supply.

Every power plant that requires especially high-grade coal of the smokeless type for its efficient operation is another unit tending to increase the average cost of coal at all power plants.

Every ton of refuse hauled to the consumer with his coal involves the absolute waste of cost of power, wear and tear, interest on equipment, and proportionate overhead expense of operating the railroads over which it is transported.

Every boiler plant that operates inefficiently and every prime mover using steam inefficiently contributes to the maintenance of abnormally high prices by wasting a part of the available supply.

The remedy is in the hands of the consumer. The operator will give the consumer what he asks and is willing to pay for—no more, no less. If the consumer will see that boilers are efficiently fired, that the coal is fully burned and makes the maximum quantity of steam; if he will install and keep in good operative condition prime movers of high efficiency; if he will arange his plant to use the cheaper coals of medium grade and insists upon proper preparation of the coal prior to shipment, many of the difficulties of present and future fuel supply will disappear.

Vienna is Pinched by Lack of Coal

The Vienna authorities announce that they are unable to issue the meager seven kilograms of about fifteen lb. of coal for each household weekly, which was recently promised. Thus the fuel situation grows worse and the failure of the owners of the forests near Vienna to fulfill their old contracts because of the depreciation in the value of the crown aggravates conditions. The government apparently is helpless.

A subcommission of the reparations commission is investigating the food and fuel problem, and the press and people pin their hope on its recommendations.

The movement of export coal has touched a low point, and unless there is a speeding up in production the foreign trade that has been built up by this country in coal is likely to lose its strong position.

Regarding the coal situation abroad advices have recently been received here in connection with the fuel supplies in France. It is reported that there is not so much lack of coal for domestic purposes, but a lack of coal for transport and industrial undertakings. The Pas-de-Calais mines, according to one French journal, in Oct., 1917, produced 42,000 tons per day and in Sept., 1919, the production fell to 23,000 tons daily. The mines of the Nord, which produced 6,813,761 tons for the year 1913, produced 1,500 tons for Jan. this year, though it is hoped that the yield for Nov. will be 100,000 tons. It is also estimated that the coal imported to the Department of the Nord has decreased by 38 per cent since 1914 and that prices of imported coal have risen by 337 per cent.

Miner's Strike Affects Italy's Supply of Coal

Italy's supply of coal, which will be scarcely 700,000 tons in November, will be even less in December owing to the recent strike of bituminous miners in America. While Italy never received promised German coal to Belgium and France, it is hoped she may get a larger quantity from England as a result of increased production there.

American Mining Congress Holds Session

By R. DAWSON HALL
Managing Editor, Coal Age.

WITH your coal operators busily in conference with the mine workers at Washington and your senatorial co-operators battling in their chamber on no less a matter than the League of Nations, what hope has your energetic secretary that he will have a good Mining Congress? James F. Callbreath, with the Executive Committee, that controls the organization of which he is secretary, little thought, when he put the date on his schedule, that everything would conspire against him to make the Congress a failure.

But it was not the Congress, but the conspiracy, that failed. There was a splendid attendance of about 1200, a more than ordinarily good exposition, and better speakers than ever before. The imagination is set working to wonder what kind of a Congress, Bulkeley Wells, the president, and James F. Callbreath, the secretary, would have staged if the miners had kept their contract and the senators signed the treaty, for the American Mining Congress is now grown into full manhood. Its years attest that fact no less clearly than its finances. It has ventured to ask 10 cents for every $1000 of output—a voluntary contribution, but one that seems quite generally paid. No Congress or other institution can succeed that does not boldly face the question of finance by some such measure of taxation as that which the Congress has taken.

The twenty-second annual convention of the American Mining Congress assembled at 2:30 p. m., Monday, Nov. 17, in the Convention Hall of the Exposition Building, an edifice which in earlier years was known as the Southern Hotel. Robert E. Lee, the grandson of the veteran commander of the Southern Armies during the Civil War, presided in the absence of Thomas T. Brewster who, though a St. Louisan, could not be present as he was busy fighting for the public in the wage conferences at Washington, D. C. Mayor Henry W. Kiel, who was expected to be present, could not perform the duties of host, owing to sickness, and W. K. Kavanaugh, chairman of the Exposition, had to absent himself because the coal-strike negotiations in Washington made his absence imperative.

SOME INTERESTING ADDRESSES MADE

The address of welcome was made by Xenophon P. Wilfley, former United States Senator, a resident of St. Louis. He urged greater production and commended President Lewis of the United Mine Workers of America for courageously saying that the strike of the mine workers must be called off because the courts of the United States had so ordered. No institution, declared the ex-senator, could be allowed for one moment to set itself in opposition to the Government of the United States.

President Wells in his reply to the address of welcome denounced the activities of the Industrial Workers of the World, especially expressing his abhorrence of the Reds at Centralia, Wash., for their dastardly murder of former service men when these men were passing in a parade in honor of Armistice Day. He favored compulsory arbitration, commended collective bargaining and the eight-hour day as fair both to employer and employee.

He did not speak so favorably as to profit sharing because, in his belief, labor was willing to travel along with industry in its periods of affluence but was not ready to accept the unpleasant descent into the period of decreased prosperity. It was willing to share with enthusiasm the gains of capital, but would not share with it any of the losses of lean years.

He recommended the formation of an industrial commission that would take jurisdiction when strikes occurred and have power to enforce its decrees on both parties, employers and employed alike.

Elmer Donnell, a St. Louisan, general manager of the Associated Industries of Missouri, who represented Arthur J. Davis, the president of that organization, who was ill, said: "We are ready to fight to the last ditch against those radical interests which would defy law, overturn the Government, wreck our institutions and destroy industries."

Dr. Van H. Manning, Director of the United States Bureau of Mines, as personal representative of Franklin K. Lane, the Secretary of the Interior, drew attention to the fact that the coal mines of the United States stand idle between one-fourth and one-third of each year, with consequent hardships on the mine workers and great loss to the operators and the public.

He recommended the establishment by the government of winter and summer rates on coal, the summer rates to be materially lower than the winter in order to induce industries and individuals to purchase and store their coal in summer and thus keep the mines going full blast the year through.

Winter and summer prices, or a sliding scale of coal rates, he said, would keep the miners busy, maintain a regular flow of coal, and keep the public supplied at reasonable prices.

EXPORTS WILL BENEFIT THE INDUSTRY

A good export trade, Dr. Manning said, would greatly benefit the coal industry of the United States. He added that the coal exports from this country had grown enormously since the war, due to the shorter hours obtained by miners in Great Britain, which curtailed the production of that country.

He advocated that the coal-export business from the United States be placed upon a firm basis, through its own shipping facilities, so that coal produced here could be enabled to compete with coal mined in other countries. Dr. Manning said that owing to high freight rates, demurrage, insurance, etc., American coal sells at prices as high as $35 a ton in France. Of this charge, he said, 90 per cent is required for transportation, insurance, demurrage and charges incident to shipping, and only 10 per cent for production.

He advocated the creation of a coal-export corporation under the provisions of the Webb-Pomerene law to handle for operators all shipments of coal. By this method coal unsuited for foreign uses will not be shipped to the detriment of the American coal trade. The prices of transportation, etc., he thought, might be better regulated than they are at present.

He deplored the tendencies of the various countries to exclude foreign capital from engaging in the exploitation of mineral resources, declaring this policy to be short-sighted and likely to lead to international complications. He urged the Mining Congress to support a policy of reciprocity that "will place our citizens upon a parity with other nationals in the exploitation of the universal resources of the world."

He said that it had always been the policy of America to encourage foreign capital to enter freely and that the United States had permitted foreign companies to acquire holdings here on the same footing as citizens of this country. He said he believed in that policy.

Dr. Manning said further that the use of oil as fuel in competition with coal should be discouraged, because the thermal efficiency obtained in the average steam plant is but 10 to 15 per cent, while in internal-combustion engines an efficiency of from 30 to 36 per cent can be obtained.

He declared that the development of oil shales to supplement the oil wells when their supply begins to decrease is a

problem of first magnitude for the congress to consider. At the close of his address Dr. Manning declared the exposition open.

In the evening, under the chairmanship of Bulkeley Wells, a meeting to discuss the railroad situation was held. Alba B. Johnson, formerly president of the Baldwin Locomotive Works, and now president of the Railway Business Association, who represented the Co-operative Committee on Railway Legislation, urged that the Congress should interest itself in the railroad situation, for the mining industry furnished 58 per cent of all the freight traffic of the United States and so was vitally interested in the financial abilities of the railroads.

He freely admitted that reprehensible acts had, in the past, been committed by railroad corporations, but he pointed out that if railroads had taken bribes, the public had paid them. The public should bear half the onus of the evil of which the railroads are accused. Where a railroad has done wrong, a section of the public has been party to that wrong and cannot therefore point accusingly at the railroad that merely participated with it in that wrongdoing.

MANY PLANS ARE HATCHED

There had been 36 plans of railroad control put forward by nine separate groups. The Railway Business Association has no plans for railroad regulation, but it has certain principles which it wants borne in mind in the making of the settlement. The United States Chamber of Commerce distributed Referendum No. 28 requesting that replies be returned by July 24. Since that date the Chamber has been silent. Apparently it is not actively committing itself to any plan. H. H. Merritt is the president of the Co-operative Committee on Railway Legislation. That body has no miners in its personnel, but it would be pleased to take note of the views of the mining industry.

It was interesting, he said, to note that after all the investigation and all the aspersions of the public the Railway Valuation Board had so far found few over-capitalized railways where its work is complete and many railways which are immensely undervalued. Drastic reorganizations and what is quite aptly termed "the ploughing in of capital" have caused values in many cases to exceed capitalization.

The time has more than come therefore for the public to take a more generous view of the railroads' claims to adequate returns and fair freight rates. There are two bills providing for the return of the railoads: the Cummings' bill in the Senate and the Esch bill in the House.

The latter enables large railroads to affiliate with small, cuts out piratical competition that has in the past ruined railroads, demands that the issuance of securities shall be under federal control, requires that the regulation of the railroads shall be exclusively federal even as to intrastate traffic, though the state authorities shall be heard as to the latter, and it provides that the regulating body shall, in determining freight rates, base them on what will give a fair return to the investor.

The Cummings bill is more specific, and would set 5½ per cent as a fair return to the investor and orders that on this return to capital all rates shall be based, granting, however, a further ½ per cent as a regulation fund. This assumes that railroads will be able to borrow all the money they need at 5½ per cent. Just at present foreign governments and municipalities are willing to give that and even more.

There is a competitive spirit shown that may make 5½ per cent an altogether inadequate figure. Congress may name the rate, said Mr. Johnson, but it cannot compel investors to purchase stocks. It would appear, he added, that an authority should be allowed to issue a certificate of necessary revenue, and let freight rates be high enough to make it possible to secure such a return.

Samuel O. Dunn, of Chicago, the editor of *Railway Age Gazette* of New York, then presented an argument based on the decline in railroad investment activity in the last few years. In his estimation we have fallen behind seven billion dollars since 1915, as compared with our investment for a similar time in the 10 years before that date. He estimated conservatively that we would need to spend six and a half billions of dollars in the next three years.

We have already planned to spend 633 million dollars on public highways, and they cannot be built because the railroads are not able to transport the material, so inadequate are the railways to meet the nation's demands. If the railway companies are to raise six billions or more of capital they must be allowed to earn such revenues as will make the investor willing to lend them money.

Magnetic, but not wholly fair, Clifford Thorne, a railway-rate expert of Chicago, then opposed the return of the railroads to private operation, saying that the standard return should be extended till the war throes no longer trouble us. He is a wizard with figures, but he did not venture to assail those presented by his opponents, though the audience could hardly fail to surmise that just that, and that only, was what he was doing.

Tuesday morning's meeting was addressed by E. W. Parker on "Labor Conciliation in the Anthracite Industry." Mr. Parker believes that the Labor Conciliation Board of the anthracite region should have its duplicate or duplicates in the bituminous fields. Possibly so; however, the bituminous coal operators watching the action of the board are not confident that it prevents strikes. It is quite a general practice in the anthracite region to have a local strike about every grievance however small, and finally after a week or so's duration the strike comes to an end, and the conciliation board gets busy.

In the bituminous region there is a similar local strike, which lasts about the same length of time and ultimately is settled by parleys between the operators' commissioner and the district president of the union. Button strikes, which are inexcusable from the point of view of the contract between mine operators and miners, are more frequent and severe in the anthracite region than in either the fully unionized or the partially unionized mines of the bituminous fields, and whenever a new contract is due, or the men want to make it due before the time, the work of the Conciliation Board is rendered null and void.

THE CONTRACTS ARE DIFFERENT

Just at this time the Conciliation Board may appear to be composing matters, but the reason why there is a strike in the soft-coal field and none in the hard-coal region is because the contracts in the bituminous-coal field mostly call for their termination at the end of the war—a date that the mine workers declare is in dispute—whereas the anthracite contract runs unquestionably to Apr. 1, 1920.

When April of next year comes, some cheerful optimist in the Central Competitive Region may be able to point out to Dr. Parker how much better things are there. However, the contract in the anthracite region is a "trailing" contract, if I may coin the word. It will be easier to make because the mine worker, the steel worker, the pressman and the compositor have learned that the public is against unreasoned increases.

The mine worker has asked more than pay and a half for half time. He has tried to cut his yardstick in two and add 60 per cent to the price of his goods. The public has proved its powers of resistance to this robbery, and so when the anthracite workers come to make a "trailing contract" they will not be so paintully dynamic and sanguine as their fellows in the soft-coal regions.

Dr. Parker declared that the Conciliation Board was free of the taint of politics. Congratulations are in order, but did

any bituminous operator ever find any politics, outside of union politics interfering in a settlement under the present regime? Union politics, in the anthracite region, as in the bituminous, appear to affect the operations of the Conciliation Board, for the frequency with which the labor leaders unanimously line up together in favor of the demands of the employees, causes the frequent reference of matters to the arbitrator of the Board.

Dr. George O. Smith, Director of the United States Geological Survey, in a paper entitled "Our Industries' Part," stated that the mineral industry had grown to a 5½ billion dollar stature, but that the increase in production was only in a degree the reason why the figure stood so high. The market cost of the minerals had increased more than their volume of production. He would have freight rates based on cost of transportation and not on the exigencies of business. He declared that welfare rather than wealth should be our aim.

At the afternoon meeting held by the National Conference of Schools of Mines in the Planters' Hotel, papers were read by Lewis E. Young, now of the Union Electric Co., St. Louis, Mo., on "The Amount and Kind of Business Training, Including Economics, Cost Accounting and Business Organization to Be Taught in the Mining and Metallurgical Curricula," and by E. A. Holbrook, superintendent, United States Bureau of Mines Station, Pittsburgh, Penn., on "Closer Co-operation Between the Colleges, the United States Bureau of Mines and Industrial Corporations in Research Investigations." These papers, especially the first, were discussed at length. This was in strong contrast to the practice followed in regard to all the other papers, or almost all of them, presented to the Congress. There was no opportunity given for discussion at most of the meetings, the papers being read usually *in extenso* and passed over in silence.

The general attitude of the educational men present—and they were there in force—was to the effect that the average student was not phychologically prepared to study economics, cost accounting and business organization and did not realize the value and importance of those subjects; that, in many cases, the curricula were so full that the short years of student life were already overcrowded, though perhaps there was much, like higher mathematics, which might be left out.

As one professor said, mathematics may be excellent mental gymnastics, it may strengthen the sinews of the mind, but there are other exercises having a closer relation to the future needs of the student. It was remarked that after all the main purpose of college life was to stimulate the thinking habit and that the importance of the subject in the life work of the student was subordinate to its work in forming active mental habits and in giving the pupil the basis for the establishment of a sound judgment.

WHAT DOES THE STUDENT NEED?

The educationists quite generally admitted that it was hard to forecast just what training would help their men in their life work, for some would later be executives, some geologists, some metallurgists, some mining men. Others again would be analysts or educators. The differences in the metal and non-metal values to be recovered are as numerous as the occupations. There are few perhaps who would have to undertake the charge of companies, but equally true is it that only a few would be geologists. A knowledge of geology would be of little use to an analyst or an executive.

It is because of this fact that we must make our curricula all-embracing, so that it will not fail to give every mining student what he wants, even if more than he wants, remembering always that the imparting of knowledge and the causing of the student to think on any subject is valuable training in itself. If the interest in economics, cost accounting and business organization has proved lacking, it is probable that it is because the value of these subjects has not been duly emphasized. We all have seen vital parts of education react unfavorably on the student because they are not taught interestingly and with conviction.

In many small colleges there are few indeed who can be depended on to teach these subjects with ability, especially when the instructor is not closely in touch with the mining field. In how few colleges are there good economists, cost accountants and business experts whose acquaintance with mining is really intimate? Then again all colleges have their specialties, and the strong parts in the various curricula are not always as closely based on the needs of the students as on the preferences of the professors and the lines in which they excel.

Well-balanced curricula require well-balanced talent, and where may such a balance be found? Some of the professors declared that methods of mining could not be effectually taught in the classroom even with expensive models and a multiplicity of charts. Some, lamenting their inability to create tridimensional vision in their pupils, would abandon methods of mining as a subject and replace it with something that an executive may well need to use.

Dr. Victor C. Alderson, president of the Colorado School of Mines, at Golden, Colo., declared that he made it his practice to give the senior students problems of actual life, political problems, it may be, and calls on them to discuss them before, and with, the assembled faculty. He will require them to make a constructive report on a mining property, not giving mere details of operation, character of ore and methods of working, but explaining whether the property was worth more or less than the price of its stock would indicate, and why, the idea being to get a thoughtful presentation of the real essentials of the mine as a financial proposition.

T. T. Read, of the United States Bureau of Mines, was not at the Congress and so could not present his article on "The National Temperamental Characteristics of Labor, making Certain Nationalities Suitable or Unsuitable for Mixed Labor in Mining and Metallurgical Work." In consequence this number in the program had to be passed over.

AN INTERESTING DINNER

An informal dinner was held at 6 p. m. at the Planters' Hotel with E. P. Mathewson, consulting metallurgist, New York City, in the chair. Interesting remarks were made on the labor problem, Arthur Thacher, of St. Louis, receiving quite an ovation after an address urging the power of the Golden Rule as a means of creating good relations and increased production in the mines. He stated that while the earnings per shift at the mines under his charge had increased from $1.84 to $3.74 from 1908 to 1918, both inclusive, the cost per ton had dropped from 68 cents to 47 cents per ton loaded, and the tons per man had risen from 2.7 to 8. At one of the mines he assured me the tonnage loaded by a Greek miner reached 110 tons per day.

At 8 p. m. another session was held at which Col. Roberts, of Roberts and Schaefer, construction engineers, made a report for the committee on the standardization of mining equipment. The committee has only recently been formed. There are sub-committees on mining and loading equipment, on underground transportation, on underground power transmission, on mine drainage, on mine ventilation, on outside coal-handling equipment, and on power equipment. Some work has been done, but the work is too large for speedy accomplishment and nothing would be gained by making snap judgments.

The late evening program was filled by addresses on "The Russian Radical as I Found Him," by George W. Simmons of St. Louis, Mo., who from actual experience in Red Cross work in Russia, had come to the conclusion that the Russian Red was every bit as evil as he had been painted; "The Red Men-

ace," by the Rev. Charles W. Gordon (whose pen name is "Ralph Connor"), a well-known novelist of Winnipeg, Can., who detailed the Red uprising in that city, and how the Reds were kept in check by the Citizens Committee of 1000 and the Northwest Mounted Police; closing with "What Is the Matter With America?", by Allen Walker of the Guaranty Trust Co. of New York City.

Extravagance, Mr. Walker said, lies at the root of the high cost of living in the United States, and is productive of some of the economic ills of which we are complaining. He said silk shirts and silk socks are all too commonly worn by people who, at the same time, are complaining of the high cost of living. He remarked that "the basic sin at the bottom of all our social unrest is that same covetousness against which we are warned in the tenth commandment." "The ruling passion is extravagance, the arch enemy of thrift, supplemented by a very common determination to do as little as possible for as much as can be obtained by fair or unfair means."

He said that a Boston hosiery manufacturer thought it would be a patriotic act to raise the price of silk hosiery and decrease the price of cotton hose. "To his astonishment," said Mr. Walker, "during the succeeding three months he sold 25 per cent more silk hose than before, and about 20 per cent less cotton." The teaching of simple economics to employees by business men, the speaker said, might prepare the great majority to combat in their meetings the talks of radicals.

MANY PEOPLE ARE MISLED

He said there is a class of "parlor socialists with whom it is regarded as quite the proper and fashionable thing to commiserate with the long-haired men and short-haired women who dispense anarchy in disguise."

"I know a number of worthy and thoroughly well-meaning men and women in New York who are being fooled to death by the new species of reformers and have been induced to support their camouflage by devious outward coatings of harmless sociological preachments." The Reds, he added, use the money of these men and women to spread literature which the latter are never allowed to see, and which they believe are far less revolutionary than they really are.

The real division of the people actively connected with the labor problem, he said, "is not between employers and workers, but is now between the constructive people and the destroyers." He recommended no compromise with advocates of unsound doctrines, the elimination of "class warfare," the observance of contracts whether by capital or labor, the removal by employers of legitimate grievances, maintenance of law and order, and the stern suppression of any organization which sets itself up as bigger than the government.

He advocated a "full day's work for a full day's pay." He denied that employers are attempting to break down the organization of labor, and declared that there should be no objection to "reasonable combinations of wage-earners organized for the purpose of improving the conditions of labor." No class of people," he said, should be permitted to choose which laws they shall obey.

"Year after year," he added, "labor has caused Congress to degrade itself by refusing funds for the prosecution of lawbreakers. The same convention of mine officials which called the coal strike," he said, "presented a report in which it rejected the doctrine that unions and their officers can be held responsible for violence against the operators and workers of non-union mines." He said he would like to see emanate from some authoritative source a serious proposal for a twelve months' armistice between capital and labor, with an accredited commission to consider all grievances and controversies.

During the period of twelve months, he said, he would like to see an intensive campaign for production and thrift, because, he added, "we cannot save money to invest in securities to help reconstruct the world and at the same time spend our earnings for luxuries which are beyond the means of the prudent and thrifty."

A meeting of the Safety and Welfare Section was held in the Exposition Buidling in the forenoon of Wednesday, Nov. 19. The first address was by C. W. Seiberling, vice-president of the Goodyear Tire and Rubber Co. He described the remarkable work of this company in the promotion of the safety and welfare of the employees.

Dr. J. J. Rutledge, mining engineer of the United States Bureau of Mines at McAlester, Okla., outlined a plan of securing safety in the mines by organizations established for that purpose. He said it was hard to induce the actual miner to take a part and even an interest in safety work. It was far easier to introduce it to the company man; but a little reflection will show that the miner is the man most greatly interested and he should be led to recognize that first-aid and rescue work, which is established for him primarily, should find him earnest in its support.

W. D. Ryan, commissioner of safety for the United States Bureau of Mines, made an address on the large returns paid by safety work to both empolyer and employee. He said that in Oklahoma the shotfirer is supposed to tamp every shot. Recently one man fired 85 shots in 45 min. Mr. Ryan left it to the audience to say whether he tamped a single one of them. The last one "got him." Does such foolishness pay any one in the long-run? The fatality is bound to happen if chances like these are taken.

Mr. Ryan said that the safety engineer should have power to act without reference to headquarters. A man who was engaged to inspect the mines, but not remove dangerous conditions or have them corrected, reported to the manager when he returned to the office that there was some loose rock over a light board overcast under which men were continually passing. When the manager got the communication, he turned it over to the superintendent in the regular order of business. This official passed it on to the mine foreman, who in turn instructed a man to remove the hazard. There are all kinds of possibility of delay in so passing up information to the manager and in so passing down instructions to the foreman. Meanwhile the lives of men are jeopardized.

GOOD SAFETY RESULTS WERE OBTAINED

Austin Duffy, manager of the Safety Section of the United States Fuel Administration, then read an address on the "Result of the Safety-First Movement on Labor." He declared that accidents were reduced 56 per cent during a safety campaign extending over two weeks, the campaign being waged on the broad lines which are calculated to reach not only the man in danger but his family also.

Charles S. Allen, secretary of the New York Wholesale Coal Association, at the afternoon session, gave some facts as to the invasion of oil in the boiler rooms of the East where coal was formerly used exclusively and emphasized how and why the aggression should be repelled. Whenever oil is installed the company officials who introduce it must defend their action in order to excuse it and to give satisfactory account for the expenditure of the money.

The employees who find that oil is a saving of labor naturally declare that oil is the preferential fuel, even when they know it is a source of financial loss to the corporation. In fact, they tend to prevent a return to coal. The oil men are quite ready to lend money to corporations to pay for the installation of the necessary oil-burning equipment. Thus the Missouri, Kansas & Texas Lines were advanced $650,000 by the Mexican Petroleum Co., according to Mr. Allen, so that it could make the changes incident to a transfer from coal to oil burning.

At Providence, 200 industrial plants are already burning fuel oil and more are on the way. Similar conversions of

equipment have taken place at Pawtucket and Fall River. One concern, however, fitted up six out of ten of its boilers to burn oil, but took the oil-burning equipment out after six months and reinstalled coal-burning stokers at the expense of $25,000, for which the fuel-oil company paid. Another company having seven units, fitted three up to burn oil and scrapped the rest, but today they are back in use. The Pocasset Manufacturing Co., Mr. Allen said, having 27 boilers, spent $5000 in investigation. It found it would take 24 years to pay back to it in savings the cost of installing the equipment. The Essex Rubber Co. declares that there is no saving to be made in using oil with fuel at 3 cents per gallon.

The New York Wholesale Coal Association has engaged a combustion engineer to find out the whole truth regarding the possibilities of oil. Mr. Allen said that the question is not one for New York alone to solve, for the matter is interesting to many cities and not to the tidewater municipalities only, for oil is accessible to all places that can be approached by water, and there are few indeed, even in the Middle West, that can not be so reached.

Paraffin-oil residues, according to Mr. Allen are not suitable for use under boilers. Mexican fuel oil does not have a paraffin base, and it is therefore more suitable than most oils from the United States. The prospect for the continued use of United States oil is also problematical, said Mr. Allen, for while 7 per cent of the available coal has been used, it is estimated that as much as 40 per cent of the available oil has found its way to the market.

THE STORY OF COAL

Following Mr. Allen, James Taylor, special mines investigator of the Department of Mines and Minerals, in Illinois, delivered a written address on "What Is the Cause of the Present Labor Discontent?" Mr. Taylor's address was couched in almost classical language, and I should but do violence to it if I attempted to brief it here. The delay in starting the afternoon meeting made it necessary to pass the other addresses over to the next day. A motion picture, "The Story of Coal" was then shown by Morton F. Leopold. The film has just been completed by the Safety Division of the United States Bureau of Mines, co-operating with the National Coal Association, the latter body expending $10,000 on its production.

It shows most of the operations of mining and preliminary to mining and is extremely interesting, especially that part of it where a motion picture is taken of an entry, the photographic machinery being propelled on a truck and carrying 16 lights of 64,000 aggregate candle power.

The film being rotated by hand, the speed of operation was excessive. The men in the working places seemed to be working almost breathlessly. No man could work as these men labored for more than perhaps 10 minutes at a time, and the speed of the same movements could not have been duplicated in actual practice even for that length of time. It is a pity when mining films are so rapidly run through the kinematograph, for they give the idea that the miners and laboring men are harried at their work till they work like men possessed, which, of course, is not true.

At the formal dinner held in the Planters' Hotel on the evening of Wednesday, Gov. Frederick D. Gardner, of Missouri, was the leading speaker and Robert E. Lee was the toastmaster. Other speakers were James G. Strong, a representative of the House from Kansas; F. F. Foss, the chairman of the Russian Mining Commission, and the Rev. Charles W. Gordon, of Winnipeg, Manitoba, who was on this occasion heard for the second time, his talk being on: "The Industrial Situation in England." Mr. Gordon greatly affected his audience, emphasizing the spiritual elements of the labor problem. He frankly admits that he is a radical and that he has great regard for the labor leaders of Great Britain, but his attitude is certainly one that will appeal to every one, for he has absorbed none of the toxins of radicalism and recognizes the idealisms of both employers and employees.

On Thursday morning J. C. Thompson, director of the Department of Mines and Minerals of the State of Illinois, gave an address on "Stabilization of the Coal Market Through Storage." No one could fail to approve of its purpose, but the treatment of the subject seemed to have suffered from the slipping of a decimal point two places to the left. The depreciation of coal in four months is surely not 25.0 per cent, but 0.250. Granted, however, that it is the larger figure, we can see that Mr. Thompson has hit on the correct cure—storage under water.

As a matter of plain, ascertained fact, coal, if it is stored in the open, loses only in its sizing and not appreciably in heat units unless it heats or burns. Storage under water must be done at the plant where the coal is used or the coal will freeze solidly in the cars during winter transit. Coal can only occasionally be stored under water at the plant that expects to burn it and when it does the drying of it under the boilers is an expensive process, far more expensive surely than is justified by the slight saving effected by the preservation of the entire thermal efficiency of the dry coal.

Edwin Ludlow, consulting mining engineer, of New York City, read an excellent paper showing how the anthracite region suffered from government regulation, and stated that Dr. Garfield was fair enough to admit that his final price was 50c too low to protect the anthracite operators from loss, but nevertheless he did not reach the point of raising the price to the level that he well knew to be equitable.

PLAN OF STANDARDIZATION PRESENTED

George S. Rice, chief mining engineer of the United States Bureau of Mines, delivered an address describing a proposed system of standardization of coal. Any producing company could arrange to enter its name. It would specify its own analysis and the Government would certify the mines on that basis, inspecting the shipped coal at intervals and withdrawing certification if the coal did not measure up to the standard the company had elected. However, the producer is not to be penalized for his coal not being up to standard. He will be required to make a new standard which he appears competent to fill and may then be certified as before. This plan was proposed by O. P. Hood, the chief mechanical engineer of the United States Bureau of Mines.

Dr. Henry Mace Payne, chairman, coal export committee of the American Mining Congress, then made a report on the activities of his committee, stating that the foreign coal trade was briskest in the summer when insurance rates were low and unloading facilities in northern ports were favorable. Thus foreign trade would serve as the much needed balance to help carry the coal trade through the summer, aiding both East and Middle West, the latter by relieving the pressure of Eastern coals in the Middle West markets.

R. Dawson Hall read a paper on "The Industrial Clean-Up," saying that the houses built in mining villages in the early nineties were more nearly in keeping with the homes in the small towns adjacent than they are today and similar to those used by lumbermen, the lumber interest in those days being one of the most important, if not the most important, in the areas where coal was mined. Years have not effaced these houses. They stand like billboards along the main railroads of the country, and they give the public a poor idea of the mining industry.

An attempt should be made to induce the owners of the old villages to clean up. The newer towns, well back from the main roads, are sightly, habitable places as a rule, but the public never sees them. The older villages, that are better

entitled to be termed "camps," from tipple to coal house, are far from presentable, and care should be taken to render both the plant and the houses seemly places. If this is done the town, with its prominent position, will no longer be a disgrace but an advertisement, such as manufacturers along a railroad spend much money to attain.

In the afternoon of Thursday, Alva C. Dinkey, president of the Midvale Steel Company of Philadelphia, Penn., presided. S. R. Russell of the Du Pont Powder Co., Wilmington, Del., read a paper on "Practical Uses of Explosives from a Safety Standpoint," and Dana Caulkins, secretary, National Physical Education Service, Washington, D. C., made a splendid address on "Physical Efficiency and Its Effects on Production." He urged that physical deficiency was the twin brother to moral deficiency and declared that rarely will you find a physical exemplar disposed to morbid thoughts and evil broodings. He stated that the death rate from organic disease in the State of Massachusetts had increased 86 per cent, and declared that the change arose from the abnormal lives that the people of Massachusetts, as also ourselves, are living. Formerly our days were shortened by darkness; rich foods were not available and exercise was enforced by lack of facilities for the saving of human labor.

HEALTH IS EASILY SECURED

Health can be assured if only 50 per cent of what is indicated as best is diligently followed, for the human mechanism is fairly foolproof and tries to function despite the strain put on it. He urged that physical defects, including bad teeth, adenoids and enlarged tonsils, were to be found in most persons and that 75 per cent of the school children of the country have impaired mentality as a result of their bad health.

George L. Nye, special counsel of the American Mining Congress, Denver, Colo., made a report on "The Minerals Separation Ltd. Situation," and F. A. Wildes, state superintendent of mines, Hibbing, Minn., spoke commending "The Minnesota Leasing System." His optimism, however, reached its height when he said that the state hoped to earn a revenue from the five billion tons of peat bog in the swamps and overflowed lands of the commonwealth.

Thomas T. Brewster was not present to explain "The Value of a Contract." There is but one word that will express that value, and that is "Nothing," as has been learned more than once recently.

THE ANNUAL BUSINESS MEETING

The Annual Business Meeting of the Congress met at 7.45 P. M. of Thursday in the Planters' Hotel, where a report was rendered as to the action taken by the directors of the association during the past year, which report the meeting approved. The annual receipts of the Congress are roughly $75,000 a year, the income being derived from a voluntary assessment of 10c per thousand dollars of output. Mr. Callbreath roughly outlined what had been done to relieve the mining industry and other industries which in operation were compelled to "waste" or, better, "exhaust" their resources.

These "wasting" industries include of course, the oil, gas and lumber industries besides all those producing metallic and non-metallic minerals. These industries, for many reasons, cannot operate on the basis that an inexhaustible supply of materials is available for their exploitation. What has been found and developed at considerable expense and what we have only learned to extract by the erection of trial plants often costing hundreds of thousands of dollars, must be regarded as having a large initial value in the ground which should be properly allowed for in making income-tax returns.

The attitude of the Internal Revenue Department and Congress is fair, and always would have been so, had they really understood conditions or in the rush of war had been granted time to consider them. It was the work of the American Mining Congress to supply the facts and urge them on all who were concerned in the regulating of taxation, so that justice should be done the mining industry. Another work of the Congress was to obtain relief for those who at great expense had endeavored to obtain war minerals for the Government in time of its need and now were left without a market. The American Mining Congress hopes soon to have in its staff an authority on taxation and another on freight matters so that these important parts of its work may be in charge of competent departmental authority.

DIRECTORS CHOSEN

The following were elected on the directorate: R. C. Allen of Cleveland, Ohio; Col. D. B. Wentz, a coal operator of Philadelphia, Penn.; T. T. Brewster, a coal operator of St. Louis, Mo.; and John C. Howard, as a representative of the petroleum interests. These directors will serve for three years or until their successors are elected.

Bulkley Wells was announced as president; Harry L. Day, first vice president; Col. D. B. Wentz, second vice president; E. L. Doheny, third vice president, and J. F. Callbreath, secretary. E. P. Mathewson and Walter Douglas, both of New York City, were elected members of the executive committee who, with the president of the Congress, direct the business of the organization between meetings of directors.

On Friday morning, John A. Davis, the governor of the Alaska Chapter of the American Mining Congress, read an address on "The Alaska Coal Situation," urging that only cheap power, preferably generated at the coal fields of Alaska, would save the day. The metal-mining industry depends on steam or electric power, and the farming industry depends on metal mining. So power is the base on which the prosperity of Alaska must rest. Alaska may be lost again if some means are not provided to make its mineral resources available, for the bonanza gold no longer exists, and mining is not any more a matter of pan and muscle but a dredging proposition.

TWO DECIDEDLY OPPOSITE VIEWS

John Leitch, industrial engineer of New York City, author of "Man to Man," then followed, and Charles Plez, president of the Link Belt Co., of Chicago, succeeded him. They delivered radically different addresses. One viewed the problem from the human standpoint, and the other from the legal. If labor cannot be coaxed by the methods of a Leitch it will have to be restrained by law as indicated by Mr. Plez. In the long run good will is better than law and restraint. We need both points of view, contradictory as they may appear to be and cogently as both presentments were stated.

On the afternoon of Friday, Governor A. H. Roberts, of Tennessee, made an address in which he said that the Tennessee people had formed law-and-order committees in every community which were determined to keep the peace and suppress Bolshevism. He spoke at length on the principles of the Constitution and urged that we get back to them as a sure basis of prosperity and happiness.

The meeting then took up the presentments of the resolutions committee, among them one urging railroad rate differentials to equalize the demand for coal as between seasons. Minneapolis and Spokane both requested that they be honored by being the hosts of next year's convention. With this session the Congress closed its deliberations.

A word should be said here as to the Exposition. It was certainly the best the Congress has ever held, yet it has managed some more than ordinarily good ones in the past. The convention hall being in the exposition building, the chance of sightseeing that the booths offered somewhat interfered with the attendance at the meetings, for the interest in the exhibits was sustained up to the last day.

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Accelerating Publication

THE present issue of Coal Age is a large combined number and covering the issues of Nov. 13 and 20. It contains an account of the meeting of the American Mining Congress, which ended its sessions November 22. The following issue will also be a combined number and contain the issues of Nov. 27 and Dec. 4, but it will incorporate an account of the meetings of the West Virginia Mining Institute, which met Dec. 1 and 2, and the Coal Mining Institute of America which was in session Dec. 3 and 4. It will, therefore, not only be a big issue, but it will contain up-to-date material such as our readers will be looking for. One other combined number will bring us fully up-to-date, and from then on we shall continue the regular schedule.

The reader will note that in our editorial comment an attempt has been made to keep fully abreast of the times, though that has caused us sometimes to take cognizance of, and make comment on, events occurring after the putative date of publication.

We have had over one hundred letters of sympathy and kindly wishes. They still continue to come in, and they show no abatement in the public support. One dated Nov. 22 says: "As a subscriber to the Mining Journal and Coal Age, I am in full sympathy with your present course." Another dated Nov. 25 says: "We depend entirely on your journal for market conditions. Is the elimination of the department permanent?" Indeed it is not; Coal Age will resume all its departments as soon as the date of publication becomes identical with the date line of the paper.

The Difference and the Reason

ONE consideration among others that distinguishes man from the lower animals is the fact that he uses tools. In war he employs various engines of destruction, ranging from rough stones to poison gas, instead of his own teeth and nails. In peace he uses largely implements and machines both hand- and power-driven, not his own hands, to accomplish his desired ends be those ends the raising of a grain of wheat or the transmission and preservation of intelligence in the form of the printed page. This trait of the genus homo also serves in large measure to distinguish family from family, nation from nation and race from race.

It is not, however, the possession of, but rather the mental ability to construct and direct this machinery that raises civilized nations markedly above the level of the savage or semi-barbarous tribes. It is ability and habits of thought that really count.

With this idea in view our forefathers built and insisted upon maintaining the "little red schoolhouse" even though its maintenance often involved no small degree of peril and sometimes privation. They realized that in the last analysis the mind was superior to circumstances and could enable an individual, even physically weak, to fill a useful place in society and be a man among men. They saw clearly that the foundation of stable democracy rested solely upon educated intelligence.

If one wishes to see a practical demonstration of how thoroughly material progress rests upon the character of the people involved, he has but to make a comparison between the countries of North America and those of northeastern Europe and northern Asia. The United States and Canada are in many respects naturally comparable to Russia, European and Asiatic. Each has or had its vast fertile plains, its mighty rivers, its great mountain barriers, its tremendous mineral wealth, its frozen wastes. Each is held and governed, tilled and developed by Aryan whites.

But here the similarity ceases. In the western hemisphere we find the land cultivated, the mines and timber areas developed, the waterfalls harnessed; we find railway after railway spanning the continent from coast to coast linking ocean with ocean by bands of steel; everywhere we find active industry, populous towns and cities, prosperous farms and peaceful and happy homes.

In Russia we find the natural resources either untouched or at best inadequately developed; one lone single tracked trans-Siberian railway, the rivers untrammeled, the soil idle or cultivated in a medieval half-hearted way largely by hand methods and with implements actuated by human muscles. And at present in a country of plenty—a region naturally rich—famine, fever and starvation stalk madly through the land, while long-established laws, customs and social usages, built upon the collective experience of all mankind since the world began, tremble and totter before the onslaughts of an irresponsible minority and red riot, murder, pillage, flourish unrebuked and unpunished.

Wherefore this discrepancy between two lands naturally similar? The logical reply is that it lies solely in the mental and moral fibre and stamina of the two peoples, in the quality and quantity of their thought output.

It behooves us, therefore, if we desire that the land of our nativity shall continue to grow and flourish and wax ever stronger among the nations of the earth to see to it that each and every individual shall have both opportunity and adequate encouragement to develop all and sundry of his latent powers. Only among a people where ambition is a virtue and ignorance a crime are the principles of democracy secure.

American Coal Export Trade

During the past several months or ever since the signing of the armistice, American coal operators have heard much of the possibilities for the exportation of fuel. Some of the reports received were couched in decidedly glowing terms and many producers were anxious to reap the promised harvest. Unfortunately many of the cargoes shipped were not up to the standard of quality and preparation desired by some foreign purchasers. As a result American coal in many instances received a veritable "black eye". Furthermore, the field is not as large as it was at first thought to be although it is big enough to be worth while securing.

In the export trade preparation and appearance count for much. Thus a shipment of outcrop coal or one that is stained or rusty on top is liable to rejection. The foreign market is therefore by no means an outlet for fuel not salable elsewhere, buyers and users abroad being even more critical than domestic consumers. This doubtless arises from the extremely careful preparation of the English product to which they have been accustomed in the past.

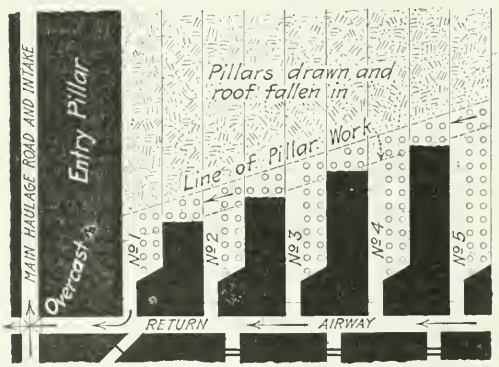
DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

Problem of Coal Extraction

Letter No. 9—Referring to the article relating to the best method to be adopted in order to obtain a maximum extraction of coal, COAL AGE, Aug. 7, p. 234, allow me to say that it would be impossible to do very much in the way of improving the conditions and increasing the percentage of extraction, by following the plan presented, showing the underground working of a mine already in operation. The mine is not properly laid out, and it is no surprise to me that but 50 per cent of the coal is taken out, the remaining half is lost beyond recovery.

Briefly stated, a few of the causes responsible for this failure are the following: 1. The plan shows too large an area being worked. A smaller extent of working would probably give a much larger extraction at a less cost of operation. 2. The room pillars are too small for this depth of cover, resulting in a large loss of pillar coal, by reason of the crushing of the pillars before they can be taken out. 3. The robbing of the barrier pilar before that is necessary, judging from the condition shown in the figure.



SHOWING UNIFORM LINE OF PILLAR WORK

To my mind, the man who supervised this mine does not seem to have cared for anything except getting out coal, no matter at what cost. This is apparent from the thousands of feet of tracking required, the great amount of timber needed and the large number of entries, crosscuts, and breakthroughs driven for a comparatively small output of coal. Also, the room pillars are much too small and, apparently, are not robbed at the right time.

My plan of working is shown in the accompanying figure, which requires little explanation further than to say that as quickly as the rooms are driven to their full length, the pillars are drawn pack in regular order, taking care to keep the line of pillar work as straight as practicable, so atso prevent any excessive pressure being thrown on the ends of one or more pillars that may lag behind. In this plan, two rows of posts are used to protect the ends of the pillars while they are being drawn back. As the work progresses and the roof breaks behind these posts, the back row of props is drawn and a new row set in place next to the coal, as indicated in the figure.

Rawdon, Quebec, Canada. C. McMANIMAN.

Letter No. 10—I have read with interest the letters bearing on the proposition of extracting the maximum amount of coal from a seam varying in thickness from 8½ to 11 ft. and lying at a depth ranging from 450 to 600 ft. Judging from the facts that were given in the original article on which this discussion is based, COAL AGE, Aug. 7, p. 234, it would seem that the thickness and depth of the seam are the most important factors to be considered in the development of this mine with a view to recovering a maximum amount of the coal.

There are probably a number of methods of supporting roof and systematizing the timbering, which a study of the local conditions regarding the roof, floor and coal would assist in determining the choice. Certainly, the suggestion made by previous writers, in respect to leaving the top layer of coal up to support the soft shale above it and prevent its disintegrating under the action of the air, is practical and should be adopted in working this seam.

The chief cause for the waste of so much coal, however, in the working of seams of this thickness or less, under such a depth of cover, generally arises from leaving insufficient pillars for the support of the overburden. At this depth, the roof pressure is an important factor and careful attention must be given to the ratio of width of pillar to that of opening, or trouble is sure to follow.

GUARDING AGAINST FUTURE TROUBLE

Referring to the first letter, written by "Assistant Foreman," Sept. 4, p. 416, let me say that driving double-neck rooms such as he has suggested would, in my opinion, soon bring on a squeeze and result in the loss not only of the 25-ft. room pillars but the entry pillars as well. At a depth varying from 450 to 600 ft., the entry stumps left in the mouths of these wide rooms would weaken and be crushed before the room pillars could be drawn back.

In the propostion described and illustrated in the second letter, Sept. 11, p. 458, two rooms are opened off a single neck 18 to 21 ft. in width and driven to a depth of 100 ft. before being widened to 30 ft. While this plan has the advantage of solving the yardage expense, it presents inadequate protection to the entry, owing to the soft nature of the middle coal and the roof and will cause future trouble.

Here, too, it is my opinion that the roof pressure will be too strong for the proper protection of the entry, and it would be better to pay the extra yardage and drive the roomnecks at a less width. Let me suggest turning single rooms, on 60 to 75-ft. centers, making the roomnecks 12 ft. wide and driving them to a depth of 30 or 40 ft., after which the rooms can be widened to the full width, say 25 ft.

If it is then desired to open a second room off the first and the problem of ventilation can be solved easier than the extra expense of yardage, let the second room be opened in the rib of the first, at a distance of, say 60 ft., where the first breakthrough would be made under ordinary conditions. This

would avoid the enormous waste of coal that I fear would result in drawing back the pillars in the proposed arrangement.

In this plan, with room pillars 35 to 50 ft. in width, there would be a good solid entry pillar that would give adequate protection and make it possible to recover the maximum amount of pillar coal. It appears to me, however, that the line of brattice required to properly ventilate the rooms, in necking the second room off the first, would amply justify paying the extra yardage.

In closing, let me repeat that my plan would be to neck each room off the entry on centers that will provide an ample room pillar. The first breakthrough should be made at a distance not less than 60 ft. from the entry. I know of no other method by which to avoid so large a loss of coal as is claimed in the working of this seam. All squeezes of which I have any knowledge have primarily been due to insufficient pillar support. In my opinion, under the conditions described, the width of room pillars should not be less than 35 ft. and room centers should be at least 60 to 80 ft. to give a maximum recovery of coal.

Thomas, W. Va. W. H. NOONE.

Roller Bearings for Mine Cars

Letter No. 2.—A short time ago I read a letter in COAL AGE (Sept. 25, p. 545), strongly advocating the use of roller bearings for mine car wheels. At different times, previously, there have appeared many similar letters discussing the relative advantages of plain and roller bearings, and giving marked preference to the latter type of bearing. It seems to me that it is only proper to note that there are many things that could be said in favor of the plan-bearing mine car, which is always abused, usually neglected and generally misunderstood.

In spite of the meritorious claims of cylindrical roller bearings, it must be admitted that they have never been adopted for use on freight cars, passenger cars, street cars, and the majority of mine cars, dynamos, motors, turbines, line and countershafting, engines of all kinds, machine tools or the crank shafts and rod-end bearings of the automobile motor, the last named being one of the most difficult bearing problems known to engineers. Neither are roller bearings used in the best makes of automobiles and on many of the heavy motor trucks.

WHY HAVE NOT ROLLER BEARINGS BEEN MORE GENERALLY ADOPTED IN MINE EQUIPMENT

With a knowledge of these facts in mind, one is led to ask the reason, since it appears that the judgment of the engineers concerned is quite generally opposed to the use of cylindrical bearings for the purposes mentioned above. Inquiry among coal operators shows a difference of opinion as to the economy of roller-bearing car wheels in comparison with a well-designed, properly made, solid bearing of suitable material and provided with an efficient oiling system.

I also find that the advocates of roller bearings for mine car wheels do not themselves agree on whether the solid or the spiral roller is best suited for the work. Again, those who advocate the spiral roller are hopelessly divided on whether they should be mounted in the wheel hub, or in a box under the car.

After a careful study of the advertisements and recommendations of mine-car-wheel manufacturers, it appears to me that the majority of them now recommend the spiral roller; whereas, for many years past, they have proclaimed the virtues of the solid roller. This would seem to indicate that the spiral roller gives better satisfaction; but there are yet to be found many advocates of the solid roller who see no advantage in the new type. It must be admitted, however, that very many operators are discarding the solid rollers and replacing them with spiral rollers, in the belief that the latter possess more merit than the former and hoping that the results will meet their expectations.

From my knowledge of the situation, it appears to me that most advocates of roller bearings argue for the doubtful (?) saving in power, but are silent on the cost of maintenance and length of life of the bearings. Attention has been called to the saving effected by dispensing with the oiler, in the use of roller bearings; but nothing is said in regard to the number of car repairers required to maintain the roller-bearing equipment after a service of one or two years.

USE OF GREASE FOR LUBRICATING MINE CAR WHEELS CALLED IN QUESTION

In my experience, the claim of greasing roller bearings once in from 6 to 18 months is not supported by facts. The claim of reduced cost of lubrication appears to be based on the use of a compressive grease, while most operators find it necessary to use a flowing oil to make the cars run easy and save the bearings. The claim of "no more bored out wheels" is not important, unless it is shown how long the wheels have been in service, the kind of material and whether or not the bearings were proportioned to carry the load, and were sufficiently oiled with a proper lubricant.

It is my desire to be fair and just in the treatment of this matter of mine-car bearings, but observation leads me to ask if the piles of worn-out roller-bearing axles and broken-down cages found around coal mines, where heavy loads have been carried on them for two or three years, help to support the claim of the superiority of this type of bearing under the severe service to which they are subjected in coal mining. At mines where roller-bearing and plain-bearing wheels are both in use, I have frequently observed plain-bearing cars running much more freely than those mounted on roller bearings, and handled in the same trip.

In view of the confusion of thought on this important subject prevailing in the minds of coal operators, and the continued experiments being conducted to establish the claims of superiority of cylindrical roller-bearing car wheels, let me ask if it would not be wise to pause and consider whether observation and experience do not recommend a solid bearing, properly designed, made of suitable material and fitted with an efficient means of lubrication, wherever heavy loads are to be carried at high speed?

Birmingham, Ala. J. F. FOX.

Finding a Mine Door Set Open

Letter No. 9—I read with interest the inquiry of Richard Bowen, COAL AGE, Sept. 11, p. 462, who is anxious to learn the opinions of practical men in regard to the manner in which a fireboss should proceed on finding a mine door set open when starting to examine the section of mine in his charge.

Assuming the conditions described and illustrated by Mr. Bowen, I agree with him that it would not be wise to close the door, before making an examination to ascertain the condition of the working places in that section. It appears clear, in the case he has cited, that the closing of the door could only result in dislodging the gas accumulated at the face of Chamber 2 and driving it on to the burning feeder in Room 5, where it would be ignited and an explosion follow.

There are other reasons, moreover, why the door should not be closed without first making an investigation to ascertain, if possible, the cause of its being set open. For example, there may have occurred a heavy fall of roof somewhere on the return of that section, and nightmen may be engaged in cleaning up the fall.

The driver may have carelessly or recklessly set the door open in order to relieve himself of the necessity of opening it when passing in and out hauling the refuse to the shaft bottom. All are anxious to get the fall cleaned up so that coal can be pulled from that section the following day, and they give little heed or thought to the probable result of the door standing open, especially as at gives them better air on the entry where they are at work.

Assuming that the rooms on the intake as shown in Mr. Bowen's sketch are driven to the rise, it is natural to suppose that there is a considerable body of gas accumulated at the face of Room 2, and it is easy to imagine what would take place should the door be closed, even if there was no gas feeder burning in Room 5 as stated.

The restoring of the circulation in the rooms by the closing of the door would at once dislodge the gas accumulated at the face, and it would be carried by the air to the point where the men were working with open lights, and another disaster would be recorded as the result of the fireboss' incompetence. My conclusion is that the only wise policy for a fireboss to pursue, in such a case, is to investigate thoroughly and ascertain the exact condition and situation in the section before closing the door.

West Franklin, Ill. CHAS. RODENBUSCH.

Letter No. 10—The discussion of this subject in COAL AGE should prove of great interest and be the means of imparting much valuable and practical information, gleaned from the experience of many competent firebosses who have had to deal with this condition when starting to make the daily examination of a mine or section of a mine.

The question is, Should a fireboss, on finding a door set open and the ventilation thus destroyed in the section of the mine he is about to examine, close the door and proceed at once with his examination; or, leaving the door in the position he found it, first examine to ascertain the condition of things in the section and make sure that it is safe to close the door?

As stated in this inquiry, the answer generally given in textbooks, is "Close the door and wait until the circulation is restored in the section, before proceeding with the examination." Considering a gaseous mine, this answer is clearly in error as is plainly in evidence from the incident cited by the inquirer and which led to this discussion.

Not many years ago, in this district (Jefferson County, Ala.), a very serious disaster resulted from the closing of a door, after it had been standing open probably several hours. In that time, a large body of gas had accumulated in the workings and the restoration of the circulation by closing the door carried this gas on to the open lights of the workmen engaged in another part of the mine. In the explosion that followed many lives were lost. This is but one of scores of similar accidents, which have not been without their effect, however, in the lessons they have taught.

Realizing that it is the common practice of miners to close a door that is found standing open, coal operators in this district have profited by the dearly bought experiences of the past and have appointed safety men to look after the general safety of the several sections of the mine in their charge. Each section is small enough to permit the inspector to make two rounds of his section in a shift. This, with the examination made by the fireboss, make three inspections a day throughout the mine. Besides all this, there is a doorman appointed whose duty it is to make sure that all doors are self-closing and no one is permitted to prop a door back to prevent its closing.

I do not approve of the suggestion offered by the inquirer, that the examiner make a firerun before closing the door. My reason is that by the time the examiner has made the "firerun" and completed his later examination of the places after closing the door, he would be too late to meet the men at the shaft bottom and notify them of the condition of their places.

When a fireboss is late in returning from his examination of the mine, he finds many of the men have gone home for the day. A late fireboss arouses the suspicion in the minds of the majority of the men that everything is not right and the management are taking chances, which affords them a good excuse for not working that day.

It is not my meaning, however, that a burning feeder is of no immediate danger in a mine; or that the fireboss can assume no danger is present and proceed to close the door without further investigation. But I want to urge that the safe operation of a gassy mine requires the employment of a firerunner, other than the fireboss, and whose duty it is to see that no feeders are left burning in the mine.

The firerunner should make his inspection of the entire mine or section in his charge, as soon as practicable after the men have left the mine for the day. He should also see, that every place is being properly ventilated and that all doors, air bridges, regulators and brattices are in good condition and properly adjusted.

Like the fireboss, the firerunner should mark the date of his inspection at the face of each place examined, using a colored crayon to distinguish his mark from that of the fireboss following him a few hours later. Like that official, the firerunner must make his report in a book kept for the purpose, which must be read by the fireboss, before he proceeds to examine the mine the next morning. A firerunner should, of course, never close a door that he finds set open, until he has run through the section and made sure that it is safe.

EXAMINATION OF A MINE SHOULD ALWAYS BE STARTED AT THE INTAKE END

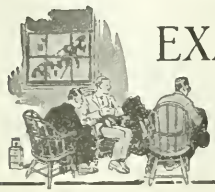
Having settled the question of a burning feeder by the appointment of a firerunner, which leaves the fireboss free to close the door and complete his inspection in the appointed time, let me refer to the suggestion of starting the examination at the return end of the section. I must beg to differ in this respect.

Permit me to say that a fireboss should invariably start at the intake end and follow the air current, in making his examination of each split. This does not imply, however, that the several splits must be examined in their regular order, starting from the shaft bottom or intake of the mine. It is the custom of most firebosses of my acquaintance to examine first those sections that give off the least gas, leaving the more gassy sections to be examined last, as this plan affords less time for gases to accumulate before the men enter their places.

For sake of illustration, let us follow a fireboss starting his examination at the return end of a gassy section. Carrying a flame safety lamp, he hastens along at an average rate of, say 4 miles an hour, or 350 ft. a minute, traveling against a current having a velocity of, perhaps 200 ft. a minute. Even taking no account of the current, the rate at which the man walks exposes his Davy lamp to an unsafe velocity of air, while the effect of the opposing current is to make an effective velocity of 550 ft. per min. against the lamp. Some forms of bonneted Davy lamps will safely withstand a current velocity of 600 ft. per min.; but the fireboss' Davy commonly used becomes unsafe in a velocity exceeding 350 ft. per minute, which makes the plan dangerous on this account alone.

Again, if the fireboss has passed over a considerable portion of his section before finding a faulty door or brattice that has permitted an accumulation of gas, his previous work counts for naught, as these places must all be examined again, after the trouble has been corrected. At the best, when traveling against a gassy current, the examination of a gaseous mine can never be considered reliable, aside from its safety.

Bayview, Ala. JOHN WALLS, SR.



EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Anthracite Foremans' Examination
Old Forge, Penn., May 6, 1919

(Selected Questions)

Ques.—What is ventilation, and why is it necessary in coal mines?

Ans.—Ventilation is the circulation of a current of pure fresh air in and through the workings of a mine and so distributing it as to sweep away and dilute the noxious and inflammable or explosive gases produced in the mine.

Ventilation is necessary in order to make and keep the mine atmosphere pure, healthful and safe for the performance of work. Not only is it necessary to remove the noxious air and gases produced in the various operations in the mine and by the different forms of combustion constantly taking place, and dilute and render harmless the inflammable and explosive gases generated, but the quantity of air in circulation must be sufficient to comply with the requirements of the state mining laws where the mine is located.

Ques.—Explain the safest and most effective way of circulating air through a mine.

Ans.—While furnace ventilation is very effective in deep shafts generating no gas, the most reliable means and the safest to adopt, in the ventilation of a mine, is a properly designed centrifugal fan capable of circulating the required quantity of air under a specified water gage varying from, say 1½ to 2½ in. Aside from the ventilator, it is important to adopt a practical and effective means of conducting and distributing the air throughout the mine, according to the different requirements in the several sections of the workings.

Every mine should be divided into two or more ventilating sections or districts, which should increase in number as the development advances. The plan is known as the split system of ventilation and requires substantial and well built airtight doors, stoppings, air bridges, brattices and regulators. In this plan each section of the mine is ventilated by an air split taken from the main air-course and conducted into the main return airway after circulating through the section. By this means, it is possible to increase or decrease the quantity of air circulating in any section so as to conform to the requirements in that section.

Ques.—Is it safe to pass a current of intake air through the abandoned portions of a mine and then conduct it to the face of the live workings? State your reasons.

Ans.—No; the intake air entering the mine should be conducted directly to the face of the live workings and never permitted to circulate through abandoned portions of a mine before reaching the working face. An air current passing through abandoned places will absorb the impure air and gases generated therein, which would render it unfit for circulation in the live workings where men are employed and fresh air is required to make the places healthful and safe for work. It frequently happens that explosive mixtures are generated in abandoned workings and would be carried by the air current passing through such sections and ignited by the lamps of the miners at work at the face, if the air current is first permitted to pass through the old workings.

Ques.—If a water gage, placed in a door 6x8 ft., shows a reading of 2 in., what is the total pressure on the door?

Ans.—A water gage of 2 in. corresponds to a pressure of $2 \times 5.2 = 10.4$ lb. per sq. ft. The area of the door, in this case, is $6 \times 8 = 48$ sq. ft., and the total pressure on the door is, therefore, $48 \times 10.4 = 499.2$, say 500 sq. ft.

Ques.—What method of ventilation lessens the dangers of an explosion and reduces friction? State your reasons.

Ans.—The split system of ventilation divides the air current into two or more separate splits, each split passing through a separate section of the mine. This system reduces the danger of an explosion occurring in the mine, because the air travels at a less velocity, carries less dust, and is not as liable to form an expolsive mixture as when the mine is ventilated by one continuous current. Should an explosion occur in one district of the mine, there is less liability of the effect being extended to other sections; in other words, a possible ignition of gas or dust in one section is generally localized.

The split system of ventilation also reduces the frictional resistance of the mine, because the same quantity of air is circulated at a greatly reduced velocity and the resistance varies as the square of that velocity. Thus, for the same amount of rubbing surface in the mine, an air current traveling in two equal splits will meet with one-fourth the resistance offered when the same volume of air is circulated in a single current.

Ques.—Describe your action, as mine foreman, in case of a fatal accident taking place in a mine under your charge.

Ans.—Immediately on being notified of the accident, summon a physician by messenger or telephone and give orders for the ambulance to be brought to the mine and the necessary stretchers, blankets, and first-aid supplies taken in to the place. Then hasten to the scene of the accident and see that every effort is made to rescue the victim, never assuming that the accident is fatal till that is assured. In a properly organized mine, one or more members of the first-aid team will already be on hand and doing what he can when the foreman arrives on the scene. The foreman should at once take charge, however, and see that every possible help is rendered to rescue the victim and save his life.

The foreman must note carefully all the conditions surrounding the accident, so as to enable him to make a correct report and give true evidence bearing on the case when that is required. The names of the witnesses of the accident, if any, and of those who arrived later on the scene must be carefully recorded. As quickly as possible, the victim must be removed to a safe place and fresh air, in the hope that life may not be extinct, while taking every precaution to stop the flow of blood and prevent further injury by reason of broken bones. To avoid this, the man must be lifted and transported with all possible care.

After the accident, the foreman must make a full report of the same, in writing, to the inspector and the officials of his company, stating the nature, place, and time of the accident and the result, together with the name, nationality, occupation and age of the victim and whether he was married or single and the number of children or dependents in his family.

QUES.—Which, in your opinion, should be the larger, the upcast or the downcast, and why?

ANS.—The upcast shaft of a mine should have a larger sectional area than the downcast when considering the requirements of ventilation alone. The same applies also to an upcast slope. In respect to ventilation, the larger sectional area of the upcast is required by the expansion of the volume of the return current, caused alike by the heat of the mine, the relief of the pressure due to the mine resistance and the presence of gases generated in the mine, all of which increase the volume of the return air.

It may happen, however, that where the downcast shaft or slope is obstructed by hoisting operations and the upcast is free and unobstructed, the sectional area of the downcast may require to be larger than that of the upcast in order not to interfere with the adequate ventilation of the mine.

QUES.—Which is the safer and more reliable system of ventilation, mechanical or natural ventilation? State why.

ANS.—Mechanical ventilation is always safer and more reliable than any form of natural ventilation, for the reason that the latter is subject to changes in atmospheric temperature or pressure and other natural conditions that affect the ventilation of a mine.

Ques.—How would you determine the quantity of air passing where the section of the airway is 6 ft. high and 12 ft. wide?

Ans.—Assuming the dimensions given represent the clear cross-section of the airway, giving a sectional area of $6 \times 12 = 72$ sq. ft., it is necessary to ascertain the average velocity of the air current passing this point, by means of an anemometer. If the reading of the anemometer, after being exposed to the current for one minute is, say 600, indicating a velocity of the air of 600 ft. per min., the volume of air passing is $72 \times 600 = 43{,}200$ cu. ft. per min.

Ques.—Under what conditions would you recommend the use of mixed lights in a mine?

Ans.—Under no conditions whatever should mixed lights be recommended or permitted in a mine. The presence of open lights in a mine requiring the use of locked safety lamps introduces an element of danger and should always be avoided if not prohibited by law, except possibly on a section of the main intake airway, for the use of motormen or drivers.

Ques.—What safety appliances should be kept and maintained at the surface landing where workmen are being lowered or hoisted out of a mine?

Ans.—The surface landing at a shaft mine should be protected with automatic safety gates arranged to rise and fall with the cage. There should also be safety blocks to prevent cars from being run into the shaft. Some form of overwinding device should be installed to lessen the danger of overwinding. The hoisting rope should be plainly marked in a conspicuous manner to indicate the approach of the cage to the landing. An alarm whistle in the engine room arranged to warn the engineer that the cage has reached a point where the steam must be shut off and the brakes applied might often prove of advantage. However, no reliance should be placed by the engineer on such warnings; he should depend solely on his own vigilance.

An automatic device for shutting off the steam and applying the brakes to the winding drum, at the proper moment, might prove very effective in case an engineer was stricken and rendered helpless at the critical moment when hoisting men. At the head of slopes where men are hoisted, the same safety blocks should be installed to prevent trips from running down the slope before the cars are made fast to the rope or the engineer is ready to lower them into the mine.

Ques.—What dangers may arise from the improper assembling of a safety lamp?

Ans.—When a safety lamp is improperly assembled, there is every opportunity for gas-charged air to be ignited by the lamp, since the flame is no longer isolated from the atmosphere surrounding the lamp. The improper assembling of the parts will generally leave small apertures or crevices through which flame can pass from within the lamp to the outside atmosphere. Such a lamp is more dangerous than an open light for the reason that it invites a trust or confidence that the miner would not have when using an open light in a mine generating some gas.

Ques.—Assuming there is 30,000 cu. ft. of air per minute entering a mine, how will this volume be affected by the temperature being raised 20 deg. while the atmospheric pressure remains the same?

Ans.—Assuming the temperature of the intake air is 60 deg. F. at the point where the measurement is taken, a rise of 20 deg. in temperature, under a constant pressure, will increase the volume in the ratio of the absolute temperatures. The absolute intake temperature is $460 + 60 = 520$ deg. F. A rise of 20 deg. will then give an absolute temperature of $520 + 20 = 540$ deg. F. Therefore, the given volume will be increased in the ratio 540 : 520, and the resulting volume is $(30{,}000 \times 540) \div 520 = 31{,}154$ cu. ft. per min., nearly.

Ques.—In a mine employing 250 persons, each person being allowed 200 cu. ft. of air per min., give the total volume of air required in a day of 10 hr., in cubic feet, and its weight in tons, the temperature being 62 deg. F., and the barometric pressure 30 in.

Ans.—The total volume of air required in this mine in a day of 10 hr., allowing 200 cu. ft. per min. to each person, will be $250 \times 200 \times 60 \times 10 = 30{,}000{,}000$ cu. ft. per min. At a temperature of 62 deg. F., and a barometric pressure of 30 in., the weight of a cubic foot of air is

$$w = \frac{1.3273 \times 30}{460 + 62} = 0.0762 \text{ lb.}$$

The total weight of air circulated in 10 hr. is, therefore, $(30{,}000{,}000 \times 0.0762) \div 2000 = 1143$ tons.

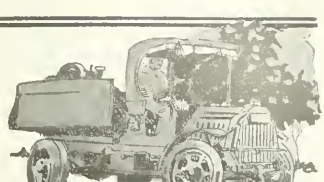
Ques.—What important principles must be observed in the robbing of pillars?

Ans.—The mine map should be consulted and a careful study made of the situation to ascertain what effect the extraction of the pillars will have on the surface and the adjoining workings in the mine. Due consideration must be given to the depth of cover and the nature of the overlying strata and whether withdrawing the pillars will cause a large inflow of water or gas into the mine.

Only experienced men must be employed in the work of robbing pillars. If gas is present in the overlying strata, only safety lamps must be used and care taken to keep these where they will be safe. Sufficient timber must be used behind the workmen to protect them from a sudden fall and to give warning of any undue movement in the roof. Regard must be had to the condition and size of the pillars to be drawn and care must be taken to keep the line of pillar work uniform and straight, so as to avoid any undue weight coming on the ends of the pillar. Two rows of posts should be kept behind the workmen and no timber left standing in the waste. As the rear posts are drawn, these or other posts must be set nearer the face of the coal.

When drawing pillars, it is important to see that the roof breaks and settles uniformly on the waste, in order to avoid an undue pressure being thrown on the end of the pillar, which would crush the coal or render the work of mining more difficult. A careful watch must be kept to detect any slips or breaks in the roof over the pillar, taking due precaution to prevent a sudden fall catching the workmen, who must always keep a way open and clear for escape.

COAL AND COKE NEWS



CHARLESTON, W. VA.

Movement of miners back to the mines. Effort made in District No. 17 to avoid court instructions to return to work. Pre-arranged plan to remain out. Miners of New River field (District No. 29) in the main return to work. Plentiful car supply. Miners in Kanawha field object to working while troops remain in the region.

Interest largely centered in this section of the state as elsewhere in the movement of miners back to the mines, and in that respect operators were partly disappointed, insofar as there was any general response to the order rescinding the strike call and directing the men to return to work. It was apparent that in the southern part of District No. 17 an effort was being made to avoid, insofar as possible, the instructions of both the Federal Court and of national officials of the United Mine Workers to return to work, and that district officials were a party to the delay of miners in reporting for duty, using one pretext and another as an excuse for the slowness of the men in returning.

As a result of this dilatory policy production (on Thursday, Nov. 13) was still at a rather low ebb in a part of District No. 17, not including, however, the northern West Virginia fields. In the first place district officials had delayed somewhat in sending out official notices supplementing the telephone and telegraphic instructions given in a half-hearted way. On Wednesday, Nov. 12, not more than five per cent of the miners in this immediate section were at work. However, as the week progressed there was a gradual return to work.

It was believed in many quarters that the reluctance of the men to return to work was inspired, as a part of a pre-arranged plan to remain out as long as possible, and yet to seem to avoid any violation of the court order. This pending the result of the conference at Washington between representatives of the operators and miners of the central field, set for Friday, Nov. 14. West Virginia operators had been invited to this conference, the invitation, however, was not accepted by operators in the southern part of the state.

A large number of cars awaited the resumption of operations along the Chesapeake & Ohio, having been accumulated during the strike and during the few days following the official termination of the strike. In sharp contrast to the slowness of miners in District No. 17 returning to work, was the general response to orders in District No. 29 (embracing the New River smokeless field) where, with a plentiful car supply, miners were rapidly reporting for duty. More coal was moving to eastern points than had been the case during the first ten days of the strike.

Miners in District No. 29 responded to the order to go back to work, even though troops were stationed in the district; in fact the troops were quartered in the same building at Beckley occupied by the district officers of District No. 29. Operators expressed the opinion that on Nov. 13 at least 60 per cent of the miners of the New River field, or about 7,200 miners in all had returned to work; operators hardly expecting such a prompt response in view of the slowness of the miners in other fields. It was also estimated that within two days after the strike had been called off, coal was being produced at the rate of about 75,000 tons a week, and it was predicted that the output would reach normal again by Nov. 19. With the resumption of operations, shipments were being forwarded to the usual customers of New River operators, government prices on spot coal still being in force.

Refusal of the miners to return to work in larger numbers in the Kanawha district during the week, following the termination of the strike, was attributed (by F. C. Keeney of District No. 17) to the presence of troops in West Virginia, Keeney stating that the miners regarded this as an effort to force them to return to work under duress. His statement was made in the face of the fact and after an announcement had been made in the press by both Governor Cornwell of West Virginia, and General Leonard L. Wood, that troops would be withdrawn as soon as the necessary arrangements could be made. Keeney wanted to know the definite date. That information was not vouchsafed him or to anyone else. Keeney expressed the belief that miners in the Central Competitive states would not return to work until after negotiations had been consummated at Washington.

While officials of the United Mine Workers of District No. 17 claimed that 50 per cent of the 12,000 miners in the district had returned to work by Nov. 13, Secretary D. C. Kennedy, of the Kanawha Operators' Association, said that not over 35 per cent had reported for duty; so that coal was being produced only at the rate of about 50,000 tons a week or about 8,000 tons a day during the last three days of the period ended Nov. 17. Empties in large numbers awaited the resumption of operations at various mines in the district, railroads having generally prepared for quick resumption.

FAIRMONT, W. VA.

Events following order directing miners to return to work. Work resumed with 25 per cent of full working force. Same 300 cars loaded for week ended Nov. 12. No violence during the strike. Coal held for distribution to essential points.

It was not until Thursday, Nov. 13, that there was any general response to the order directing miners to go back to work. On that date fully one hundred mines on the Monongahela division of the Baltimore & Ohio had resumed operations, with about 25 per cent of the full working force of men on hand. On the day previous, however, 74 cars of coal were loaded. Operations had been resumed at none of the mines on the Morgantown & Wheeling R. R., in Monongalia County, however, by the thirteenth, and it was regarded as certain that there would be few men at work at the mines in question until about the nineteenth. Only three mines on the Monongahela R. R., in West Virginia, were reported as being in operation by the thirteenth, although four carloads of coal were loaded on the twelfth. However, no general resumption of operations at mines on this particular road was expected much before the nineteenth. Six mines on the West Virginia Northern R. R. were being operated on the thirteenth, there were only six mines out of the 22 on the Morgantown & Kingwood R. R. in idleness on the thirteenth, and the prospects seemed bright for a resumption of operations by Friday, Nov. 14, 31 cars having been loaded on the twelveth.

In many instances locals did not receive official instructions to return to work until Thursday morning, and in other instances instructions had not been received up to that time. Six mines on the Western Maryland, in the Elkins district, were being operated on the thirteenth, and the prospects were good for a resumption of operations during the remaining days of the week. Three-fourths of the mines on the Coal and Coke R. R. were in operation by Thursday, the thirteenth, producing anywhere from 25 to 50 per cent of their normal output.

For the week ended Nov. 12, the production amounted to 300 cars, there being, of course, a 100 per cent car supply. Operators are unwilling to hazard a guess as to the labor supply, the strike having materially complicated matters. In other words as soon as it became certain that there was to be a strike, miners began leaving the Fairmont region, and during the strike others followed suit. It is believed that when conditions become conducive to a full resumption of operations it will be apparent that there is a quite serious labor shortage.

At no time during the strike was there any violence in any part of northern West Virginia; although at several scattered points in the northern territory, there are veritable hot-beds of anarchy; furthermore there has been much agitation among the miners at such points by Russians and Italians particularly at Star City, Wendel and Grant Town, with considerable propaganda in circulation.

Coal from the Fairmont field, up until the latter part of the week, was being shipped to no particular destination; the B. & O. having held within the division (for the ten or eleven days of the strike) all coal loaded, for such distribution as the railroad might see fit to make.

HUNTINGTON, W. VA.

Record output from Logan field during first week of strike. Miners stick to posts under protection of troops. Production maintained during second week of strike. Daily loading 800 cars. C. & O. tonnage of last week of October and first week of strike compared.

With transportation conditions highly favorable to a large production, the mines of the Logan field were able to produce coal, during the week ended Nov. 8, at the rate of 240,000 tons, about the highest point of the year. Indeed the output had reached the maximum figure for the year, being 84 per cent of capacity, with car shortage losses amounting to only 11,000 tons, or about four per cent. The labor shortage loss was somewhat larger, reaching a total of 14,000 tons; but miners were sticking to their posts more closely than at any time in recent months, and, with United States troops to protect them from outside interference, were unmolested. During the presence of troops at Clothier, no attempt of any kind was made to go ahead with organization plans, thus permitting non-union miners to proceed with their work without interference or intimidation.

During the week ended Nov. 17, insofar as it could be estimated, production was still being maintained at the same high level; cars were loaded at the rate of about 800 a day and over, or about 40,000 tons a day, with cars ample for all needs. For instance, on part of the week in question, practically all Logan coal was being routed westward and was being distributed by the Chesapeake & Ohio at Russell, Ky. During the strike such coal as was needed by the C. & O. R. R. was supplied by Logan mines.

A comparison of the tonnage handled by the C. & O. during the week preceeding the strike and during the first week of the strike, is highly interesting as showing the extent to which production at mines on the C. & O., was affected. Cars handled for the week ended Nov. 1 amounted to 13,506, and during the following week, 6,324. A comparison by districts in terms of cars is given below:

District.	Week End. Nov. 1.	Week End. Nov.8.
New River	2706	374
Kanawha	2663	228
Coal River	1072	10
Logan	4585	4728
Kentucky	1489	551
Sandy Valley & Elkhorn	674	147
Long Fork	256	232
Ashland Coal and Iron	61	54

VICTORIA. B. C.

Mines of Vancouver Island, provincial mainland and Alberta Province not affected by miners' strike in United States. No greater coal shipments to this country than usual. Puget Sound steamships bunkered as usual.

The present prospects are that the bituminous mines of British Columbia will not be affected by the strike in the United States. All the collieries of Vancouver Island, as well as those of the provincial mainland, are working as usual and there are no reports of impending trouble. The same applies, up to date, to the mines of the Province of Alberta.

It was reported some days ago that the State of Washington would look to British Columbia to replenish its empty coal bins, the assertion being made that 10,000 additional tons would be shipped to the Sound every month in order to assist in overcoming any shortage that might develop.

This caused some uneasiness in this province, it being felt that it might result in industrial and domestic embarrassment at home. J. M. Savage, manager of the Canadian Collieries, Ltd., has stated that his company would make no greater shipments to the United States than usual for the simple reason that it was not in a position to do so. He said that the local demands were so heavy that the company was fully occupied taking care of them. Certainly the local market would have to be cared for before export was considered. Much the same statement was made by W. A. Webb, of the Canadian Western Fuel Co., which operates the Nanaimo Collieries who added that the State of Washington could not look for more coal than now was being sent out because it was outside the capacity of the company to make such deliveries. Consequently those who were inclined to dispute a policy of permitting export of coal at the present moment apparently have been silenced.

The bunkering of steamships sailing from Puget Sound ports will not be affected. Most of these vessels call at Nanaimo for their fuel. The Nippon Yusen Kaisha and Osaka Shosen Kaisha vessels will be able to obtain coal from Sound bunkers which are filled from Vancouver Island mines.

PENNSYLVANIA

Anthracite

Hazleton—The Lehigh Valley Coal Co. has coupled up the new 1,200-h.p. boiler plant which will run the pumps installed to take the water out of the Stockton mines, flooded for 30 years, but now scheduled to be reopened and operated from the Hazleton Shaft colliery, one-half mile west of the Stockton slopes.

Hazleton—The citizens of this place are protesting the lack of coal available at the Lehigh Valley, Hazle Mines colliery. The breaker works seven hours daily and for the past month all production has been sold in the city.

Hazleton—On account of the decreased production of bituminous coal, the railroads running through the anthracite coal regions are preparing to burn hard coal again on their locomotives. Furthermore, steam sizes are in such demand, that banks of coal, which have stood idle since the war ended, are now being sent to the breakers.

Drifton—The breaker of the M. S. Kemmerer Co. at Sandy Run, near here, is being remodeled and soon will be placed in operation after a long idleness.

Upper Lehigh—Pumps drowned out for many years were recovered in good condition, when the No. 2 slope of the Upper Lehigh Coal Co. was dewatered by electric pumps installed recently. The slope, long closed, will be reopened and the Buck Mountain seam will be reworked.

Bituminous

Connellsville—The Union Coal and Coke Co., of Pittsburgh, has purchased from Annie E. Fulton, 196.38 acres of coal in Amwell Township, Washington County, Penn., for $63,823.50; and from Emma B. Stewart 137.173 acres in the same township for $44,581.33.

WEST VIRGINIA

Fairmont—The plant the Domestic Coke Corporation, of Cleveland, is building near here, is expected to be completed by Jan. 1 next. This plant, which will consist of 60 Koppers ovens, will mark a departure in by-product plant operation in that the gas produced will be applied to augment the natural supply in the vicinity of the plant.

OHIO

Steubenville—Three large stripping operations in the eastern Ohio field, which have not been unionized, are still in operation according to reports. They are: The Wayne Coal Co., which has headquarters in Pittsburgh; the Superior Coal Co.; and the Harmon Creek Coal Co. The capacity of the three concerns is about 6,000 tons daily, but it is doubtful if they are being operated at capacity.

INDIANA

Bicknell—American, No. 1 Mine, one of the largest bituminous coal mines in the country which was discovered on fire recently, has been sealed up. The mine is electrically equipped. Ordinarily 856 men are employed in the mine and it has a capacity of 6,000 tons of coal daily. Only 21 men including pumpers and engineers were in the mine when the fire was discovered, and they were rescued. The cause of the fire has not been determined. The shaft probably will have to remain sealed for several months. Although the employees of the mine are on strike, more than 100 gathered about the shaft as soon as the alarm was sounded and volunteered to fight the fire, as evidence, they said, that they had no connection with the fire.

ILLINOIS

Centralia — Excavation has been started for a $200,000 coal briqueting plant on the property of the Olympic Coal Mining Co., nine miles northeast of this city. Most of the machinery for the plant is already on the ground and it is expected operations will begin about the first of the year. The main building will be 67x40 ft. in size and will have a daily capacity of 400 tons. The owner of the new plant is the Centralia Briqueting Co. The company plans to erect a second plant within twenty miles of this city.

Decatur—The Decatur Coal Co., of this place is installing Sullivan electric mining machines at its plant. The company is mining a 4-ft. seam. At present gasoline motors are used on haulage roads. This company's Illantic mine had a disastrous fire in June which destroyed the surface plant, since which time the mine has been idle. However, reconstruction is now being pushed. D. W. Beggs is superintendent and E. A. Clarke, mine manager.

Du Quoin—Three of the miners' unions of this city, employed at the Security, Paradise and Majestic mines, have recently closed a deal through their officers whereby they acquire a title to the Lemp Building, on West Main street, for a consideration of $5,500. The building, which is in good condition and in the heart of the business district of the city, will be occupied in the lower story by the miners' co-operative store which was established several months ago and which is now one of the most liberally patronized concerns of the city. The second story will be remodeled and will be occupied by the miners of Du Quoin as labor headquarters. Du Quoin now has a total membership in the various miners' unions of approximately 2,100 men.

The Western Coal and Mining Co., operating a mine at Bush, south of here, is planning to ouen a plot of land near its mine for the purpose of building houses for employes. The company has been greatly handicapped during the last two years on account of the scarcity of men and it is believed that this plan will relieve the situation.

The general sales office of the Union Colliery Co., operating the big Kathleen mine five miles south of here, has been moved from St. Louis, to Plymouth Building, Chicago. Eugene McAuliffe is president and H. A. Lawrence is sales manager of the company.

KANSAS

Pittsburg—The Western Coal and Mining Co., of this place, will start hoisting coal out of its new mine, No. 20, within a few days. The mine is a shaft development and its capacity will be 1,500 to 2,000 tons per day. It is said that electrical haulage will be installed as soon as sufficient development warrants this change.

OKLAHOMA

McAlester—A little more than $100,000 worth of segregated coal and asphalt land was sold on the first day of a three-day sale of Choctaw and Chickasaw Reservation. Gabe E. Parker, superintendent of the five civilized tribes, explained that investors were holding off for the next sale, ordered to be held within six months, when the mineral deposits will be sold to the highest bidder instead of at appraised value or higher, as now.

The sale disposed of only six of the 960 tracts in holdings valued at close to $14,000,000.

Of the six buyers, all except one were from other parts of the country. They are as follows:

Seth S. Serat, Kansas Citp, Mo., purchased tract 79 for $26,425.45 in LeFlore County.

The Superior Smokeless Coal and Mining Company of Chicago purchased track in LeFlore for $31,870.

The Continental Asphalt and Petroleum Company of New York purchased tract in Murray County for $9,600 and tract in Carter County for $5,400.

D. C. MsAlpine of Hallevville purchased tract south of Savanna in Pittsburg County for $17,554.80.

Earl Cobb, of Amarillo, Texas, purchased tract south of Savanna in Pittsburg County, for $17,554.80.

Personals

Charles Beidleman has resigned as outside foreman at the G. B. Markle Co. No. 4 Colliery and will go with the Leggets Creek Coal Co., at Scranton.

J. A. Thomas, consuling fire engineer who was called to New Haven, Conn., to extinguish a fire in a coal pile at the Winchester Repeating Arms Co., announces that he has been successful. He has been called to Waterbury, Conn., to extinguish a like fire at the Scovil Manufacturing Co.'s plant.

Alexander Macomber and **John West,** since 1910 with Charles H. Tenney & Co., engineers and managers of public utilities, have become associated with **George P. Carver,** industrial architect and engineer, formerly at 53 State St., Boston Mass. Engineering problems from inception to completion will be handled by the firm of Carver, Macomber & West, Inc., with offices at 261 Franklin St., Boston, Mass.

Harry Culley, of the Peabody Coal Co., West Frankfort, Ill., has been transferred by his company from West Frankfort to its operations in Oklahoma.

George Thomson, for several years head of the Thomson Coal Co., of Chicago, has retired from the coal business and gone into the phosphate mining business in Tennessee. The Chicago, Wilmington and Franklin Coal Co., owners of the Orient mine in Franklin county, Ill., which has the world's record for hoisting, recently purchased the mines formerly under the control of Mr. Thomson.

S. B. Eaton, of Du Quoin, Ill., formerly a coal operator of southern Illinois, having retired from the trade, has left for California where he expects to make his home. Mr. Eaton developed and operated a number of mines in Perry county and held responsible positions with various companies.

Russell W. Stovel—who recently returned from France, where, as Lieutenant-Colonel of Engineers, he served as Chief of the Terminal Facilities Division of the Army Transport Service—has been appointed a consulting engineer of Westinghouse, Church, Kerr & Co., Inc., and, as a member of that organization, will devote his entire time to the company's electrical and mechanical work. Mr. Stovell has had an unusually comprehensive experience in the electrical and mechanical problems connected with central power station and steam railroad electrification work—from the fundamental economics involved, to design, construction, equipment and operation—together with a most valuable experience in mechanical handling at docks and terminals.

Charles F. Scribner, formerly industrial engineer with the Colt's Patent Fire Arms Mfg. Co., Hartford, Conn, and more recently consulting engineer for L. V. Estes, Inc., Chicago, has become associated with the Business Service Corporation of America, Chicago Ill., in the capacity of vice president and chief engineer.

Daniel E. Russell, vice president and general sales agent of the Delaware, Lackawana & Western Coal Department from 1901 to August, 1918, died suddenly while on a visit to Buffalo, N. Y., on Nov. 18, at the age of 56. Since retiring from the coal trade he had lived in his old home at St. George, New Brunswick, where he was born. He had been in a variety of occupations, including railroad building, lumber and village construction, having erected many of the homes in Depew, near Buffalo, for the Vanderbilts. At one time he was in the soft-coal trade in Chicago under his own name. When ordered to Buffalo he was shipping agent of the D. L. & W. at Hoboken.

C. W. Cross has been appointed by the Chicago Pneumatic Tool Co., as manager of Western railroad sales, with headquarters in the Fisher Bldg., Chicago.

H. W. Shields was appointed acting general manager of the Pocahontas Coal and Coke Co., to relieve W. W. Coe, general manager, who has been temporarily relieved from the duties of his office on account of illness. Mr. Shields will retain his office as land agent at Bluefield, W. Va.

Catalogs Received

Typical Examples of Lea-Courtenay Centrifugal Pumping Machinery. Lea-Courtenay Co., Newark, N. J., Bulletin S-5. Pp. 28; 3½x6 in.; illustrated. Concise description of a few of the types of centrifugal pumping machinery made by this company.

Lea-Courtenay Centrifugal Pumping Machinery. Lea-Courtenay Co., Newark, N. J. Bulletin H-4. Pp. 67; 6x9 in.; illustrated. A description of the various types and sizes of Lea-Courtenay centrifugal pumps and their application.

Safe Practice in Using Wire Ropes in Mines. By R. H. Kindlich and O. P. Hood. Technical Paper No. 237. Department of the Interior. Bureau of Mines. Illustrated; 5¾x9⅛ inches.

"Little David" Pneumatic Drills, Grinders and Saws—Ingersoll-Rand Co., New York, N. Y., Form No. 8707. Pp. 40; 6x9-in.; illustrated. Catalog describing drills, grinders and saws and some of their applications.

"Radialaxe" Coal Cutter—Ingersoll-Rand Co., New York, N. Y. Form No. 5106. Pp. 16; 6x9 in., illustrated. Describes and illustrates the type No. 47 coal cutter and shows the machine at work in various mines.

Decarbonizing Outfit. The Davis-Bournonville Co., Jersey City, N. J. A 4-page folder; 3¼x6¼ in.; illustrated. Description of outfit for burning out carbon deposits in gas engine cylinders.

Publications Received

War Gas Investigations. Bulletin 178-A. Advance chapter from Bulletin 178 War Work of the Bureau of Mines. By Van H. Manning. Department of the Interior, Bureau of Mines Unillustrated; pp. 39; 5¼ x 9⅛ inches.

Coals of the Region Drained by the Quicksand Creeks, by F. Julius Folis, Kentucky Geological Survey. Bulletin No. 18. Serial No. 25. Illustrated; pp. 79; 7 k 10¼ inches.

Carbonization of Missouri Cannel Coals. School of Mines and Metallurgy of University of Missouri, Rolla, Mo. Bulletin Aug. 1919. Illustrated; pp. 52; 5¼ x 8¼ inches.

Industrial News

Charleston, W. Va.—Operations are to be conducted on quite an extensive scale, it is reported, in Malden district of Kanawha County, by the Davenport Coal Co., of this city, a new company with a capitalization of $300,000. This concern was organized by Godfrey E Heiser, of Orchard Park, N. Y.; Geo. J. Brendel, of Hamburg, N. Y.; Geo. R. Stephens, Lancaster, N. Y.; F. Maurice E. Preisch, Isaac S. Given, Elbert E. Johnson, W. E. Farnsworth, Lewis H. Manley and O. Davenport, all of Buffalo, N. Y.

Charleston, W. Va.—Headquarters have been established by the Kelly's Creek Colliery Co., as well as by the Valley Camp Coal Co., in Charleston, offices having been secured in the Kanawha Banking and Trust Co. Bldg. C. S. Paisley is the office manager. The Valley Camp Company was only recently organized.

Welch, W. Va.—The Link Belt Co., of Philadelphia, has just been awarded a large contract for the complete installation of a modern tipple and retarding conveyor by the Mohawk Coal and Coke Co., at Mohawk, W. Va. Col. L. E. Tierney, president of the Mohawk company, is also interested in a number of other modern collieries in West Virginia and Kentucky. In order to properly clean and prepare coal for market, this company decided to replace the present old structure, with a plant of the most modern design. The new equipment will include automatic machinery throughout for handling about 2,000 tons of coal daily from a seam at the top of the mountain or from one midway along the conveyor. The conveyor will deliver coal to a 750-ton coaling station or to the new tipple.

Louisville, Ky.—The Community Cannel Coal and Mining Co., of this place, has been incorporated with a capital of $30,000. The incorporators are: L. L. Ogden, Charles H. Bastic and N. B. Mitchell. The debt limit is $15,000. The company plans to operate mines in Kentucky and Indiana with main offices at Louisville.

Fairmont, W. Va.—The Winfield Coal Co. will establish operations in Winfield district, of Marion County, W. Va., this concern having just been organized with a capital of $25,000. Plans are being made for early operations. Represented as incorporators were R. B. Satcrfield, of Lumberport; G. B. Hartley, T. W. Powell, Alpha Orr and Paul G. Armstrong, all of Fairmont.

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Greensburg, Penn.—Fred E. Thomas, of Beaver County, has sold to Senator W. F. Blair, of Waynesburg, 888 acres of coal and timber land, near Ligonier, for $65,000.

Waynesburg, Penn.—John Huffman, of this place, has sold a tract of about 278 acres of coal land near Tenmile Penn., for $350 per acre.

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Penn, Ill.—The mining plant of the Smith-Lohr Coal Mining Co., of this place, in Christian County, which was recently destroyed by fire, will be entirely rebuilt. A fireproof structure will be erected and modern equipment installed throughout. The Roberts & Schaefer Co., of Chicago, has been awarded the contract for the head frame, construction of which will be started immediately.

Huntington, W. Va.—The Wilson Thacker Coal Co., a $50,000 corporation has been organized by a group of Huntington men for the purpose of developing holdings in Wayne and Mingo counties. The incorporators were: E. N. Tyle, A. R. Maiers, P. K. King, John Bowman, and Walter C. Williams, all of Huntington.

Wheeling, W. Va.—The Arkwright Coal Co., of Elm Grove, has been incorporated with a capital stock of $150,000. The incorporators are: T. S Killcorn, J. Arkwright and H. K. Roberts, Elm Grove; J. R. McCoy, Triadelphia; and J. Handlan, Wheeling

Huntington, W. Va.—The Ohio Valley Mine Car and Manufacturing Co., of this place, which has taken over the Kyle Smith Aircraft plant, is negotiating for a considerable tract of land adjoining the aircraft property. The Ohio Valley company was recently incorporated for $200,000 and decided to remain in Huntiogton on account of good shipping facilities, cheap fuel and other advantages offered here.

Indianapolis, Ind.—The White Ash Coal Co., of Jacksonville, was incorporated with a capital of $50,000 for general mining purposes. The directors are: Glay Moss, John Mooney and Joe Fougerousse.

Charleston, W. Va.—The Royal White Ash Coal Co., of Alkol, W. Va., was incorporated to operate mines in Lincoln County, with a capital stock of $200,000. The incorporators are V. E. Hall, L. W. James and J. B. Coolidge, all of Dayton, Ohio.

Baltimore, Md.—The Black & Decker Manufacturing Co. announces the removal of its general offices from 105 South Calvert St., of this place, to Towson Heights, Baltimore.

Louisville, Ky.—The Perkins Bowling Coal Corporation of Williamsburg Whitley County Ky., has been incorporated with a capital stock of $200,000. The incorporators are: N. B. Perkins, A. V. Brown and J. W. Bowling.

Charleston, W. Va.—T. E. B. Siler and others of this vicinity have organized the Posler Coal Co., which will operate mines on an extensive scale in the Kanawha field, this company having a capital of $120,000. So far as can be learned construction work will be started in the near future on this plant. In adition to Mr. Siler, those identified with this company are: C. G. Peters, J. L. Silver, Fred O. Blue and R. E. McCabe.

Victoria, B. C.—The coal mines of the Crow's Nest Field (eastern British Columbia), are gradually being brought back to normal in point of production, although it need scarcely be said that it takes time to recover lost ground after a strike such as that through which the district has passed. The output now is about 80 per cent. of what it was and an improvement is being shown each month. The coke ovens at Fernie are idle and it is thought that they will remain so for some time. Those of Michel, B. C., are operating only on a limited scale, the demand for the product being comparatively light at present.

Canton, Ohio—The Columbia Coal & Power Co. has been chartered with a capital of $75,000 to mine and sell coal. The incorporators are: L. L. Blanchard, F. E. Schumacher, M. M. Gurley, N. E. Wise and M. C. Anderson.

Hume, Mo.—A large strip mine is soon to be opened up south of here on the Kansas City Southern R. R. The developing is to be done by Joe Klaner, a coal operator of Kansas City. A large stripping shovel is now being placed on the ground preparatory to starting operations.

Buffalo, N. Y.—At a recent meeting of the board of directors of the Stewart Motor Corporation of this place, the regular quarterly dividend of 2 per cent was ordered paid, also a 2½ per cent dividend on the common stock. This company recently acquired larger quarters and the new 9-acre plant purchased is now in full operation. The progressive assembly system used in the new works should make possible a yearly production of 10,000 Stewart trucks.

Tarentum, Penn.—West Penn Power Co. recently awarded a contract for the sinking of a mine hoisting shaft on the right bank of the Allegheny river at Springdale, Penn.

Beckley, W. Va.—The Morris Smokeless Coal Co., of Tams, near here, has organized with $200,000 capital. J. T. Morris is superintendent. The company has leased 1,625 acres of coal land and will install a mining plant with an annual capacity of 150,000 tons of coal.

Boomer, W. Va.—The West Virginia Eagle Coal Co. has been granted a charter with offices here. The capitalization being $1,000,000. Several thousand acres of land have been purchased. The incorporators include: William G. Conley, of Charleston; E. A. Charlton and J. R. Charlton, of MacDonald, W. Va.; C. H. Martin and L. S. Tully of Mt. Hope, W. Va.

Portage, Penn.—The Portage Collieries Co. has been organized by Paul Nelson, Wallace Sherbine and William Yeckley, of this place. This company will operate a mine on the Martin's Branch of the Pennsylvania R. R. in Cambria County.

New York, N. Y.—Announcement is made of the purchase of the Cataract Refining Co., of Buffalo, by the Swan & Finch Co., of this place. The Cataract Company operates large lubricant plants at Buffalo and Chicago, and maintains branch offices and warehouses in eight of the principal cities in this country besides four in England Scotland and Canada. Henry Fletcher, former president of Swan & Finch Co., is chairman of the board of directors; W. G. Moncrieff, formerly president of the Cataract company, becomes president of the Swan & Finch Co.; H. C. Hutchins, vice president and director of sales; George Elliott Brown will be vice president and secretary, and John T. Lee, vice president and treasurer.

Birmingham, Ala.—Osborne & Company, Inc., of Chicago, are reported to have acquired 10,000 acres of coal lands in the vicinity of Lock No. 16 on the Warrior River. It is said that this company expects to begin development promptly with a view to beginning the shipment of coal via the Warrior to the gulf ports in the early part of 1920. C. S. Cochran, Chicago, is president of the company.

Philadelphia, Penn.—The Richardson Phoenix Co., of Milwaukee, Wis., (lubrication engineers and manufacturers) announces the reopening of its Philadelphia office in the Bailey Bldg. George F. Fenno is district manager.

New York, N. Y.—The new Gauley Coal Corporation has been organized to acquire and consolidate into one company the various interests controlling about 40,000 acres of Ganley coal. This property was formerly owned by the Tidewater Coal Co., the Lee-Higginson interests, the estate of the late Henry K. Wickland and the so-called Camden lands of the Baltimore & Ohio R. R. on the Gauley River in West Virginia.

Columbus, Ohio—The Eastern Hocking Coal Co., of this place, has been incorporated with a capital of $110,000 by C. H. Frantz, F. C. Simpson, C. T. Marshall, Gordon Battelle, Harry M. Runkle and W. R. Pomerene. The Eastern Hocking Coal Co. purchased all the coal lands belonging to the National Hocking Coal Co. The consideration was $1,500,000. The officers in the new Hocking company are J. H. Frantz, Columbus, president; Attorney C. T. Marshall, Zanesville, vice president; H. M. Runkle, counsel, Cincinnati; Gordon Battelle, Columbus; W. R. Pomerene, Columbus, and A. F. Murphy, superintendent of th local plant of the American Rolling Mill Co. The property involved embraces 202 farms and covers 29 square miles of territory in Morgan, Perry and Muskingum counties. It is also said that a great power plant will be erected at the most available point.

Fairmont, W. Va.—Fairmont City Gas Coal Co. has been chartered by West Virginia and Pennsylvania men, who plan to develop extensive coal land acreages in this state. Its capital is $500,000, and the investors interested include: Charles E. Hawkes, of Fairmount; A. J. Salzer, of Weston, W. Va.; Thomas E. Cunningham, of Connellsville, Penn., and S. J. Bartus, of Pittsburgh, Penn.

Philippi, W. Va.—The latest addition to new coal concerns, organized for the purpose of producing coal in Barbour County, is the Wayne Steam Coal Co., which has a capital stock of $75,000. This company hopes to be in a position to undertake preliminary construction work in the near future. Those behind the new concern are A. G. Newcomer, Dawson, Penn.; O. W. Newcomer, Connellsville, Penn.; Lon Cunningham, Belle vernon, Penn.; H. R. Hurst and H. R. Parker, Scottdale, Penn.

Williamson, W. Va.—With a view to future operations in the Williamson field, Chattaroy people have organized the Wanego White Ash Coal Co., with headquarters at Chattaroy, this company having a total authorized capital stock of $50,000. Active figures in the organization of the new company were J. C. Young, L. J. Bray, Andy New, Jr., H. V. Ingham and John H. Kidwell, all of Chattaroy, W. Va.

Morgantown, W. Va.—Construction of a short line coal carrying road from the Flaggy Meadow station of the Monongahela R. R., in Monongalia County, is presaged by the organization by S. D. Brady, a prominent Fairmont operator, and others, of the Gas Coal Railroad Co., with a capital of $100,000. Organizers in addition to Mr. Brady were F. W. Byrne, of Everson, Penn.; Frank E. Brady, L. P. Monoham and Eugene S. Reilly, all of Pittsburgh.

Charleston, W. Va.—Although an old established mining engineering firm, it was not until a few days ago that the firm of Clark & Krebs, became incorporated, with a capital stock of $50,000.

Charleston, W. Va.—The Raleigh Smokeless Fuel Co., in which citizens of Beckley are the principal stockholders, has opened headquarters in Beckley where the general offices of the company will be maintained; the concern has a branch office at Norfolk with J. W. Miller in charge. The new company has perfected its organization with J. R. Clifton as president and general manager, and with Francis L. Conway, as assistant to the general manager.

Charleston, W. Va.—A deal has been consummated under the terms of which M. F. Odell and E. A. Hall, of Beckley, have secured a lease on a large tract of coal land in Nicholas County, on Gauley River, not far from Summerville. The land leased is said to contain three workable beds of coal. An effort is being made by Messrs Odell and Hall to secure additional tracts with a view to future development.

Bluefield, W. Va.—A part of the large acreage recently secured under lease by Thomas N. Mordue, president and treasurer of the Pinnacle-Pocahontas Development Co., has been leased to the Morris Smokeless Coal Co. The lease includes about 1,625 acres of No. 3 Pocahontas coal located on the main line of the Virginian Ry., near Herndon. It is the intention of the company to start construction work at once, on a model mining plant and town. In fact, the company expects to spend about $200,000 on the plant with a view to securing a production of about 150,000 tons a year. It will be approximately three months before the plant will be ready for operation. Identified with the new company are H. R. Tribon, W. P. Tams, H. O. Davis, J. W. Eads and G. L. Wilcox, all of Tams. Operations will be in charge of J. T. Morris.

Fairmont, W. Va.—Operations on a large scale are contemplated by the Fairmont Gas Coal Co., in the Fairmont field, this company having just been ushered into existence with a capital of $300,000. Headquarters of the company will be at Fairmont. Principal figures in the organization are: Thomas R. Cunningham, Connellsville, Penna.; A. J. Salzer, Weston; S. W. J. Bartus, Pittsburgh, Penna.; H. H. Staggers, Charles B. Hawkes and Rollo J. Conley, all of Fairmont.

Morgantown, W. Va.—Development on quite a large scale is to be undertaken in Monongalia County by the Soper-Mitchell Coal Co., which has just been organized with a capital stock of $250,000. This company was organized by W. H. Soper, W. R. Mitchell, R. M. Kirby and John E. Everly, all of Morgantown, W. Va., where headquarters of the company have been established.

Logan, W. Va.—The Island Creek Coal Co. has awarded a contract to the Walter Sudduth Co., of Princeton, for the construction of four and a half miles of railroad on Mud Fork of Island Creek, in Logan County and also for the grading for track in connection with four new operations of the company.

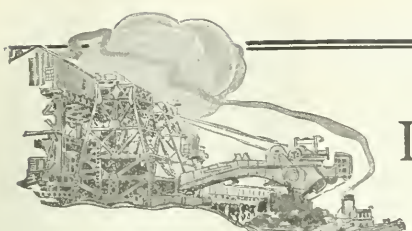
Charleston, W. Va.—Coal men, with mines on Coal River, have heard with considerable interest of the plans of the Chesapeake & Ohio to improve facilities for handling Coal on Coal River, by the establishment of terminal facilities and yards at Danville where it is stated $5,000,000 will be expended in improvements. The initial appropriation will be $1,000,000 but improvements will not be undertaken it is believed, until after the railroads are restored to their owners. Tracks, shops and all other improvements will be put in at the new Danville terminal whenever work is started.

Tams, W. Va.—Extensive coal holdings in Wyoming County are being secured by Major W. P. Tams, of this place. One tract of 3,000 acres of coal land (known as the Saunders farm) five miles from Oceana, has been secured by Major Tams, the consideration being $180,000 or at the rate of $60 an acre. Major Tams has also acquired 1,100 acres on Simmons Fork, and 1,300 acres on Clear Fork, the several purchases representing an investment of aproximately $250,000.

Clarksburg, W. Va.—Resort to the sinking of shaft mines may become necessary in view of the rapid development of coal lands in this county was ment in the Harrison Co. field. When the development of coal lands in this county was first undertaken—in fact up to a few years ago—the necessity of mining coal through the use of shafts was considered a remote possibility. Development has been at such a rapid rate, however, that shafting seems to be imperative and even now several companies are preparing to develop properties by this means. The Hope Natural Gas Co., and the Alpha Portland Cement Co. are, for instance, driving a shaft 100 ft. in depth at the Wolf Summit and it is said that this is the forerunner of other work of a similar nature.

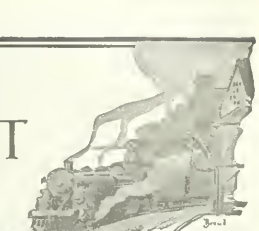
Charleston, W. Va.—Splendid progress is being made on the large byproduct plant of the Domestic Coke Corporation of this city, the $4,000,000 plant now nearing completion, covering 50 acres in scattered buildings. Six hundred men are now at work on the plant. The operation includes 60 coke ovens, a by-product building, coke wharf, three pump houses, storage tanks for light oil and a benzol building. The battery of 60 coke ovens reaches a height of 37 ft. above ground level and extends 280 feet in length. The byproducts building, 60x137 ft. in dimension, is about half completed. The benzol building under construction measures 60x100 feet.

Charleston, W. Va.—Coal lands on Meadow Creek are now undergoing rapid development with six coal companies in operation, at what is known as Meadow Bridge. In order to provide an adequate power supply for the mines, the Virginian Power Co. is extending its transmission line from Layland to Meadow Bridge.



MARKET DEPARTMENT

EDITED BY ALEX MOSS



Weekly Review

Operators and Leaders of the United Mine Workers Unable to Agree on Wage Scale—Few Miners Return to Work—Anthracite Output Normal

Operators and miners' leaders of the central competitive district are deadlocked in their efforts to negotiate a new wage scale that will be satisfactory to all concerned. Naturally this makes for decided uncertainty. Surprising as it may seem, no cessation of industry, because of a lack of coal, is reported, though if the present situation continues for a week or two longer the reverse will be true.

Though the strike has been called off, few miners have returned to work. The non-union districts are all working, and some are producing practically record tonnages.

Production of soft coal during the week of Nov. 8 is estimated at 3,477,000 net tons. This was the output of the non-union fields. Mines in the central competitive district, which includes Illinois, Indiana, Ohio and western Pennsylvania, were shut down.

Anthracite output is at top-notch figures. Demand is keen for all the domestic sizes. No real scarcity is expected, for operation is normal. During the week ended Nov. 8 the quantity of anthracite shipped to market totaled 1,972,000 net tons.

Atlantic Seaboard

BOSTON.

Steam trade marking time. New England comfortably supplied for the present. New machinery of distribution functioning slowly and procedure not yet well understood. Toward the latter part of the week coal released at loading piers for specific requirements. Local conservation measures. Anthracite situation unchanged. Retail prices in Boston advanced.

Bituminous—The first week of the strike has shown an almost entire absence of any developments in New England. No real anxiety has as yet come to the surface and as a whole the steam trade is marking time throughout this territory. It is realized that stocks are ample for the next 60 days at least, and the few applications that are understood to have been made for emergency supplies were from consumers who were beginning to worry over the possibility of coal they had in transit being taken for other requirements. So far there has been no confiscation or summary diversion of coal en route or at destination; the railroads have simply withheld deliveries as a matter of prudence, acting under instructions from Washington. These measures have created hardly a ripple, thus far, although there are many in the trade who cannot follow such a policy, if continued more than a relatively short time. There are a great many non-union mines in operation and if cars are not released there are likely to be tendencies toward a car famine. Such a result would not be in the interest of conservation.

A thorough combing over would probably disclose only a comparatively small number of consumers who are not amply supplied. Most of these cases would sift down to instances where small plants rely upon retail deliveries from day to day, and in certain localities along the coast the retail dealers are somewhat embarrassed because of the lack of barges due to the striking marine engineers. Even these retailers, however, anticipated early in October and if they are allowed to unload their own coal now at destination or en route, by far the most of the urgent cases would be taken care of in short order.

There is a good deal of vagueness as to the Regional Committee and how it is supposed to function. It is not yet understood who really constitutes the committee which is assumed to have jurisdiction over distribution. A news dispatch from Washington published as this is being written indicates that Mr. J. J. Storrow will represent the Fuel Administration. This is more nearly in line with the proprieties than earlier rumors, for to experiment now with so delicate a situation as may follow would certainly be anything but wise. The official blanks are not yet available in Boston, and generally there has been a lot of needless delay over announcing a program, but it is hoped now that within a few days the trade will be able to get a better idea of policy than has yet been unfolded.

At the New York and Philadelphia piers there has been nothing like the same delay. Coal was being released at both these ports and at Hampton Roads by Nov. 3rd. It was possible during the week for any real emergency to be met promptly by applying through railroad channels. There are certain details that are not made clear, but action was had and steamers and barges were not held up to the extent that was feared. Except for bunker and cargo coal for foreign-owned ships there has been little delay the past few days and with the Pocahontas field marking up a record production there is a good deal of optimism over the current situation.

Under Gen. Sherburn, who is chairman of the Massachusetts Commission on the Necessaries of Life, prompt action was taken to conserve present stocks of bituminous by instructing retail dealers to deliver $\frac{1}{4}$ screenings with soft coal and to restrict deliveries by team to not more than a week's supply for any one consumer. The retail dealers were cheered by this for there is a considerable tonnage of steam size anthracite on hand left over from the stressing times of early 1918. At the same time it was forbidden to make deliveries of pea coal for industrial steam use.

There is little news on prices. Mines that are in operation are disposing of output under the legal price rules but the volume of such sales is small. In such cases contracts are being followed so far as possible and there is already some encouragement for the feeling that the strike situation will be over within a reasonable short time.

Anthracite—There is still much anxiety over getting forward domestic sizes for winter consumption. Cities like Providence, Boston, and Portland have been very well served, and for the greater part the all-rail movement has been heavy. The communities that suffer most are those along the coast to the eastward where dependence is placed upon barges that are still tied up, awaiting adjustment of difficulties with marine engineers. Part of the demands have been waived and it is hoped this will forecast a complete settlement.

Effective Oct. 27 retail prices in Boston were advanced from $12.50 per net ton delivered for egg, stove, and chestnut. Broken is still sold at $12 and pea at $10.75.

NEW YORK.

Pea coal demand increase and the anthracite steam sizes are in good call. Railroad are taking heavy tonnage of the latter to mix with their bituminous stocks. Egg, stove and chestnut continue to be in good demand. Domestic coals are sent westward before the close of navigation. Manufacturers are not hard hit by the soft coal strike. Stocks are large.

Anthracite—The soft coal strike has caused a bigger demand for the anthracite steam coals, most railroads taking heavy tonnages to mix with their bituminous supply. Pea coal which has been almost a drug since early summer has tightened and moving freely. The demand for egg, stove and chestnut continues strong.

Conditions, generally, do not show much change. There continues to be a heavy demand for the larger domestic coals principally from the west and shippers are diverting heavy tonnages there before the close of navigation the last week of this month. In the meantime, a fair tonnage is being placed in this section and in the New England States, where, salesmen claim there is great need for more coal. As soon as navigation on the lakes closes it is predicted that shippers will give more attention to the demand from the New England states and that the trade there will be given heavy tonnages.

In this market there is not an urgent demand although few yards boast of any large supplies. However, consumers are well fortified against the cold winds, in fact, they are better supplied with coal than in many years past, with the exception of last winter.

The reports received from the mining regions, while not altogether discouraging, are not encouraging. Mining is going on steadily but the workers, when so inclined, remain at home. The prospects of the bituminous workers securing an increase in wages does not add to the disposition of the hard coal workers to increase production,

although they are assured of a continuance of the present wage scale until April 1 of next year, even though Peace is declared by President Wilson. Many of the workers expect that at the expiration of the present working agreement their leaders will be able to negotiate a new agreement containing an increase in wages. The men in some of the mines declare their work is becoming harder and that they are entitled to more money on that account, if for no other reason. However, no trouble is looked for.

The present demand for the domestic coals will it is expected become easier and there are some who believe that within the next six weeks or two months salesmen will be out looking for business instead of the business looking for them as at present. Independent operators are generally adhering to the 75c differential on the domestic coals. Even though the demand for pea coal is strong no sales have been heard of at prices above the regular company circular of $5.30 at the mines.

There is a strong demand for buckwheat and rice and the independents are receiving company prices for the better grades. Barley is easier. The railroads are said to be storing large quantities of buckwheat and rice to mix with their bituminous coal.

The reports of the railroad administration show a big increase in local dumpings during the 7-day period ending November 15, when 5582 cars were dumped as compared with 4564 cars the previous week.

Bituminous—The strike has not caused much trouble or anxiety to the manufacturers hereabouts. They seem to be unconcerned as to the immediate outcome and judging from the appearance of the stock piles surrounding many of the factories in suburban New Jersey they are justified in their unconcern. If appearances count for anything most manufacturers are better stocked with bituminous coal than in many years past and most of them have been able to get along with their daily shipments so far without resorting to their reserve stocks. Many claim to have sufficient coal on hand to last them until the latter part of February or the first part of March.

The railroads appear to be the hardest hit by the present shutdown. They have taken up the burning of the anthracite steam coals, which are being mixed with bituminous.

Locally the situation as regards deliveries, has not changed. If reports are to be accepted, shipments from the piers have been greatly restricted and there has been no change in the matter of permits.

Those dealers who make a specialty of bunkering vessels complain of the present methods to secure permits, which they say is too prolonged and which may result in serious delay in sailing time for important ships.

This market has not yet felt the full effect of the strike. So many loaded cars were awaiting delivery to destination on Nov. 1 that the railroads have not yet been able to get them all delivered.

Reports of the Railroad Administration show that during the 7 day period ended Nov. 15 there were 5081 cars dumped at the local piers as compared with 2,558 cars the week previous and that there were 6255 loaded cars at the terminals as compared with 5141 cars the previous week.

PHILADELPHIA.

Anthracite production increasing. Dealers in the city not satisfied with their receipts. Some look for early break in market. Consumers pressing strongly for deliveries. Egg, stove and nut the favorite sizes. Pea coal increasing in demand. Retail prices firmly fixed. Steam sizes active, except barley. Bituminous situation shows little change. Small tonnage of spot coal at Government price. Early settlement of trouble looked for.

Anthracite. With the biggest production for any month of the present year being reported by the operators, the local retail men are wondering why they did not get a greater percentage of shipments. It has always been estimated that new business amounts to 10 per cent. each year and while the colliery production is up to that maximum at last, the receipts by local dealers have not increased in the same proportion. However, the operators intimate that the heavy tonnages to the outside markets have about ceased, and have actually stopped in some instances.

Despite the fact that the retailers are clamoring for heavier shipments, they cannot get away from the fact that they have delivered good tonnages of all sizes to customers beginning early in the summer and right up to this time. This coal has been put away by thousands not accustomed in pre-war days to store fuel for winter, with the result that it is the belief of many intelligent observers that the companies would not have to ship very heavily before the dealers would have more coal than they could deliver on current orders. It is predicted that if we have ordinary weather up to the first of the year that the demand will be such that the operators will have to put their salesmen on the road again in the endeavor to move the output. When the amount of coal that is stored away is considered, it would not cause any surprise should this happen even sooner.

During the past week the demand for coal gained momentum over the previous period. The consumer seemed to be deeply anxious to have more egg, stove and nut, and these sizes are just about as scarce now as they have been all season. While the call for egg is still strong, there is no doubt that it would not take very heavy shipments before this size would pile up in the yards. With stove and nut, though, the dealers have very heavy orders on their books for these sizes which would take a considerable tonnage to clean off. There is a faint suspicion that customers are placing orders with several dealers and thus duplicating the tonnage.

This consumer demand is not traceable so much to weather conditions, although the temperature is now normal or a little under for the time of the year. The real reason is found in the bituminous strike, which many people are fearful might affect the anthracite trade. With the adjustment of the soft coal difficulty there is expected to be a considerable easing up in the domestic anthracite demand.

While the scarcity of sizes has been such as in ordinary times to warrant increases in retail prices, yet no dealer has taken advantage of the situation, at least publicly, to advance the prices of the wanted sizes. With variations of five and ten cents the standard retail prices this month are as follows: Egg $11.25, stove and nut $11.50, and pea $9.50. Despite the efforts of the operators to induce domestic consumption of buckwheat, very little of this size is handled by the retailers for domestic use.

Following its spurt early in the month pea coal is strengthening its position and the demand for it is such that the dealers with the big stocks are well satisfied at their foresight in taking in this size last summer. When the phone orders begin to call for half ton lots of this size, then the dealers know that the pea coal season has opened. Even with their big washeries in operation some of the large companies report that they are not filling the orders for pea as promptly as they would like to.

The anthracite steam situation also continues its improvement and this week a greater tonnage than ever was removed from the storage yards, and this would probably have been increased were it not for a shortage of labor at the storage plants. There has also been some picking up of rice. Barley is the only size that shows no particular strength.

As is usual in times of strong demand for coal, shipping houses report collections in the healthiest sort of condition. There are practically no outstanding accounts at this time, as the retail men are well able to conduct their business on a nearly cash basis. The retailer realizes that his method of payment has much to do with his shipments and as a consequence his financial standing at this time is all that could be desired.

Bituminous. So far as shipments are concerned the situation is most quiet, as little additional tonnage has arrived in this market. There are a few houses who at the beginning of the week had a little coal to offer. This was due principally to stray cars received from wagon mines, and in still other instances where some operations were able to get under way to a very limited extent. The spot coal on the market, what little there was, was generally offered at a price of $3.10, which is the Government price of $2.95 plus the middle house commission of 15 cents. The distribution of fuel still continues in the hands of the railroad administration and they are drawing from stocks which have accumulated during the past two weeks. At this time there is no particular suffering for coal, and it is really felt that the trouble will be adjusted long before such a stage is reached.

BALTIMORE.

Rescinding of order for coal strike at instance of court found conditions tightening at Baltimore. Reserve on railroads was still large. Anthracite supplies very light.

Bituminous—When the Mine Workers leaders decided to obey the order of the court and formally call off the strike it found the coal trade here and the consumers in a constantly tightened condition. Many industries were approaching the time when they would be forced to ask the Government apportionment of fuel and some few were already in that class. The reserve awheel in command of the Government, however, was fairly large, as the Baltimore & Ohio Railroad alone had reported having a total of some 19,000 cars of soft coal on its lines, or about 950,000 tons, while the Western Maryland & Pennsylvania together probably had nearly that amount. Standing at Cumberland were 2,000 cars of coal consigned to Baltimore and at Brunswick there were 1,400, much of which, however, would have been distributed elsewhere in view of the fact that more than 5,500 cars of coal were standing at the tide water terminals here, including Curtis Bay, Canton and Locust Point. While the rescinding strike order came in mid-week the miners in Maryland, District 16, decided to discuss the affair on Thursday, and there was at once raised the prospect that little hope of a general resumption could be entertained before the following Monday. The coal trade here, faced with the fact that October say a total loading on export account of 460,056 tons of cargo coal and 75,662 tons additional of bunker coal for these ships, or a grand total of 535,718 tons, an immense line of waiting foreign orders, more than thirty coal ships in port or coming on foreign account, is preparing in the present lull for a very busy period with the removal of the ban on export coal loading. To get in on this business in the near future the Western Maryland Railway has given a contract to the McLean Construction Co., for a new wooden pier, to cost about $900,000 to replace the one destroyed at Port Covington here about two months ago.

Anthracite—The hard coal dealers of Baltimore are feeling the pinch of light shipment to this territory in many cases. The majority have filled all except their actual fall orders, although there are a few still behind on summer business, but the usual late line is developing and there is not enough coal to meet it. The small yard reserves are being allotted in most cases to persons with no coal in their cellars. The light run here is attributed to the fact that the government rushed all available empties into the soft coal region in order to be prepared for a record movement as soon as the strike was declared off.

Lake Markets

CLEVELAND.

Receipts of bituminous coal range from 75 to 300 carloads a day, compared with around 2000 cars a day in normal times. Pocahontas and anthracite receipts have improved some-

what. The lake trade recovery is scarcely noticeable. .. ..

Bituminous—Railroad sidings to the south of Cleveland are jammed with loaded cars of bituminous coal, according to reports, but receipts in Cleveland proper are no higher than a seventh of normal. Some days as high as 300 cars filter through the committee that is distributing coal in this district. Other days as few as 75 cars are reported coming through. No actual suffering has yet been reported, nor have any industries been compelled to shut down. Many are close to the deadline, however. Retailers are rationing domestic consumers, paring the few orders they will take down to one ton. Few complaints of the restoration of government prices are heard, inasmuch as $2.35 for mine run and slack and $2.60 for prepared sizes for No. 8 coal were not far from the prevailing quotation prior to Nov. 1. The local committee appears to be functioning well, and the bituminous situation is all that can be asked, considering conditions. Another week will see the No. 8 field operating at better than 50 per cent, it is felt, and the trade will be able to crawl along until a final settlement.

Pocahontas and anthracite—Receipts of these grades are approximately normal, especially of anthracite. With bituminous coal almost impossible to get, domestic consumers turned to the more expensive grades. So far prices have not been boosted, with the exception of Pocahontas mine run, which some dealers have advanced 25 cents. Dealers have pushed coke into the breach, and sales have tripled almost over night. Eleven dollars is asked for coke by most dealers.

Lake trade—Both weather and shipments to Lake Erie ports are conspiring to cut deeply into the lake trade. Last week the dock only loaded 161,380 tons of cargo bituminous and 14,8888 tons of vessel fuel or about 11 per cent of normal for this time of the season. In no day recently have the docks dumped over 900 cars. Rough weather at the head of the Great Lakes has delayed the carriers considerably. Present shipments are the smallest of the season, and the outlook for improvement is bad.

Prices of coal per net ton delivered in Cleveland:

Anthracite—Egg, $11.75 to $11.90; Chestnut, $12.00 to $12.20; Grate, $11.75 to $11.90; Stove, $11.90 to $12.10.

Pocahontas—Forked lump, $10.00 to $10.50; Shoveled lump, $10.00; Mine-run, $7.90 to $8.25.

Domestic bituminous—West Virginia splint, $9.00; No 8 Pittsburgh, $6.60 to $6.90; Massillon lump, $8.25 to $8.50; Cannel lump, $10.50; Coshocton lump $7.50.

Steam coal—No 6 slack, $5.25 to $5.50, No 8 slack, $5.10 to $5.50; Youghiogheny slack, $5.25 to $5.50; No. 8 ¾-in., $6.00 to $6.25; No. 6 mine-run, $5.25 to $5.50; No. 8 mine-run, $5.75 to $5.90.

CINCINNATI.

The market for all grades of coal in Cincinnati is quiet. Wholesale and retail dealers have a limited supply on hand. How could consumers have been taken care of by a special committee headed by the Federal Fuel Administrator of Ohio and Indiana. The quotations on all grades remained steady during the past week. Committees representing the wholesale and retail dealers are co-operating with the District Fuel Administration to keep this district supplied in fuel.

The supplies coming to the Queen City were drawn from the West Virginia Fields. During the strike period, Cincinnati was indeed fortunate in being on the edge of the non-union fields and consequently no one suffered from a shortage of fuel, there being enough of the commodity moving to the city at all times to take care of the industrial needs of those who did not and those who could not store enough for emergencies. There was little call for help from the domestic consumers because about 80 per cent of them had heeded the warnings and had laid away their winter's supply early in the spring and summer.

The demand from the industrial users during the past week was unusually heavy and those from the domestic users, while not heavy, was enough to keep the dealers on the jump. The first touch of winter weather caused unprepared domestic users to clamor for coal and fortunately there was enough on hand to supply all wants.

When the strike became effective Nov. 1, coal men did not take advantage of the Government maximum prices which were from 50 cents to one dollar higher per ton than those prevailing among coal men prior to the strike.

Retail dealers at no time charged the limit allowed by the government because they felt it would be making unfair capital of a critical situation when co-operation and the maintenance of public confidence were vitally important, and also because any such radical changes in price would entail a great deal of revision and reorganization in the coal business throughout the city.

The indisposition on the part of the dealers to charge the full price allowed by the government has resulted in probable financial loss to some of them, for when they were obliged to sell coal distributed by the Fuel Administrations through the railroads, they paid full government prices. Frequently the dealer did not know at the time when he sold his coal to the domestic consumer whether he was making a sale at profit or at a loss, because the local coal committee has not been able to furnish invoices simultaneously with the allotments of coal to the dealers.

According to Cincinnati retail dealers the domestic consumers are being charged about $7.25 per ton for high grade bituminous coal for use in homes. This was not the maximum price allowed by the government and therefore, the fact that the Fuel Administration removes the limit which can be charged for retail coal will not have any effect in prices so far as the domestic consumer is concerned was the assurance given by various coal merchants. Prices of coal in Cincinnati delivered, follow:

Bituminous, $7.50; Run of mine, $6.50; Smokeless lump and egg, $8.00, $8.50 and $9.00; Run of mine, $7.00 and $7.50; Anthracite $10.50 and $12.75; Coke, domestic egg, $10.50 and $11.

BUFFALO.

No local effect of the coal strike apparent. Practically no one asking for bituminous coal. Shippers afraid that the expected return to mines will be disastrous. No change in anthracite.

Bituminous—The calling off of the strike gave the situation a new phase, but it is early now to say what will be the actual result. This market was feeling quite comfortable over the outlook. If there was any consumer with shortage who was short of supply or had less than a six-weeks' stock the shippers did not know him. So it is a mere matter of sentiment with the shippers to rejoice over what appears to be the triumph of a new principle in the strike problem.

As it stood here there was practically nobody asking for coal. Even pictures were published showing big piles of coal that had been delivered to outlying consumers. The Buffalo shipper did his full duty by his customers. He fairly obliged them to put in a stock. Now he is nearly out of business and does not expect orders of any amount for weeks to come. He was quite prepared to sit down and wait for the strike to die out as the steel-workers' strike did.

There are a great many cars standing on tracks here and on the way from the mines. The railroads generally refuse to release them except by government order. A local committee has classified the coal and when a consumer asks for a certain grade or sort it can then be turned over at once. No distress is likely, even if the men are slow to go back to work. The average jobber is so entirely without orders that he rather hopes that they will take their time about it.

The bituminous prices are hardly visible in any form just now, but they will continue as before if nothing radical happens at $4.55 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for same three-quarter $4.20 for mine run, $4.10 for slack, $4.70 for smokeless, $5.70 for Pennsylvania smokeless, $7.75 for coke, domestic sizes and $5 for breeze, all per net ton, f. o. b. Buffalo.

Anthracite—The situation does not change materially, except that there is no report now of big premiums paid on independent coal. The government stand on the matter seems to have sopped it. Locally the supply is as light as ever and the rail-line business is still slack. Some of the lake shippers are now closing out that branch of the business for the season and will give the local and line trade all the coal asked for. The fall has been so mild that consumption is at its lowest, which cannot help making the supply much more than it would otherwise be.

Shipments by lake are falling off. The amount forwarded is so much more than it was last season to date, though, that there ought to be a good supply in upper-lake territory. For the week the loadings totaled 97,950 net tons, of which 43,500 tons cleared for Duluth and Superior, 27,200 tons for Milwaukee, 7,200 tons for Fort William, 7,000 tons for Sheboygan, 5,600 tons for Chicago, 5,0000 tons for Vanitowce and 1,750 tons for Lake Linden.

Coal freight rates are weak, from the scarcity of other freight, at 60 cents to Chicago, 47½ cents to Milwaukee, 42½ cents to Deluth, Fort William, Sheboygan, Manitowoc, Lake Linden.

Coke

Buffalo—The trade is pretty slack, for there is a big stock of both coke and ore available and the output of iron and steel is not yet up to the normal and there is no need of haste in laying in more. Hardware dealers and the like are finding themselves out of certain supplies that they cannot get, but it may be quite a long time before they can get them again, for the supply is likely to be less than the demand for quite awhile. The prices of coke still rule at $8 for 72-hour Connellsville foundry, $7.50 for 48-hour furnace and $7 for off grades, all per net ton, f. o. b. Buffalo.

DETROIT.

Detroit and most of the other towns of the state are reported fairly well supplied with bituminous coal.

Bituminous—Under the method of distribution made effective by the government's regional committees, few complaints of shortage of coal are received from towns in Michigan, despite the suspension of a large part of the production. Coal is coming to Detroit in liberal supply, according to jobbers. P. G. Finlay, head of the local regional committee, is turning over a considerable amount to consumers who are in the four priority groups following railroads, and is urging that cars be unloaded as swiftly as possible to facilitate relieving local terminal tracks.

Investigation by the Detroit Board of Commerce elicited the reassuring information that there is sufficient bituminous coal at hand to meet the requirements of the city's manufacturing plants for about three weeks. While some of the retailers are reported to have little bituminous coal in their yards, the present situation is helping to relieve others of the residue of stocks that were left over from the former regime of the federal fuel administration.

It is so far a matter of congratulation among the local jobbers that Dr. Garfield has not restored the wearisome system of reports that added to the trials of these dealers a year ago. There is some speculation also, as to how long the fuel administration will continue to function after termination of the strike.

Anthracite—With stocks of prepared sizes of anthracite low in retailers' yards and very little coal of that description coming to Detroit, household consumers who neglected to stock up early in the year are viewing the outlook with anxiety. Jobbers are not inclined to encourage the theory that

receipt of anthracite will be increased after the end of navigation on the lakes. They argue that the demand from eastern markets is likely to absorb whatever additional supply may be made available.

Lake trade—Lake freighters are again assured of coal for bunker use and coal is being released also for loading for delivery at points on the upper lakes where present supplies are held to be inadequate to meet winter requirements. Bunker coal is being released also to Canadian freighters, which for a time were cut off from fuel. The purpose is to facilitate movement of grain down the lakes.

COLUMBUS.

While the strike order has been cancelled by the officials of the Miners' Union, very few miners have returned to work in Ohio. Some few mines have opened but they are generally small and production is still almost nil. It is doubtful if there will be much production before the settlement of the wage scale, or until some definite move is made by the international officials.

There is still a strong demand for coal, both domestic and steam grades in Ohio as production with the cancelling of the strike order has not yet been resumed. The federal authorities still retain control of the distribution of coal and every one who is in dire need is being supplied. The first attention of the local distributor B. F. Nigh was to relieve retailers, hospitals and other public institutions. Quite a few applications for coal to take care of such cases were received and after investigation orders were given to move coal promptly. A large amount of coal is still being held on the tracks in the Columbus area. Retail stocks are getting low and most of the dealers have to depend on the fuel distributing machinery for their supply. It has been the rule to deliver smaller lots to customers in order that all can be served. Retail prices are firm at the levels which prevailed, although some reductions are reported where the coal sold was purchased at the government prices. Pocahontas is quite scarce and the same is true of West Virginia splints.

Steam trade is also firm and steam orders are buying all available stocks. But in most instances the larger consumers had accumulated reserves which are carrying them through the emergency. Railroads are confiscating a considerable tonnage but not as much as was expected. In fact every one is going slow in making requisitions. Steam prices remain firm at former levels and no appeal for reduction has been made. Hocking mine-run is selling at $5.25 to $5.50 delivered, while West Virginia mine-run is selling around $7.50 delivered.

Some tonnage is going to the lakes but not sufficient to make any records. There is still a shortage of fuel in the Northwest and the lake trade will probably run on until the closing of navigation. But the large majority of contracts have been filled.

Miners in all Ohio producing fields are slow in returning to work, following the cancellation of the strike order. It is called to attention that the cancellation of the strike order did not command miners to return and it is believed it will require some time before production is being done on a fair scale. Many of the miners are waiting to see the results of the Washington wage conference before returning to work.

PITTSBURGH.

Few miners return to work thus far. Coal consumers feel little concern. Price regulations.

Few miners returned to work in the Pittsburgh district immediately on the calling off of the strike, pursuant to the injunction of the Federal Court, but the expectation is that beginning Monday, Nov. 17, there will be a fairly general return. Some of the small union mines are working fairly well, a few of these have not stopped work at all. The non-union districts are all working and some are producing practically record tonnages.

The Railroad Administration has released to original consignees little of the coal it has been holding, much of this being on railroad company sidings adjacent to points of delivery. The steel industry is no longer seriously concerned over the coal strike as it had fair stocks for a short cessation in production and it is expected that the consigned coal held will be released shortly.

The Pittsburgh Coal Producers' Association has been notified by J. D. A. Morrow, of the Fuel Administration, of certain modification in the price order originally issued. Coal shipped on or before Oct. 29 is to be billed at contract or invoice price and if diverted the producer can add 15c to cover cost of rebilling, hailing, etc., while all coal shipped Nov. 13 and later on a contract made prior to Oct. 30 is to be billed at original price, no rebilling charge being allowed. All coal shipped after Nov. 13, not on contract, is subject to Government price, and to rebilling charge of 15c if deverted. Thus the Pittsburgh district market is quotable at $2.35 and $2.50 for mine-run and 25c higher for screened, per net ton at mine.

Coke

CONNELLSVILLE

Coke operators very firm on prices. Increased costs expected. Large increase in coke production in first week of coal strike.

Coke operators interpreted the calling off of the coal strike as being favorable to the maintenance of coke prices, on the ground that the ending of the coal strike would stimulate the iron and steel industry and help to get its strike out of the way. Operators express the opinion that a wage advance of considerable proportions will eventually be given the union coal miners and that the Connellsville region, although non-union, will follow with a proportionate advance. A considerable increase in the cost of making coke therefore, is taken into account in connection with negotiations for coke to be delivered in 1920. A prominent producer of foundry coke made a number of contracts with regular customers for the first half of 1920, on the basis of $7.00 for foundry coke, plus an extra dependent upon any wage advances that may come to prevail, then withdrawing from the market.

In the case of furnace coke it is reported that one or two operators have been ready to close at $5.50 for the half year, without any allowance in addition for wage advance, but operators in general are indisposed to negotiate until the wage matter is settled. Operators are again talking of sliding scale contracts, even though the contracts made on that basis for the present half year did not justify their expectations, since for four months pig iron did not advance.

The prompt market is quotable at about $6 for furnace coke and $7@7.50 for foundry coke, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Nov. 8 at 248,676 tons, an increase of 46,178 tons.

Middle West

MIDWEST REVIEW.

No great results, as yet, have been derived from Mr. Lewis' withdrawal of the strike order. Far from rushing back to work and a place on the payroll, the mine workers are living on their accrued incomes, and with their families, friends and automobiles, are enjoying the beautiful Indian Summer weather. This may sound like irony, sarcasm, or an attempt at humor, but as a matter of fact, it is the absolute truth. One of our friends chanced to be in an Illinois mining town about a month ago, and he counted over 70 automobiles parked in the vicinity of one coal tipple. It certainly is a great thing for the miners to own automobiles, and we have nothing against this, but unfortunately it weakens their cry of povery. The public will always listen to a plea for bread or a like necessity, but not much sympathy can be expected for strikers desiring more money for gasoline or silk shirts.

While the strike, as a matter of fact, has been called off, the situation has not changed a particle, as to date no operator has been able to report that his men are back at work. Some mine owners are predicting that the mines will remain practically idle until around the first of December, basing their prophecy on the fact that practically all the miners in Illinois and Indiana have a big pay coming to them on November 15. It is said that this pay, in a general way, will prove the biggest for the fiscal year. This will give the mine workers considerable cash in hand, and no doubt will put them all in an independent mood.

No reports, so far, have come in, telling of hardships incurred through a coal shortage. Today, the temporary machinery of the Fuel Administration, combined with the Railway Administration has proved able to handle the situation well. Iowa appears to be the state with the smallest supply, while both Indiana and Illinois have ample. This applies both to retail yards and steam plants. If the men go back to work promptly, it is believed that enough coal can be produced to keep plants running and homes warm.

CHICAGO REVIEW.

There is practically no activity in the coal market here, except on the part of the retail dealers who are doing a rushing business, one and all. These gentlemen evidently have an abounding faith in the future, as they are all reducing their stocks very rapidly. Every now and then the local representative of the Fuel Administration releases some coal to the retail trade, but not enough to make up for the large tonnage delivered to the householders almost daily.

The operators are doing nothing, and the jobbers find themselves almost in the same fix, except that some are selling coke, whole others are distributing a small tonnage of coal from wagon mines, and from the anthracite regions. No great activities can be looked for in the wholesale trade until the miners resume work.

MILWAUKEE.

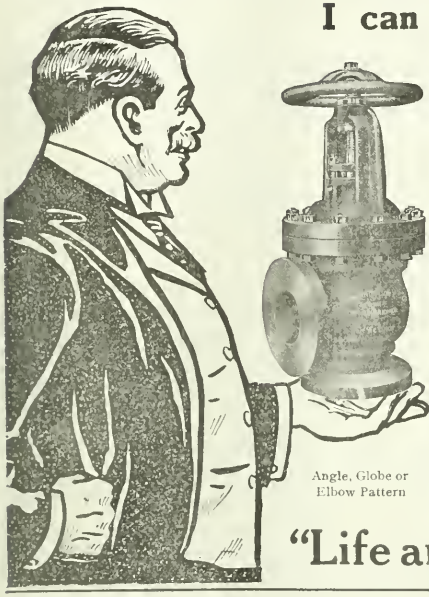
Coal market normal, despite the general disturbance. Good stocks on hand, but chestnut and stove anthracite are scarce. Prices unchanged.

The coal market at Milwaukee is normal, notwithstanding the disturbing element which beset the trade at large. There has never been any fear of a shortage in case of a strike, because consumers are fairly well supplied and the docks are piled high with bituminous coal. Only a prolonged and unusually cold winter would exhaust stocks in the yards. Some small dealers have suffered inconvenience because rail shipments of Pocahontas coal have been taken over by the coal administration, and shipments of steam coal to the interior have been held up by the temporary embargo on the movement of bituminous coal, but the situation is viewed with complacency by coal men as a rule. There is a scarcity of chestnut and stove anthracite, which makes it hard for dealers to meet the wants of consumers with magazine heaters, otherwise deliveries are being freely made. Wintry weather has stimulated business. Receipts by lake are the slowest of the season, averaging one cargo a day thus far in November. Receipts for the season thus far total 794,264 tons of anthracite and 2,792,895 tons of soft coal, a gain of 146,316 tons of the former and a falling off of 395,469 tons of the latter compared with the record of the same period last year.

Coal fires are still burning in the yards of the Central Coal Co., Kanawha Fuel Co. and Milwaukee Western Fuel Co. Thousands of tons of soft coal are being consumed or converted into coke. The Pugh yard at Racine, Wis., is also burning.

"I Know My Boilers Are Safe—

I can test this valve right in service"



Angle, Globe or Elbow Pattern

Yes, sir—certainty that my boilers are being protected against the sudden reversal of steam flow is always at hand.

All my boiler connections between the nozzle and the header are equipped with

Golden-Anderson

Patented Automatic Double-Cushioned Triple Acting and Non-Return Valves

1. They are the only valves that can be tested in service from the boiler room floor. Opening a small hand valve will give complete assurance that the big valves are faithfully on guard against disaster.
2. They automatically cut out a damaged boiler and prevent the back pour of steam from the other boilers through the rupture. That means no shutdown.
3. They automatically equalize the pressure between all boilers and positively prevent steam from entering a cold boiler in which the engineer may be at work.
4. The double Corliss Dash Pot gives absolute relief from pounding, sticking and chattering. It protects the valve and you.
5. The valves can be closed instantly from distant points by steam or electricity.
6. When fitted with our patented safety latch they may also be opened by hand like an ordinary stop valve.

Also made in the triple acting style that works "both ways" causing instant automatic closure of the valves on every boiler in case a steam pipe lets go

1700 used by U. S. Steel Corporation

after making thorough tests of all well-known makes

"Life and Property Insurance Valves"

"No shut-down when a tube bursts"

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Automatic Cushioned Controlling Float Valves

1. They carry a constant water level in feed water heaters by perfectly controlling the flow of make-up water.
2. Operated by protected enclosed copper float.
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4. Operate without hammering, sticking or chattering. No metal-to-metal seats.
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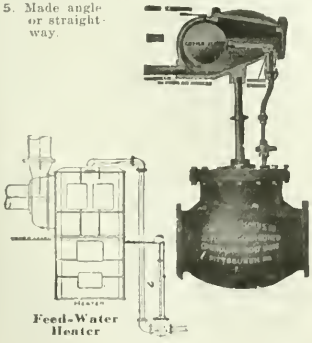
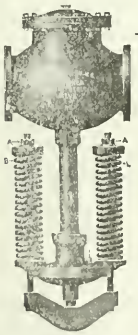


Feed-Water Heater



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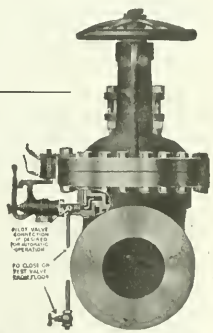
AUTOMATIC CUSHIONED STEAM PRESSURE REDUCE VALVES

FEATURES

1. Automatically maintains a constant reduced steam pressure no matter how much the boiler pressure may vary.
2. Perfectly cushioned and guided. Absolutely no pounding, fluctuating or improper seating.
3. Entirely self-contained. No auxiliary valve or small passages to give trouble.
4. The patent safety piston makes it impossible for boiler pressure to reach the low pressure side.
5. No attention necessary after first adjustment.
6. Double extra heavy and practically fool-proof.

Golden-Anderson Double Cushioned Quick Closing Emergency Trip Valves



Provide Against Runaway Engines and Disastrous Accident

Features:

1. Electrically operated from distant points.
2. Emergency tripped by small branch pipe connection.
3. Hand operated by hand wheel.
4. Double cushioned by Corliss dash pots—positively no hammering or pounding.
5. Double extra heavy throughout—practically indestructible. Suitable for any pressure—no adjustments.

"Hosts of References"

Golden-Anderson Valve Specialty Co., 1213 Fulton Bldg., Pittsburgh, Pa.

ST. LOUIS.

Railroad Administration distributing what coal is available locally. Present supply fairly good in city while country districts are suffering.

The local situation is fairly good, everything considered. No restrictions have been put on in regard to the conservation of fuel, although they are supposed to exist in a limited way.

The Regional Fuel Committee have now the assistance of a few practical coal men and things are working out fairly well.

In the country districts, however, it is different. People who need coal can go up and get it as a rule, but the steam users and the dealer in the country districts who is unable to get to St. Louis and who has no information as to how to get coal is without it and from many places throughout the southwest, reports come in that electric light plants and other users are down because of no fuel.

In many places the retail trade in the country had not coal for the past couple of weeks. These communities have to use wood when they can get it or go without fuel.

The railroads have been very liberal locally with coal as far as steam plants are concerned and have shown a better disposition than was expected. It is a known fact that several railroads are hard up for coal at this time, but nevertheless they have as yet not refused any request for coal here.

The car supply at the mines will be one hundred per cent for perhaps a week or ten days when they resume. The only thing that worries the operators now is when the miners will go back to work, and whether the railroads will be able to handle the coal when it is produced.

Storage supplies are getting low in St. Louis, and the first week will likely find the railroads and steam plants taking most of the coal.

The feeling here is that there will be very little doing in the Standard and Mount Olive districts until the miners know exactly what they are going to get. They say they are not going back to work until the wage scale is settled. The first to go back in Illinois may be those in the Williamson and Franklin County fields, the miners there being more conservative, and the last to go back will be those in the fifth, ninth and Springfield districts in Illinois. If they continue to stay out another week or ten days, all the available coal in this section in cars will have been used.

LOUISVILLE.

Miners reported going back to work in all fields. Cold weather not creating much domestic demand. Railroads still holding coal consigned to industrial consumers and retailers. Market expected to slowly get back into a normal stride.

Leading operators report that things are working back toward normal, and that the loss of eleven days work in the mines will not be seriously missed inasmuch as the country was fairly well stocked on all grades of coal. However, in Southeastern Kentucky and the Southern Appalachian district, miners didn't go back to work the day following the calling off of the strike. In some cases official notice had been delayed. Many of the miners were dissatisfied, and in some sections it is believed they will hardly report until Monday. Northeastern Kentucky reports that mines are filling up fast and that operations will soon be on a normal basis. In Western Kentucky men were eager to get back to work, and mines are producing well.

However, it is held tha in some sections miners are dissatisfied, and will not work with much energy, with the result that production will be lower and more costly for the operator.

During the last few days of the strike production on the L. & N., lines in Kentucky was equal to about 50 per cent normal operation, due to heavy tonnage movement from Western Kentucky, where forty-seven union mines were working; and from the Hazard field where operations were nearly normal, while from Harlan districts fair tonnage was moved as a result of the monster plant of the U. S. Coal and Coke Co., running at capacity, as well as the plant of the Wisconsin Steel Co.

River shipments as a whole are very light, although there is a big river at the present time and boats would have no trouble in getting through.

Much coal is still held by the railroads to the detriment of retail business, as many retailers have consigned coal in the yards and can't get it. The same thing applies to a number of industrial consumers, and many towns out in the state are complaining of the shortage.

Nov. 13, with a drop to 23 degrees, registered the coldest weather of the season, and since 1873. However, it failed to produce much retail demand as consumers are well stocked.

Producers openly state that they would rather see miners get a slight increase and get the trouble over with, than have it dangling for months. Signing of the peace treaty would probably be the signal for another strike, and while it is not felt that miners are entitled to more money until the old agreement runs out, it is felt that peace must be secured.

Just how soon price regulation will be withdrawn is a question, but it is generally understood in the trade that Garfield's work is completed with the calling off of the strike, and that things will go on much as they did before the trouble started.

BIRMINGHAM, ALA.

Mine workers returning to their labors rapidly and coal production is now around 75 per cent normal. Steam demand is not urgent, neither are inquiries for domestic sizes.

Mine labor throughout the Alabama field, with the exception of those formerly employed in the Cahaba collieries, are reporting for work at the mines and are being taken on as rapidly as practicable at the plants which have been idle or partially so during the strike. It is reported that few of the men have reported for work in the Cahaba field, where the largest tonnage of domestic coal is mined, but they are expected to return the first of the week, and within a few days thereafter normal output will be obtained in this section of the field.

Notwithstanding the fact that coal production was reduced to probably 25 per cent of the normal output during the first few days of labor trouble and was gradually brought up to 60 to 70 per cent normal at the time the strike call was rescinded, there has been no shoratge of consequence suffered by either the steam or domestic consuming public, and few complaints were registered on account of scarcity of fuel dring the strike period. At present there is only a moderate demand for steam fuel, but with contract deliveries behind there will be little surplus coal available for several weeks. Steam and domestic prices are as follows per net ton mines as per Government schedule now in force:

	R/M Slack	Lump
Big Seam	$2.45	$2.40 $2.75
Cahaba, Black Creek.	3.45	3.10 3.75
Pratt and Corona ...	2.85	2.45 3.05
Montevallo	4.10	3.60 4.35
Climax	4.60	2.50 4.85

The railroads are now forwarding to destination as rapidly as possible the large tonnage of fuel which they have been holding in yards and sidings since the beginning of the strike, and while the car supply is now plentiful a shortage may develop pending the return to the mines of the loaded equipment, much of which was diverted from other transportation channels and may not be returned to the coal fields.

Foreign Markets

TORONTO, CANADA.

Bituminous shipments held up at the border. War stock piles being drawn upon. Storage not seriously felt as yet. Anthracite supply about equal to demand.

No shipments of bituminous coal have lately been received from the mines, all consignments having been held up at the border by the American Government. Some soft coal is being brought in from war stock piles at outside points of the province, which is selling wholesale at $9.60 per ton on cars at Toronto. The shortage has not so far been seriously felt or resulted in anything like a panic, the principal danger being the near exhaustion of supplies for the Gas Company which is a very large consumer. Supplies of anthracite are light but about equal to the present demand, most consumers having laid in their winter stocks.

Retail quotations for short tons are as follows:

Anthracite, egg, stove, nut and grate	12.50
Pea	11.00
Bituminous steam	8.75
Slack	7.75
Domestic lump	10 00
Cannel	11.50

Recent Coal Patents

Automatic stoker. H. G. Lee, Tacoma, Wash. 1,311,624, July 29, 1919. Filed May 14, 1917. Serial No. 168,335.

Mining car. C. H. Lubken, Westmont Borough, Penn. 1,311,659, July 29, 1919. Filed June 17, 1918. Serial No. 240,312.

Coal drill. C. F. Helflinger, Durham, Wash. 1,311,396, July 29, 1919. Filed Nov. 7, 1917. Serial No. 200,669.

Mechanical stoker. J. Van Brunt, assignor to Combustion Engineering Corporation, New York, N. Y. 1,309,344, July 8, 1919. Filed May 21, 1918. Serial No. 235,797.

Automatic stoker. E. J. Hart, Philadelphia, Penn. 1,312,397, August 5, 1919. Filed May 26, 1917. Serial No. 171,087.

Mining bit. I. Hubbell, Peoria, Ill. 1,312,732, Aug. 12, 1918. Filed Nov. 26, 1917. Serial No. 204,011.

Safety cartridge for mining purposes. E. Lemaire, Mons, Bel. 1,310,616, July 22, 1919. Filed Dec. 26, 1916. Serial No. 139,066.

Mine door operating means. J. J. Body, L. Long and M. L. Johnson, of Dante, Va., C. F. Kilgore and A. Blevins, of Coeburn, Va. 1,311,488, July 29, 1919. Filed Jan. 16, 1919. Serial No. 271,452.

Method of treating mine water. E. C. Auld and J. R. Campbell, Scottdale, Penn. 1,310,382, July 15, 1919. Filed May 8, 1916. Serial No. 96,232.

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Mine drill. F. Kalata, Springfield, Ill., 1,305,219. May 27, 1919. Filed Jan. 24, 1919. Serial No. 272,849.

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COAL AGE

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What the Coal Strike is About

By R. Dawson Hall

(*Written as of Dec.* 1.)

WHAT is the coal strike about? The kindest, perhaps the truest, explanation of the great strike may be embodied in the words that it is a protest against the irregular working of the high-cost mines that are producing low-grade coal and an aspiration that these mines may be enabled to work steadily, or at least more steadily, than before and if not that they will pay the men more than under the old scale.

For many of the men the strike appears likely to be wholly a failure. One is sorry to admit that for these, the more unfortunate mine workers, it is so entirely lost. The mine workers in the inefficient low-grade mines are worse off than if it had not occurred. The new scale and it seems that it is accompanied by price regulation, will make matters worse instead of better. The future is darker than the past, if the operators are to bear any part, or all of the burden of the wage increase.

Price regulation will prevent the high-cost low-grade mine from working at all as soon as the press for tonnage is at an end. The miners where the demand for a repudiation of the contract on Nov. 1 arose will shut down tight as soon as the needs of the public are in any degree satisfied. For the prices of the low-cost high-grade coal will be kept low by regulation, and the public will satisfy its needs from the mines that produce it and work in the other mines will be impossible.

True, these mines can ask the high prices granted during the war, but they can only work so long as the shortage exists, for none can be compelled to pay the high price conceded to these operators. As soon as the shortage is assuaged they must close down. Dr. Garfield has explained that what he is doing is bringing his "bulk lines" nearer the cost of production and so putting mines out of operation. The new adjustment will close ill-equipped high-cost mines in greater numbers than before.

Instead of mines capable of six hundred million tons being allowed to work, only sufficient mines to produce five hundred million are to be permitted to operate. In fact more will close than Dr. Garfield imagines, for the bulk lines during the war were based on steady work and on the patriotic endeavor of the workingmen.

Those bulk lines will now be below the producing cost of more mines by reason of the 14 per cent wage increases and below still more, by reason of the unsteady work and low productive effort of the workmen now obtaining. Thus they will rule out more mines than Dr. Garfield imagines.

The strike falls more heavily on the malcontents than it does on those who were only led to complain by the example of those who were discontented. The action of John L. Lewis and William G. McAdoo in protesting against the operators earnings has been distinctly unfortunate, for it has sounded the death-knell for the pick miner and the mule driver in the small mine, the men who, being most in trouble, vociferated most loudly and most naturally for relief.

The cause is lost at least by those with whom we have most sympathy. Had the mine workers not tried to put the burden on the operator, a degree of victory—a real 20 or 25 per cent betterment—might have been won for all the mine workers in fortunate and unfortunate mines alike.

The inefficient mine is doomed. The public will see its end without regret, but its closing will mean no little hardship to those who through years of hope against hope have cast their fortunes on its success. They have gambled with the progressive spirit of the present—and lost. How long will it take them to learn that the effort was illspent?

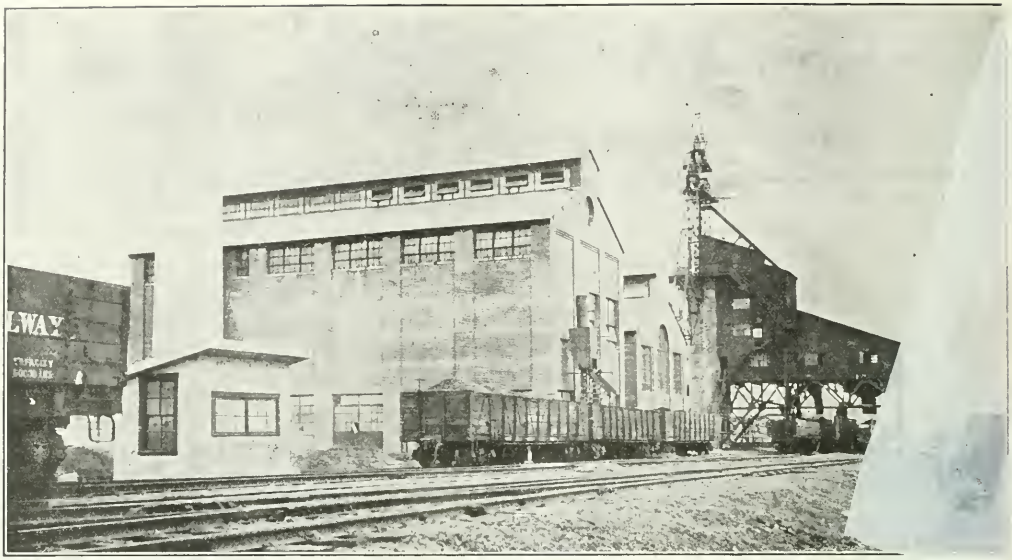

FIG. 1. POWER HOUSE AND TIPPLE AT THE SUPERIOR NO. 4 OPERATION

Engineering Features of Modern Large Coal Mines in Illinois and Indiana*—I

By C. A. Herbert† and C. M. Young‡
Vincennes, Ind. Urbana, Ill.

The concrete tipple of the Kathleen mine is an innovation in the southern Illinois field. The preparation plants of the various mines here described vary widely in detail, yet all embody simple apparatus of proved utility. The housing of employees has received careful attention in at least one instance.

WITHIN the past few years, considerable development has been made in the coal-mining industry in Illinois and Indiana and it is the purpose of the authors to record its most important phases. Perhaps the two most striking features are the entry into the producing fields of certain large consumers of coal and the magnitude of some of the new operations. Mines are now being equipped by the Chicago & Northwestern R.R., the Chicago, Burlington & Quincy R.R., the Standard Oil Co. of Indiana and the Union Electric Light and Power Co., of St. Louis. Besides these the U. S. Steel Corporation has increased its coal-mining activities by commencing operations on its large holdings northeast of Benton, Franklin County, Illinois.

Until recent years the supply of commercial coal has commonly been adequate and prices have generally been favorable, especially to large consumers, as the magnitude of their purchases enabled them to obtain satisfactory quotations from producers. In fact, many large consumers of coal have believed that they could buy their fuel more satisfactorily in the open market than they could produce it themselves. The entry of the United States into the war was accompanied by various disarrangements of industrial conditions, and a demand for coal in excess of the supply seemed likely to be experienced for an indefinite period. Under these circumstances it seemed that the greatest assurance of a supply of fuel was its production by the operation of mines. In the case of the Chicago & Northwestern R.R. and the U. S. Steel Corporation, the production of coal has been carried on for many years with satisfactory results, but the Chicago Burlington & Quincy R.R., the Union Electric Light and Power Co. and the Standard Oil Co. of Indiana had not been producers of coal, at least in this district.

Apparently the most impressive feature of the newest mines is their capacity, for in some cases it is planned that production shall be in the neighborhood of 1000 tons per hour. There are mines now in this field having nearly that output, but these were not planned for such a production; in fact, when the shafts were sunk and the machinery installed it was generally supposed that the daily outputs would be only in the neighborhood of 4000 to 5000 tons. Incidentally, there has risen an interesting rivarly among some of the mines of large output. For a few years, the record for a day's output from a shaft mine in the bituminous

*Part of a paper presented before the Chicago meeting of the American Institute of Mining Engineers, September, 1919.
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coal districts of the United States, and probably in the world, was held alternately by the No. 3 mine of the Superior Coal Co., at Gillespie, and the No. 1 mine of the New Staunton Coal Co., at Livingston. Subsequently the contest passed to the south and the record was held alternately by the Orient mine of the Chicago, Wilmington & Franklin Coal Co., at Orient, Ill., and the No. 1 mine of the American Coal Mining Co., at Bicknell, Ind. While the output of the latter mine is generally above 5000 tons per day, the record for a day's output is now held by the former mine, at which there was hoisted, on Mar. 6, 1919, 6776.75 tons in 1501 hoists.

No attempt has been made to chronicle any but the most important phases of recent events. Many new mines have been sunk and equipped in the past few years but these have not been discussed unless some new features of engineering practice were involved. For the purposes of this article six mines have been selected as exhibiting the most striking recent developments. These are the No. 2 mine of the Standard Oil Co., the No. 4 mine of the Superior Coal Co., the Kathleen mine of the Union Colliery Co., the No. 2 mine of the Bell & Zollar Mining Co., the Valier mine of the Valier Coal Co., and the No. 2 mine of the American Coal Mining Co. These mines are located as follows: Standard Oil Co. of Indiana, Mine No. 2, at Schoper, 8 miles northeast of Carlinville, Macoupin County, Illinois; Superior No. 4, 7 miles southwest of Gillespie, Macoupin County, Illinois; Kathleen mine of the Union Colliery Co., 5 miles south of DuQuoin, Perry County, Illinois; Bell & Zoller No. 2, 1½ miles southwest of Zeigler, Franklin County, Illinois; Valier mine of the Valier Coal Co., 3 miles north of Christopher, Franklin County, Illinois; No. 2 mine of the American Coal Mining Co., about 2½ miles southeast of Bicknell, Indiana.

These mines are the properties of companies unrelated to each other. In each case the plans have been made by engineers of experience in coal mining and of perfect familiarity with the conditions to be met. These mines, therefore, embody the best knowledge and experience obtainable and represent the highest type of coal-mine engineering in the district at the present time.

The Standard Oil Co. of Indiana is a new operator. To provide fuel for its refineries at Wood River, Kansas City and Whiting, which together consume about 7000 tons of coal every day of the year, the company purchased the old mine of the Carlinville Coal Co., at Carlinville, with about 2300 acres of coal lands, and also about 22,000 acres of undeveloped coal lands lying to the north and east of Carlinville.

The Superior Coal Co. is a subsidiary company of the Chicago & Northwestern R.R. It first entered the Illinois coal fields about 14 years ago and already had three mines in operation near Gillespie, the combined output being about 12,000 tons a day. The coal rights of the company include nearly 45,000 acres in the Gillespie field.

The Union Colliery Co. is a subsidiary of the Union Electric Light and Power Co., of St. Louis, which in turn is a subsidiary of the North American Co. The latter company is already interested in coal mining in Ohio and Kentucky. Coal from the Kathleen mine will be supplied to power plants in St. Louis and Milwaukee and to the open market.

The Bell & Zoller Mining Co. is a producer and marketer of coal for steam and domestic use. The company has mines at Centralia and Zeigler, the latter mine being the largest and best known.

The Valier Coal Co. is a subsidiary of the Chicago, Burlington & Quincy R.R., and its coal will go entirely to that consumer.

The American Coal Mining Co. of Indiana is, like the Bell & Zoller Mining Co., a producer and marketer of coal for steam and domestic use. It already owns and operates its No. 1 mine, which is one of the most productive operations in the bituminous-coal fields of the country.

In the case of each of the Illinois mines under consideration, the coal developed is the well-known No. 6 bed, which is the principal measure worked south of Springfield. The characteristics of this coal are not the same at all of the mines considered.

The two mines lying farthest north, Standard Oil No. 2 and Superior No. 4, are in coal that, at the former, varies from 6 to 8 ft. in thickness and at the latter averages 7 ft. 1½ in. with about the same limits. In this northern part of the district, the coal is nearly horizontal and there is no reason for anticipating serious trouble from grades, as the mines already developed have not encountered serious difficulty from this cause. As far as the experience in the district indicates, there will be no trouble from gas, at least at the Standard mine, but the Superior No. 4 approaches so close to the Staunton natural-gas field that inconvenience from this source is possible. The roof conditions in this district are, in general, very good and it is the practice of the Superior Coal Co. to drive its entries and crosscuts 21 ft. wide in order to avoid payment for narrow work. In some cases this is not possible and the present development of the No. 4 mine indicates that the entries in part of the mine cannot be made more than from 15 to 18 ft. wide.

TABLE I. DATA OF MINES DISCUSSED

Name of Operator	Name of Mine	Approximate Output Expected per Day, in Tons	Thickness of Coal, in Feet	Depth of Hoisting Shaft to Bottom of Coal, in Feet	Inside Dimensions of Hoisting Shaft, in Feet	Inside Dimensions of Air Shaft, in Feet
Standard Oil Co. of Indiana	No. 2 (Schoper)	7000	6 to 8	317	7 by 17	14 by 31
Superior Coal Co.	No. 4	7000	average 7½	313	11 by 21	11 by 17
Union Colliery Co.	Kathleen	7000 to 8000	average 8½	261	11 by 19	12½ by 26½
Bell & Zoller Mining Co	No. 2	6000	average nearly 11	310	12 by 21½	12½ by 22½
Valier Coal Co.	Valier	7000 to 8000	9½ to 12½	605	11 by 18½	13 by 30
American Coal Mining Co.	No. 2	7000	average 6½	248	12 by 20	12 by 18

The Kathleen mine is situated near the bottom of the monoclinal fold, commonly known as the DuQuoin anticline, which passes a little east of north across the eastern side of Perry County. The shaft of the Security mine on the west side of the fold is 90 ft. deep, while those of the Paradise and Majestic mines on the east side are respectively 365 and 409 ft. Heretofore operations on the steep part of the slope have been avoided, though there have been some small workings.

After considerable exploratory work, the Union Colliery Co. decided to develop a property so situated that about one-third of the coal will be taken from the plateau on the west side of the fold, where the depth is about 90 ft. about one-third from the slope of the fold,

and about one-third from the east side where the average depth is about 250 ft. With such a topography of the coal bed, the location of the shaft required thorough consideration. Since the coal east of the steepest part of the fold continues to dip slightly to the east, the only position of the shaft that would have allowed a general down-grade from west to east would have been on or near the east boundary of the plot. This, however, would have required the development of a one-sided mine and the surface conditions would have been unfavorable.

Study of conditions led to the location of the shaft as far down the slope of the monocline as the surface would permit. Development of the underground working has shown that the bottom of the monocline was not reached but that the steep grade, approximately 5 deg., extends for a short distance to the east of the shaft. The larger part of the coal will travel down-grade but some will have to be hauled up an adverse inclination. The grade on this monocline has been found to average from 5.2 to 5.3 per cent. but is not constant, appearing rather as a series of steps in which flatter and steeper parts alternate.

Car Movement Under Mechanical Control

It will be necessary to use mechanical means to control the movement of the cars approaching the shaft when uncoupled from the locomotive. The average thickness of all sections of the coal thus far made at the Kathleen mine is 8 ft. 3½ in., the thickest coal being on the eastern side of the monocline. It is not expected that much water will be encountered as the other mines in the vicinity have no trouble from this cause unless the roof is broken by the removal of coal. Little difficulty from gas has been experienced in the neighboring mines.

In the case of the Bell & Zoller mine No. 2, the No. 6 coal is reached a little south of the famous Zeigler mine, which was the first opened in Franklin County and the one in which the thickest coal is found. It is now thought that the coal in the No. 2 mine will not have as great an average thickness as that at Zeigler, where it is close to 11 ft. and where as much as 15 ft. is found in places and the average thickness taken out is about 8½ ft. The coal at the new mine will, however, be thicker than most of the other coal of Illinois and a thickness of 8½ ft. can be mined as at Zeigler. The depth at the Bell & Zoller mine No. 2 is 310 ft. and the dip to the north is indicated by a depth of 450 ft. at the Zeigler mine of the same company about 2 mi. north of No. 2.

At the Valier mine, the depth to the bottom of the coal in the main shaft is 605 ft., this being one of the deep mines in the state. The shaft was located with an idea of avoiding an unusually thick layer of water-bearing material. Success was attained in this respect but the topography of the coal bed at the shaft bottom was found to be somewhat rough and considerable grading will be necessary. The thickness of the coal is somewhat variable, ranging from 9 ft. 6 in. to 12 ft. 2 in. so far as known. It is expected that a thickness of 8½ ft. will be taken out in the rooms. The mine gives off considerable gas, as do all of the operations in this part of the district. Electric lamps are used exclusively.

The coal being developed at the American No. 2 is the No. 5 bed of the Indiana series. The coal varies considerably in thickness in different parts of the field, averaging about 6½ ft. at the No. 2 mine. The coal bed lies generally horizontal, but some trouble is experienced from local hills and swamps. The coal contains many impurities and is not well suited to domestic purposes; it is a most excellent steam fuel and for this purpose finds its most ready market. The No. 5 bed has little or no water and has an excellent roof, but gives off large quantities of methane.

The high yield of coal planned for these mines has necessitated the sinking of shafts not only large enough to accommodate the necessary hoisting but to transmit the large volumes of air required for ventilation when the mines become fully developed. At the Standard mine, the main shaft is 7 x 17 ft. inside and 317 ft. deep. The lining is 3 x 10 in. timber laid flat above the solid rock, and 3 x 5 in. timber laid flat through the rock, all nailed with heavy spikes. The lining inside the timber will be of reinforced concrete 17

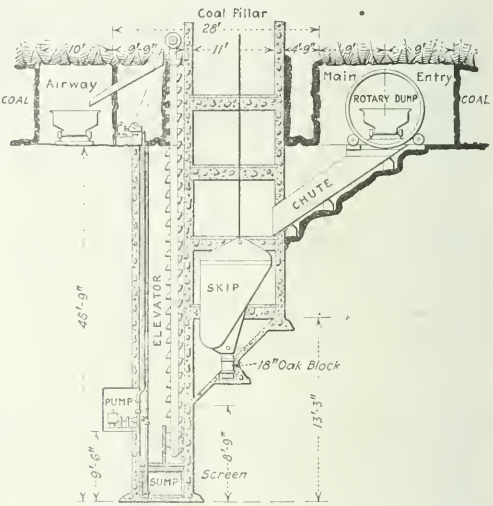


FIG. 2. ELEVATION OF SHAFT BOTTOM AT VALIER

in. thick from top to bottom. At all of the mines the concrete was mixed on the surface and lowered through pipes to the bottom, and in all cases, but one, the concreting was done from the bottom upward. At the Standard, the concrete was distributed from the bottom of a pipe to the periphery of the shaft through a flexible tubular chute similar to those used for handling grain, while at the Valier mine a rubber hose was employed. At the Kathleen mine the concrete was lowered through a 6-in. flanged-joint pipe and discharged into a metal telegraph, or baffle, to which was attached a flexible metallic elbow from which the concrete was carried to the forms through wooden chutes. At the Superior No. 4, wooden chutes, floored with metal under the pipe, were used for distributing the concrete.

Various kinds of shaft forms were used at these mines. Those at the Standard consisted of planks laid on edge and bound by corner pieces devised by the engineers for this work. The buntons are of concrete, poured in position as the lining was brought up. The forms for the lining at the Superior No. 4 were made of planks set on end and held by horizontal strips of 2 x 6-in. timber bolted together at the corners. A joint

in the middle of each timber permitted the form to fold in at the middle when the braces were removed. At the Kathleen mine, the forms were made of 2 x 8 shiplap fastened vertically to horizontal studdings held in place by a frame work of 3 x 3-in. angle irons bolted at the corners and braced by easily removable 4 x 4-in. buntons. Five or six sets of forms were kept in use, the lower sets being removed and used at the top after each pouring.

The air shaft of the Standard No. 2 is probably the largest shaft in cross-sectional area in the coal fields of the United States being 19 x 36 ft. outside dimensions at the surface and 14 x 31 ft. inside. It is also timbered in the same way as the main shaft and is lined in the same manner. This shaft has four compartments: air, stairway, main cage and counterweight.

The use of a counterweight cage in the airshaft has been adopted at two of the Illinois mines considered—Standard and Valier. In each case the main cage is large, that of the Standard being of sufficient size to accommodate a 15-ton locomotive without disassembling, and the one at Valier being of approximately the same size. In each of these cases the counterweight cage is small and has two decks; the number of men hoisted on the two cages will be the same. At the Valier mine 30 men will be hoisted per trip, while the main cage at Standard No. 2 will accommodate 45 men, allowing over 2 sq.ft. of area per man, though the number hoisted per trip will probably be less. In each case counterweight cars will be used on the small cage when heavy loads are handled on the main cage.

At the Superior No. 4, the main shaft is 313 ft. deep and is 11 x 21 ft. inside. The lining is of reinforced concrete 2½ ft. thick for 100 ft. and from 15 to 18 in. thick for the remainder of the distance. The buntons are 8-in. I-beams riveted to 30-ft. lengths of channel iron. These were fabricated on the surface and lowered into slots left in the lining to receive them, later being wedged into alinement and anchored with concrete. At this mine 65-lb. railroad rails are used for guides. The air shaft is 11 x 17 ft. inside with the same lining as the main shaft. This shaft has only two compartments, airway and stairway, separated by a solid 12-in. reinforced-concrete partition. No hoisting is done at the air shaft.

Stairway at Superior No. 4

The stairway at this shaft is different from any other in the state. The landings, of concrete reinforced with triangular wire mesh, were cast in place as the lining was cast. The stringers and treads, also of reinforced concrete, were cast on the surface and lowered into position; the stringers were put into place and the treads slipped into notches left for them. Both shafts were concreted in sections as the sinking progressed. At the bottom of the air shaft is a deflector of concrete so curved as to direct the air in both directions along the airway with the least eddying.

At the Kathleen mine, the main shaft is 261 ft. deep to the bottom of the coal and is 11 x 19 ft. 11 in. inside. The lining is of concrete approximately 1 ft. thick. The buntons are of 6-in., 23.8-lbs. H-beams set on 5-ft. centers. Guides are 85-lb. steel rails. The air shaft is 230 ft. deep, 12½ x 26½ ft. inside, and the lining like that of the main shaft is 12-in. reinforced concrete. The shaft is divided into four compartments—hoisting compartment 9 x 12½ ft., counterweight compartment 3 x 12½ ft., stairway compartment 4 x 12½ ft., and air compartment 8 x 12½ ft. The air compartment is separated from the remainder of the shaft by a 12-in. reinforced-concrete partition. In this mine only one cage is used, but this has two decks each of which will accommodate 25 men. The counterweight is of concrete with a scrap-iron aggregate. Both shafts were temporarily lined with 3 x 12-in pine curbing. The buntons in the air shaft are 9-in., 21-lb. I-beams. The hoisting capacity of the air shaft is about 800 tons of coal in eight hours.

Hoisting Shaft at Bell & Zoller No. 2

At the Bell & Zoller mine No. 2, the hoisting shaft is 12 by 21 ft. 8 in. inside. The lining is a wooden cribbing of 6 x 12-in. timber laid on the sides for a depth of 60 ft. and on edge for the remainder of the depth. The upper 60 ft. has a lining of 6 in. of reinforced concrete and the remainder has 2 in. of gunite with wire-mesh reinforcement. There are three rows of 6 x 12-in. wooden buntons with 8 x 10-in. yellow-pine guides. The air shaft is 12 ft. 2 in. by 22 ft. 10 in. and is divided into three compartments, a stairway 3 ft. 2 in. by 12 ft. 2 in., an air compartment 10 ft. 7 in. by 12 ft. 2 in. and a cage compartment 8 ft. 1 in. by 12 ft. 2 in. The partition between the air and hoisting compartments will consist of 6 in. of gunite and the buntons will be coated with gunite to make them fireproof in compliance with the Illinois law. The counterweight for the air-shaft cage runs on wire-rope guides in the air compartment.

At the Valier mine, the main shaft is 605 ft. deep to the bottom of the coal with a 52-ft. sump below this. The inside dimensions are 11 by 18 ft. 1 in. The lining down to the rock, a depth of 30 ft. is 24 in. of reinforced concrete and for the remainder of the way is from 12 to 15 in. thick. The reinforcing consists of ¾-in. bars set on 6-in. centers vertically and 1-ft. centers horizontally. The concrete mixture was 1 to 4. The buntons are reinforced concrete cast on the surface and lowered into place and there anchored with concrete. The air shaft is 13 x 30 ft. inside and has a lining similar to that of the main shaft. This shaft has four compartments—airway 9 ft. 9 in. by 13 ft., stairway 4 ft. 3 in. by 13 ft., cageway 8 ft. 4 in. by 13 ft., and counterweight compartment 4 ft. 4 in. by 13 ft. The air compartment is separated from the other compartments by 12 in. of reinforced concrete. The guides are 8 x 10 in. wood. The excavation for the air shaft amounted to 12,000 cubic yards.

The American No. 2 hoisting shaft is 12 x 20 ft. inside dimensions and is 248 ft. in depth. From the surface to the rock, a distance of 52 ft., it is lined with reinforced concrete, the balance of the distance with 4 x 10-in. yellow pine placed on edge. There are three rows of buntons; steel I-beams through the concrete, and below this 6 x 10 in. wood. The guides are 6 x 10-in. yellow pine. The air shaft is 12 x 18 ft. inside dimensions, with two compartments, air and cage. The counterweight for the cage runs in guides in the air compartment and is made up of sections or blocks of cast iron so designed that it may be made heavier or lighter by the addition or removal of these sections. The lining of the air shaft is similar to that of the hoisting shaft.

In the mines developed according to the common practice of the present day in this district, the output is limited, first, by the capacity of the shaft or tipple and, second, by the layout of the underground workings. Both of these features have been given careful atten-

tion in the new developments under consideration.

Two lines have been followed in the increase of the hoisting capacity of the shafts. In three of the mines considered, capacity is being increased by the use of large mine cars and of hoisting appliances adequate to handle these cars, whereby the number of hoists necessary for large output is decreased somewhat by increasing the amount of coal hoisted at each trip. In the case of the other mines the coal is hoisted in skips. As the skips hold about two mine-car loads of coal the hoisting speed can be reduced by about one-half.

Another considerable advantage of hoisting in skips is the fact that tight cars can be used. A large part of the troubles encountered in handling coal in cars arises from the end doors necessary when the car is hoisted in a self-dumping cage. Moreover, such cars are always more or less leaky and a considerable amount of coal is scattered along the haulage roads, where some of it is ground into dust, part of which is suspended in the air and part deposited on the ribs, adding considerably to the chance of explosion.

The principal advantage of hoisting in cars is that the product of each miner is kept separate from that of other workmen until it has reached the surface where it can be inspected for impurities. When coal is dumped from the mine cars into skips at the bottom of the shaft, this last advantage is sacrificed to the advantages of lower hoisting speed and a smaller number of hoists per minute. It is this advantage of hoisting in cars which has determined the retention of this system in the three prominent cases mentioned.

Still Pursue Old Method of Dumping Coal

At three of the mines, the Superior No. 4, the Bell & Zoller No. 2, and the American No. 2, the old method of hoisting coal in end-dump cars on self-dumping cages is followed, while at the other mines the coal is hoisted in skips. The No. 1, or Zeigler, mine of the Bell & Zoller Mining Co., is equipped with skips, but these were installed by the predecessors of the present operating company before this method of hoisting coal had reached its present development. This company has not adopted skips in the new mine.

Apparently there are no new developments as far as the use of cages is concerned, except in connection with the size of cars, which, at all three mines where cages are used, hold approximately 5 tons. No new arrangements were required at the shaft bottoms in connection with the three mines at which cages are employed, though all have been planned to make the rapid movement of cars easy. Where skips are used the main shaft is set at the side of the entry. In all cases the cars are handled in rotary dumps, the coal going into a chute from which it passes either directly into the skip or into a hopper. The former arrangement is used at the Kathleen and Valier mines, see Fig. 2. In each of these cases two cars are to be discharged simultanously and the trip is to be passed through the rotary dump without uncoupling. In each case the chute branches and coal is directed to the proper side by a vane.

At the Valier mine, all operations in connection with dumping and hoisting will be performed by one man at the bottom. The position of the vane in the chute and of the skips will be indicated by lights. The bottom man, observing which skip is at the bottom, will direct the vane into the proper position to discharge coal into the skip. These positions are indicated by the simultaneous lighting of two lamps in the same column. The rotary dump is then operated and the hoist started. The operation of the hoist is to be entirely automatic, only the starting being performed by the bottom man.

At the Standard No. 2, two rotary dumps are set side by side, see Fig. 3. From the cars, the coal goes into a hopper of, approximately, 40 tons capacity and cars can be dumped without regard to the position of the skip. In this case the cars are uncoupled and dumped singly. From this storage hopper the coal will go to a measuring hopper holding one skip load of about 12 tons, then into the skip, as soon as the latter arrives at the shaft bottom. As the empty skip descends, it

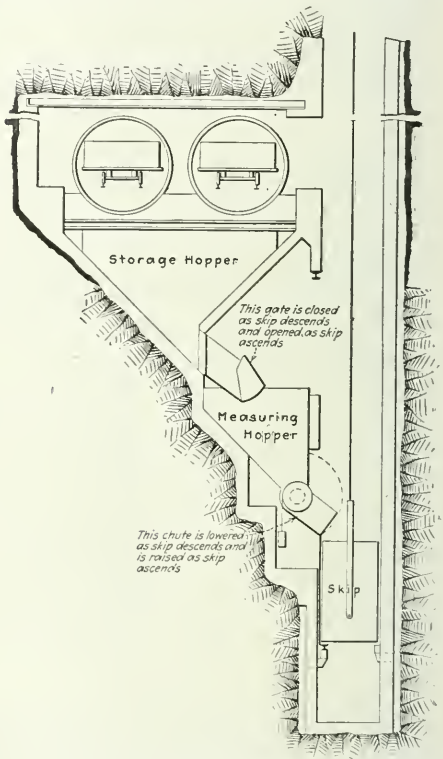

Storage Hopper
This gate is closed as skip descends and opened as skip ascends
Measuring Hopper
This chute is lowered as skip descends and is raised as skip ascends
Skip

FIG. 3. SHAFT BOTTOM DUMPING ARRANGEMENT, STANDARD OIL CO.

will close the discharge gate of the storage hopper and open that of the measuring hopper. As it ascends it will close the gate of the measuring hopper and open that of the storage hopper. The chute from the storage hopper is self-sealing, the gate being used only to prevent coal from passing into the measuring hopper during the loading of the skip. The amount discharged into this hopper can be somewhat varied by raising and lowering a dam in the upper part of the hopper, in this way changing the point at which the accumulation of coal seals the chute. The breakage resulting from this method of loading is not objectionable as all coal from this mine is to be crushed.

At the Kathleen and Valier mines the skips have curved bottoms, while at the Standard No. 2 the bottoms are square.

Various means have been adopted for cleaning the sumps. At the Valier mine an extra compartment is excavated at the side of the shaft to the depth of about 10 ft. below the shaft bottom. An elevator in this compartment will raise the spilled coal and load it into cars.

At the Standard No. 2, it is thought that the method of handling coal from the hoppers will largely prevent spillage into the sump and that little besides dust will accumulate. For the removal of this material a square box it fitted in the sump. When this is full it will be attached to the bottom of the skip and raised high enough to be dumped into one of the hoppers.

At the two Illinois mines at which coal is to be hoisted in cars, steam-hoisting engines will be employed, while an electric hoist will be used at the Indiana mine. These engines have cylinders 28 x 42 in. and an 8-ft. cylindrical drum. The hoisting equipments of these two mines are nearly the same, as are the depths of the shafts and the loads to be raised.

At the other three Illinois mines, electric hoists will be used. The load is about 9 tons at the Kathleen and Valier and about 12 tons at the Standard. The most important difference in conditions is the depth of the mines, the Valier shaft being 605 ft. deep, while the Standard No. 2 is 317 ft., and the Kathleen 261 ft. These depths are from the shaft collar to the bottom of the coal and approximately 100 ft. will be added in each case by the depth of sump and height to dump circle.

The air-shaft hoist at the Standard No. 2 will run at a rope speed of 600 ft. per minute and the main shaft hoist at 900 ft. per minute. The hoisting cycle at the main shaft will be 48 seconds and it is expected that the average amount of coal hoisted will be 20 tons per minute. At this mine, the hoists at both main and air shafts are geared machines operated by alternating-current slip-ring motors with liquid-rheostat control on the secondary. These motors will run on 2200-volt currents. The main-hoist motor is 900 hp. and the air-shaft motor 250 horsepower.

At the Valier mine, the maximum rope speed of the air-shaft hoist will be about 700 ft. per minute, and that of the main hoist about 1600 ft. per minute. The hoisting cycle at the main shaft will be 35 seconds for starting, accelerating, hoisting and stopping, and 8 seconds for loading.

The main hoist at the American No. 2 has a 7- to 10-ft. combined cylindrical and conical drum, directly connected to an 800-hp., 500-volt, direct-current motor that receives its energy from a flywheel motor-generator set operated by a 500-hp., 2200-volt motor, driving a 750-kw., 500-volt direct-current generator. It is expected to make four hoists per minute. In addition to the 800-hp., direct-current motor, the drum is connected at the opposite end through herring-bone gears and a clutch to a 350-hp., 2200-volt alternating-current motor, which will be used at night and on idle days to avoid the necessity of using the flywheel set for intermittent operation. The air-shaft hoist is driven through clutch and gear by a 250-hp., 2200-volt alternating-current motor at one end, and at the other by a double 10 x 12 geared steam engine. Should the electric power fail, it will be possible to operate the air-shaft hoist by steam in order to take the men out of the mine. The fan, which is ordinarily motor driven, is also equipped with an auxiliary steam engine to be used in case of failure in electric power. Steam for these auxiliaries and for heating the surface buildings will be furnished by a 150-hp. boiler.

At the Kathleen mine, the combined cylindrical and conical drum is driven through a Francke flexible coupling by a 600-kw., direct-current motor, with full voltage speed of 235 r.p.m. Current will be supplied to this hoist motor at 500-volt by a flywheel generator-set having a 500-hp. alternating-current induction motor, taking current at 2200-volts and running at 900 r.p.m. The direct-current 500-kw. generator is separately excited. The flywheel weighs 20,000 lb. This set is equipped with a speed-limit switch. The hoist is equipped with air-operated brake, a Royer & Zweibel over-winding device and mechanical slow-down. The air-shaft hoist is operated by a geared slip-ring induction motor operating on 2200-volt, 60-cycle, three-phase current and having Cutler-Hammer reversible magnetic control.

At the Valier mine, the main hoist will be driven by a direct-connected, direct-current motor of 1350 hp. A cylindrical drum is used, 9 ft. in diameter, and the full speed will be 55 r.p.m., giving a rope speed of approximately 1600 ft. per minute. Current will be supplied by a motor-generator set having an 1100-hp. motor and a generator capacity of 1000 kw. with voltage of 0 to 600. This set will run at 720 r.p.m. The flywheel weighs 33,000 lb. The air-shaft hoist will be operated by a geared alternating-current motor.

Legal Department

Unauthorized Use of Surface—A Pennsylvania deed to coal in place contains the following clause in favor of the grantee: "Together with all the necessary privileges, through and under the lands * * * for the opening, mining, airing, draining, and transporting to market of said coal hereby sold and conveyed, and also any other coal the said party of the second part now owns, or he, his heirs and assigns, may hereafter purchase or acquire; also the privilege of a road or right of way not exceeding 20 ft. in width from the main entrance to said coal hereby sold and conveyed. * * * Said party of the second part restricts himself to one opening on the surface on the south side of said farm for airing and draining." It is held by the Pennsylvania Supreme Court that this clause conferred no right on the grantee to use surface outside the area of underlying coal for the purpose of maintaining a coal chute or other structures (Horning vs. Kraus, 107 Atlantic Reporter, 695.)

Unsafe Condition Near Track—Where plaintiff was injured while in the employment of defendant mining company, running along the side of and spragging cars as they were let down grade to a tipple, through stumbling over an abrupt rise from an earth runway to a plank runway, defendant may be held liable in damages on the ground of negligent failure to furnish plaintiff with a reasonably safe place in which to work, if the risk involved therein was not appreciated by plaintiff, although the rise was plainly visible to him. (New Mexico Supreme Court, Leyba vs. Albuquerque & Cerrillos Coal Co., 182 Pacific Reporter, 860.)

Title to Coal in Transit—The consignee of a shipment of coal, or other commodity, is presumptively the owner thereof, so far as concerns right to hold the carrying railway company liable for negligent delay in transportation. Hence, where defendant was sued for demurrage charges accrued on delays in unloading cars, he was entitled to counterclaim damages arising from delay in delivering coal shipments which had been originally shipped to one from whom he bought them while they were in transit, the railway company having consented to the reconsignment. (Indiana Appellate Court, Cleveland, Cincinnati, Chicago & St. Louis Railway Co. vs. Partlow, 123 Northeastern Reporter, 838.)

Semi-Annual Meeting of the West Virginia Coal Mining Institute held at Huntington

By R. Dawson Hall
Managing Editor, Coal Age

SYNOPSIS—Despite the strike the institute held a well-attended and interesting meeting, good papers being presented. Storage-battery locomotives, mine drainage without, or with less, pumps, standardization of mine machinery, the coal-camp Sunday School and coal recovery were the principal subjects.

THERE was some fear that the West Virginia Coal Mining Institute would find its 24th semi-annual meeting a failure because of the strike, but the dislocation of industry only eliminated one class of men while it supplied another. The mine managers were somewhat generally absent. Their responsibilities kept them strictly at home. They were either busy or apprehensive of trouble. On the other hand, the engineers never had a less responsible time than they have now. Not much mining development is in progress, and as the mines are idle, there is no maintenance work to be done or mine maps to be extended. Probably it was for this reason that the meeting did not suffer grievously from the loss of the chief executives.

There were a number of state mine inspectors present. The institute has steered somewhat clear of late from controversial topics such as disturbed its earlier years, and when it has touched on them it has been only broadly and in a manner to offend only the supersentitive. As a result the attendance has been more general. In fact a general cussing-out of the mine worker may be a relief, but it can be done better at home among friends than in public. The introduction of what is frequently dubbed "politics" for many years made it difficult for mine inspectors to attend. Fortunately that is no longer the case.

THE MEETING WAS WELL ATTENDED

The meeting was held in the Frederick Hotel, Huntington, W. Va. about 100 persons being present. The address of welcome was ably made by R. L. Hutchinson, president of the Huntington Chamber of Commerce. He pronounced the only sentence against the mine worker occurring in the entire meeting when he said that the producer was hard pressed between the miner on the one side and the Senate on the other. The Senate of late has been somewhat sympathetic. If he had replaced the Senate by the Fuel Administration, the Railroad Administration or the President he would have been more nearly correct.

With a Fuel Administration which expects to put one sixth of the coal capacity of the country out of business and raises wages 14 per cent and leaves prices where they are, with a Railroad Administration that refuses to buy coal in July and commandeers it in November and cannot tell when it will pay for it and with a President who holds that the right to strike is inherent even with an organization so nearly national that it can by its strike cripple the nation's industries, surely it is not necessary to blame the present Senate for our woes, however much we may excoriate its predecessors.

Josiah Keeley was not present, so a vice president took his place. The gavel fell to J. R. Cameron, of Bluefield, W. Va. and he, after a few remarks on the future of the institute, called on H. B. Smith, assistant manager of the Crozer Coal and Coke Co., to read what proved to be a most complete and valuable address on "The Care of Storage-Battery Locomotives". To J. L. Dawson of the Ironton Storage Battery Locomotive Co., was assigned the duty of leading the discussion.

He recommends the modified constant-potential method for recharging storage batteries. He said that battery upkeep was not to be regarded as a depreciation charge. It was strictly a charge of maintenance, though he cited one case where in two years the only expense of operating the locomotives had been for current, lubricating oil and electrolyte.

Asked by Mr. Griffith whether any progress had been made for fitting the storage-battery locomotive for use on main haulages, he replied that nothing had been effected except in the direction of increasing the number of cells and providing means whereby the locomotive could be run at will either from the storage batteries or from a trolley wire. It was stated that one storage battery now entering its 24th month had for 15 months taken cars up a 14 per cent grade, 400 ft. long. One mining man said that he charged his locomotives in series by raising the charge on the more exhausted batteries till it reached the charge on those less exhausted.

SOLENOID USED WITH STORAGE BATTERY LOCOMOTIVES

H. B. Ingham, of Chateroy, W. Va., said that his company has seven storage-battery locomotives working on bad grades. He had provided these with trolley poles. They could not feed the batteries when these trips were on heavy grades, but they could charge them when the locomotives were waiting for car trips. He put in a solenoid that prevented the batteries from feeding into the line when a circuit breaker went out or when other locomotives or even mining machines drew too heavily on the line current.

J. K. Mahaffey of the Edison Storage Battery Co., in reply to a question of one of the members said that the space of ¾ of an inch always provided between the cells of a storage battery could not be filled with insulating material because it had to be left open for purposes of ventilation and cooling, nor could an insulating cover be placed over the cells for the same reason. It is true such a cover would most satisfactorily prevent sand from drifting in and short-circuiting the batteries and preclude the possibility that the motorman would drop a burr or some other conducting material where it would connect the cells, but any provision that interfered with ventilation would make injury to the cells sure while the present conditions make injury dependent solely on the improper care of the equipment. Some companies desiring to protect the cells from injury padlock the cover in place, and thus make it almost impossible for meddlers to injure the cells.

Loman Riggs, division engineer of the Consolidation Coal Co., then read a paper on "Elimination of Mine Pumps". He described many of the means used to make pumping necessary. R. Dawson Hall spoke at some length regarding the many expedients—tile, siphons and drilling to the limestone, among others. He declared that the joints of the tile should always be laid true and tight: If cement joints were not used, at least clay joints should be inserted. If the latter are chosen, enough wood, or pipe chips or other hard material should be used to keep

the pipes in true alignment, and the pipe should be surrounded by material of such a character as will keep the clay in place despite the water pressure.

He said that if a tile drain is laid in rock, with rock filling and the joints are left open the water is apt to pass through the joints and travel through the rock-filling around the pipe leaving the sediment in the pipe, thus clogging it up. Until the ditch in which the tile drain is laid succeeds in choking up with enough sediment to keep the water in the pipe, and until the pipe has been properly cleared of sediment, the passage of water will be slow and unsatisfactory and no water may pass through it at all.

The best way to get rid of sediment is to keep it in the water and that can frequently be done even where attempts are now being made to take it out at various manholes or traps. It is necessary however to see that water, and the material tending to settle, be compelled to travel along together.

COMBINED AIR CARRIED WITH SYPHON

Similarly a siphon must carry its combined air along with it even though, under the reduced pressure at the high point, the air desires to part company with the water. This is the crucial point in a siphon and not the discharge. If there is to be any reduction in diameter of pipe it should be here, for unless the water runs fast at that point it will leave air behind it, and the air will put a back pressure on the water in the ascending leg of the siphon. When a few bubbles of air can be seen rising in the water in the trough at the end of the down leg of a siphon the man in charge may feel confident that what entered the pipe in the mine is leaving it at the surface. Unless the pipe discharges all it receives, it cannot go on working very long.

Mr. Hall also stated that in Pennsylvania it was customary to drill down into the underlying limestone, from the coal or even the surface, using churn drills in the latter case, for the limestone usually has large crevices which make channels by which water may be discharged to the surface. In every limestone country it is noted that the limestone crops are sources of large discharges of calcareous water.

They drain the measures above them as well as themselves whenever a passageway, natural or artificial is provided from the measures above. While limestone is impervious, its solution creates in it wonderful natural channels of which the subterranean waters freely avail themselves.

Discussion vered to wood drains, and it was said that an old oak box covered with 2½ in. oak plank was found with bottom and sides in good condition and so impregnated with sulphate as to be cut with an axe only with difficulty. But the top which had been dry and wet by turns and had not been fully impregnated had rotted away and broken down. The top blank of a drain should be cut into lengths equal to the outside width of the drain and set crosswise instead of lengthwise, of the waterway. It can then be taken up where desired, and the drain cleaned out. Such sections as are injured can then easily be replaced.

In the afternoon session, the disposition to consider the subject of mechanical loaders was so strong that the discussion turned in that direction when a paper was read on "The Large Mine Versus the Small mine as a Standard of Operation" by E. L. Bailey, general superintendent, Solvay Collieries Co. H. B. Ingham declared that, by the use of the mechanical loader, 38 to 40 ft. of progress in headings had been made per shift with coal 7 to 10 ft. thick. The machine loaded 120 to 150 tons per day. The machine of the Lake Shore Engine Works, Marquette, Mich. loads three times as much per man shift as a human loader will put on the cars.

It requires three men to run it and does with that help as much as nine men. These men are a trimmer, a loader and a third man to supervise the work of the machine. In all there are 8 men in the entry, three men being employed on the cutting machine which has a cutter bar 7½ ft. long. A 10 ft. cutter bar was tried at one time but it did not give satisfaction in about two cases out of three because the coal did not all come down, and pot shots and hand picks had to be used to make up for the deficiency of the main shots, and that was a cause of much annoyance and delay.

The maximum tonnage mined in an entry in any one day has been 225 tons. Mr. Ingham added that he had never used the machine in pillaring work. It is working in only a 12 ft. roadway, but the large machine will clean a width of 20 ft. without a shift. He stated that the production was cut down to one half of the capacity of the shovel by the delay in the supply of cars. The machine has loaded as much as 3 tons in 1¼ min., but service of that kind is obviously not attainable in continuous practice. The rate for the short period of time was equal to 1152 tons per 8-hour shift.

In the discussion of the mechanical loader it was brought out that one loader has a 3-ton hopper which serves, at least in a degree, to permit the steady action of the shovel whether a car is in place at the rear end of the conveyor or is not. E. E. Jones, of Stotesbury, described his experience with a scraper loader which he had worked on faces varying from 30 ft. to 200 ft. He had the best results with a 60 ft. face. With seven men he had loaded from 75 to 150 tons per day in 30 in. of coal. The men were paid by the day with an allowance for the tonnage loaded or yardage cleaned up. Four acres had been mined, and the coal loaded by the scraper. There was a sandstone 60 ft. thick which gave a strong roof. Several times the places had fallen in and caused them to lose the face but the equipment was not destroyed in any case.

UNIQUE AMERICANIZATION METHODS

"The Coal-Camp Sunday School" was discussed by J. L. Dickerson, Kanawha Valley Bank, a man with a religious interest in Sunday Schools and a financial interest in coal mines, by J. O. Doolittle, the active superintendent of the Rural Department of State Sunday School Association and by W. A. Snow the general secretary of the same institution. Mr. Doolittle has an automobile with beds folding outward like a pullman car with a kitchenette, organ and typewriter and is making his rounds through the coal fields, organizing the constructive elements of the mining camps for law, order and good citizenship. He finds that the best results are obtained where he does not have to accept the hospitality of the people in the camp. They are less likely in that case to regard his mission as a mercenary one. His home on wheels enables him to go through the coal fields without being anyone's guest.

After the address an automobile ride through the beautiful city and suburbs of Huntington fully convinced the visitors that the Cabell County town was one of the best cities in the world to live in. It claims to have passed Wheeling and vaunts itself on being the metropolis of the state.

On Tuesday Dec. 2, in the absence of R. L. Kingsland, chief of the Power and Mechanical Department of the Consolidation Coal Co., E. D. Knight of the same department of the Cabin Creek Consolidated Coal Co. led the discussion. He said that he had been so impressed with the importance of standardization that he had arranged, in four locomotives of different makes, to have standard gears though he had to use some that were not listed in the catalogues. The change altered the gear ratios, it is true, but not in a way

that prevented the proper functioning of the locomotives. Thus one gear ratio should have been 69:14 and when he had changed it, it became 68:15. In some cases he somewhat increased the speed and accordingly lessened the draw bar pull, but that did not make any material difference to the operation or life of the locomotive.

J. R. Cameron said that he would be sorry to see 42-in. accepted as the sole standard for mine track gage as conditions were so varied. He wanted at least 36,42 and 48-in gages to be permitted.

Mr. Knight said that the American Mining Congress' standardization committee had recommended a 24 in. gage for metal mines and 36 and 48 in. for coal mines, 42 in. to be added if possible, to these three. Another speaker declared that the proposal was not final but only tentative. In his belief four gages were necessary but possibly four gages were also enough. No one wanted to introduce a universal mine gage, but every one desired to see an ending of the present chaotic condition in which the gages varied from one another by only ½ in. differentials. A 44-in. gage, he thought would have to be adopted because so many had their equipment built to accomodate it.

DISCUSSION ON COAL RECOVERY

Mechanical loaders could not be further discussed as James Elwood Jones, general manager of the Pocahontas Consolidated Collieries Co., who was to read a paper and E. Drennan, general manager of the West Virginia Coal and Coke Co., who was to discuss it were both absent, like most of the other general managers who usually put in an appearance at these meetings. "Recovery of Coal" was discussed by A. C. Callen, professor of mining of the West Virginia University.

He declared that subsidence and breakage were not synonymous terms—that the roof would sometimes bend and flow without breakage, and thus relieve the strains which excavation created in it. He referred to the interesting case of the Marquette Cement Co. versus the Oglesby Coal Co., near La. Salle, Ill. The first company had a limestone mine which from the evidence in court stood up well on its pillars until the Oglesby Coal Co's longwall workings began to approach the limestone mine from beneath.

L. E. Young, the University of Illinois authority on subsidence, set several bench marks and noted periodically the changes in level. As a result it was found that over the limestone mine before the longwall reached it the surface of the ground actually was raised by the stresses incident to subsidence over the extracted area.

W. J. Heatherman, chief inspector of the state of West Virginia, in his discussion urged that the upper unmined seams of West Virginia should be protected from the harm done by the excavation of lower seams of greater thickness. He felt that the upper seams, when of inferior value would never be mined first till legislation was passed compelling their earlier extraction.

One of the inspectors, Evan L. Griffith read a paper on extraction and he was followed by J. G. Vaughan, another inspector. Mr. Thomas declared that he had noted when two seams had been worked with 220 ft. of an interval between them and in the upper bed the recovery was between 85 and 90 per cent. Frank Haas, consulting engineer of the Consolidation Coal Co., was disposed to question whether it was the best plan to attack the upper seam first and leave the lower seam intact till the lower was worked out.

In the Meyersdale section, the Redstone was some 60 ft. above the Pittsburgh bed. The Redstone seam was 6 ft. thick and was mined first. When the time came to extract the Pittsburgh bed which was 9 ft. thick, it was found to have what might be termed a "floating top". It proved quite hard to handle and much coal was lost in the Pittsburgh seam, which was unfortunate as it was the thicker of the two as has been noted above. What was lost in the lower seam, would have made a seam as good as the Redstone.

In the Georges creek field, the "Big bed", or Pittsburgh, has been removed. The Sewickley Tyson, remains above it. It has been mined in many places and with little difficulty. Apparently the more complete the extraction in the Pittsburgh bed, the better the conditions of the Sewickley for recovery, though it was true there were spots in the Tyson where there was no possibility of recovery. He believed that, where there are 100 ft. of interval between upper and lower seams, the lower seam can well be mined first.

LONGWALL SYSTEM ADVOCATED

Mr. Haas said he did not believe that longwall had received a fair chance in the hands of the mining men of this country. He felt that it did offer distinct advantages and should not be condemned offhand, for it was his opinion that it took 10 years to properly test out any mining system. The Consolidation Coal Co., he said, spent hundreds of thousands of dollars trying out longwall and regarded its efforts as failures, nevertheless he believed the plan had merits and should find its way into West Virginia.

It must also be remembered that conditions in this country were different from those in Europe where glacial till covered the surface with loose gravels that rendered subsidence less abrupt and less surface-disturbing. It is not well to quote European experience as determinative of what would occur here.

In the Fairmont region the surface has broken most unmistakably over mine workings that are 700 ft. below. While shelly shale and shelly sandstone will break vertically; hard shale and hard sandstone will fracture at 45 deg., and the fracture may even follow an approximately level line. Several others discussed the subject instancing places where coal had been mined and good recoveries made when the lower of two coal seams was mined first.

The meeting decided that in future the dues should be $5 a year. The following were elected officers for the coming year: J. R. Cameron, president; R. E. Sherwood 1001 Kanawaha Bank Bldg., Charleston, W. Va., secretary-treasurer; R. F. Carson, J. W. Bischoff, W J. Heatherman, E. D. Knight and E. E. Jones, vice presidents; F. Haas, E. B. Day, K. F. Schoew and W. Paul, executive board members. With the close of the election the meeting adjourned.

The impurities permitted in coal shipped under the old "65 per cent. contract" are not to exceed the percentages given in the following statement:

	Per Cent. Slate, Rock, Etc.	Per Cent. Bone
Broken	1	2
Egg	2	2
Stove	4	3
Cheatnut	5 to 7*	5
Pea	10	†
Buckwheat	15	†
Rice	20	...

* Average shall not exceed 5 per cent. and maximum shall never exceed 7 per cent.

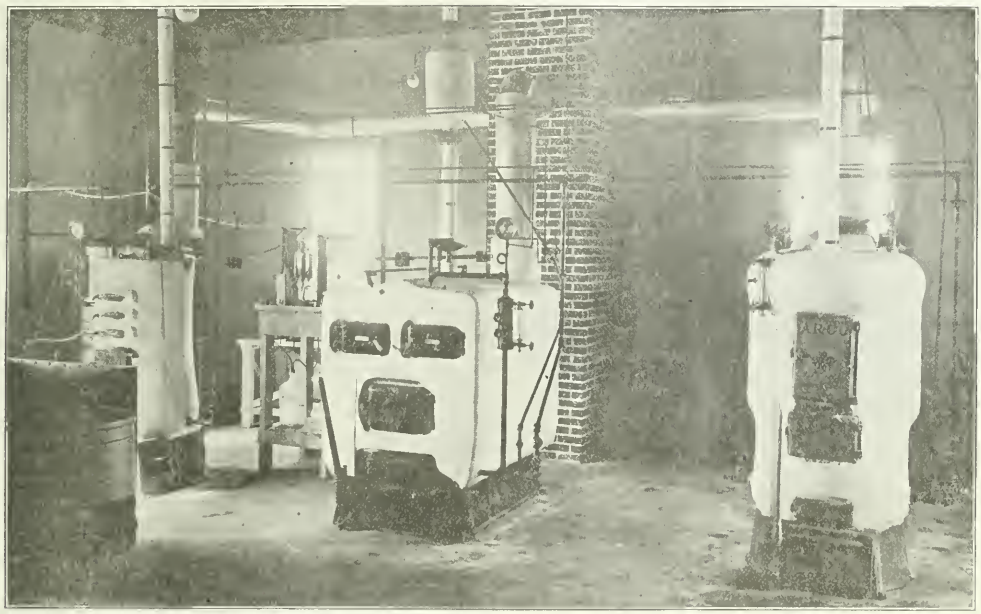
† Bone content shall not reduce price below average for these sizes.

The need of preparing for explosions is most evident to one who arrives at the scene of a disaster and finds a total absence of material, tools and equipment for quick recovery of the men entombed or for quick entry into the mine. Lack of such preparation no doubt has often resulted in unnecessary loss of life among the imprisoned miners, and also among the rescue force.—*Rescue and Recovery Operations in Mines.*

Future Developments in the Use of Fuel*

By H. Kreisinger†
Pittsburgh, Penn.

In the near future increasing quantities of low ash coal will be shipped to population centers to be used in by-product plants for making coke, gas, oil, and other useful products. Low ash coal is preferable for this purpose because it is desirable that the coke have a low percentage of ash. The large size of coke will be used for metallurgical purposes, the medium and the small sizes for heating purposes, and in small power plants located in the heart of the city where smoke is prohibited. The very small sizes and coke breeze will be burned on stokers in larger power plants.



VIEW OF THE INTERIOR OF MINNEAPOLIS, MINN., FUEL TESTING LABORATORY

The surplus gas from the by-product plant will be used in steadily increasing quantities for cooking, house heating and lighting. It will also continue to be used in certain industrial furnaces where it is desirable to have clean products of combustion.

The light oil recovered from coking soft coal will supply part of the ever-increasing demand for motor fuel. Already large quantities of this oil are used for that purpose. The heavier oil or coal tar will be used in the manufacture of a large number of drugs, dyes, explosives, paints, wood preservatives, road dressings, roofing and building papers and a great variety of other useful articles. The number of new articles made from coal tar will increase daily. Coal tar will also continue to be used in place of fuel oil for metallurgical purposes.

Another valuable product is ammonia. Its chief value lies in its nitrogen content. One of the most important uses of ammonia is in making artificial fertilizer. More fertilizer means more productive farms, which are especially desirable in the thickly populated industrial centers, where large quantities of food are needed. If the food is produced where it is used, transportation charges are eliminated, and thus the cost of food is materially reduced. Ammonia is also used in artificial ice making, cleaning, and in the manufacture of nitric acid. It has frequently been proposed to build large hydraulic power plants to generate cheap electricity and use the electricity to obtain nitrogen from the air. It seems, however, more logical to get the nitrogen direct from the coal by coking it in by-product recovery plants, instead of burning the coal in the raw state, discharging all its contained nitrogen into the atmosphere and then building expensive hydraulic plants to get back from the atmosphere part of the nitrogen wasted in burning the raw coal.

When one ton of soft coal having a market price of $7.00 per ton is coked in a by-product plant, the chief products obtained have the value shown in the following table:

0.65 ton of coke, worth	$ 6.00
5,000 cubic feet of gas, worth	5.00
3 gallons motor oil, worth	.75
9 gallons of tar, worth	.25
25 pounds of ammonia, worth	1.25
Total value of products	$13.25
Less cost of 1 ton of coal	$ 7.00
Increase of value	$ 6.25

The table shows that the products of the coking process have a market value about 90 per cent. greater than the original coal. This increased value is due mainly to the human labor expended in the coking process, because it takes

*Paper presented before the Coal Mining Institute of America, Pittsburgh, Penn., Dec. 3 and 4, 1919.

†Fuel Engineer, U. S. Bureau of Mines.

a great variety of labor to plan, build, and operate a by-product plant. The use of bituminous coal in by-product plants will develop in much the same way as the meat packing industry has developed. About thirty years ago a large amount of material from the slaughtered cattle was thrown away, and thus not only was wasted but became a nuisance by polluting streams and the atmosphere. At present everything from the slaughtered cattle is utilized, and the packing industries give employment to thousands of skilled and unskilled workmen and the meat packing centers are no longer a horror to the inhabitants of the surrounding country. In the past soft coal has been burned in its raw state in dwelling

INTERIOR OF MINNEAPOLIS STATION

houses and in many plants not equipped with furnaces that would give complete combustion.

A large part of the valuable substances in the coal escaped as black smoke and was not only wasted but polluted the atmosphere. In spite of the many efforts that were exerted to improve the furnaces in such small plants in order to obtain smokeless combustion, the smoke persisted. Man is now beginning to realize that the smoke from the chimney is a warning to him that he is not using the coal to the best advantage. Times will change; a large part of the soft coal output of the country will be sent through the by-product plant and substances that were previously wasted as smoke will be turned into valuable products, and at the same time smokeless fuels, coke, and gas made available for efficient burning in almost any kind of furnace.

Use of Bituminous Coal in Large Power Plants

Most of the coals higher in ash will be used in large power plants, which will be equipped with mechanical stokers for burning the coal sufficiently. The stokers will be of such design that they will automatically remove the ashes from the furnace. These plants will also have mechanical equipment for handling the coal from the railroad car or boat, as the case may be, to the furnace.

Mechanical equipment will also be used to remove the refuse from the ashpits. The tendency will be to locate these large plants near the coal mine so as to reduce the freight on the coal to a minimum. The power generated in these plants will be transmitted in the form of electrical energy over power lines to places where the power will be used. Whether a plant will be located near a coal mine and the energy transmitted by wires, or the plant located where the power is needed and coal freighted to it from the mine over rail or by water, will depend on the local conditions. In all cases a careful study of the cost of power must be made before it can be decided where the plant should be located.

The increased overhead charges due to transmission lines must be justified by the saving on the freight of the coal and possibly the lower price of the coal due to its higher ash content. Under present-day conditions the margin in which the engineer has to work is not very large. This margin is illustrated in the following diagram, showing in a general way the distribution of operating revenue received by a large central station:

Fixed Charges	50 per cent	
		Interest on Investment (Dividends)
		Sinking Fund
		Taxes
		Insurance
General Expenses	20 per cent	
		Salaries of general officers
		Advertising
		Rentals, etc.
Operating Expenses	30 per cent	
		Coal 50 per cent
		Oils
		Maintenance
		Salaries of Engineers
		Firemen, Labor, Etc.

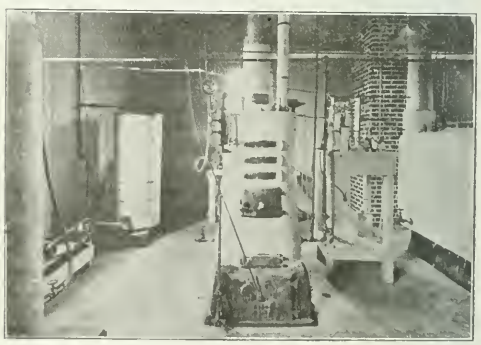
The items in this diagram are given in round figures and are intended to illustrate the principles which guide the engineer in his decision to determine the location of a plant.

The diagram shows that half the revenue goes to pay the fixed charges consisting of interest on investment, sinking fund, taxes, insurance, etc. Twenty per cent. of the revenue goes for general expenses, consisting of salaries of the general offices, advertising, rentals, etc.; and only 30 per cent. of the revenue is spent for operating expenses. Of these operating expenses only about one-fifth is spent for coal; that is, only 6 per cent. of the total operating revenue received by the central station goes to pay for the coal. This figure can be verified in another way. A modern central station uses approximately 1½ pounds of coal per kilowatt hour.

Assuming the price of coal at the station to be $5.00 per ton, the cost of coal per k. w. hour is then

$$\frac{500}{2000} \times 1\tfrac{1}{2} = 0.375 \text{ cents per k. w. hour.}$$

If the average selling price is 6¼ cents per k. w. hour, the coal at the price quoted then constitutes six per cent. of the revenue received by the company. Transmitting power over a long-distance line would increase the fixed charges. In any



FUEL TESTING LABORATORY AT MINNEAPOLIS

good business proposition the increase in the fixed charges must be justified by a reduction in the cost of fuel. However, in the average large power station the cost of fuel is only about six per cent., it is apparent that the increase in the fixed charges due to the installation of transmission lines

must come within the six per cent. cost of fuel. By locating the power plant near the mine the saving in the cost of fuel will largely consist of saving the freight, which, in the average case, constitutes about two-thirds of the fuel bill. It is therefore sound to count on saving only 4 per cent. from the operating expenses and adding it to the fixed charges.

The hydraulic plant is an extreme case of high fixed charge cost and low operating cost. In that case the cost of fuel is zero, but the fixed charge is so large that only a few hydraulic plants can compete successfully with a steam plant. In order to obtain the power at a low cost, industries wishing to use large quantities of it, instead of transmitting it any great distance from the hydraulic plant, establish themselves near the plant in order to save the cost of transmission. It is probable that similar conditions will develop with the steam plants.

In order to reduce the cost of fuel, the steam plant will move close to the mine, or some other supply of fuel; again, to reduce the fixed charges due to long transmission lines, the industry will move to the plant. It is the high fixed charges that make it difficult for hydraulic plants to compete with steam plants, and it is a well-known fact that the average dividends paid by the hydraulic plant are considerably smaller than those paid by the steam plant.

Powdered Coal and Mechanical Stokers

The near future will see a lively competition between powdered coal and mechanical stokers. Both methods of burning coal have many advocates. It seems, however, that the stoker has a better start over powdered coal. It is doubtful if either of the two methods will completely replace the other. The mechanical stoker has its field as well as the powdered coal. It seems that the mechanical stoker will perhaps retain its advantages in the power plant, whereas the powdered coal will have its advantages in other industrial fields, such as burning cement, in metallurgical furnaces, ore roasting, and in other furnaces where the presence of slag in the products of combustion will not have a bad effect on the substance to be heated.

In certain localities it may be advantageous to burn powdered coal under steam boilers. There may also be certain kinds of coal which are better adapted to burning in powdered form than in mechanical stokers. It is difficult to give a general rule that will determine the conditions under which powdered coal will give better results than a stoker-fired furnace.

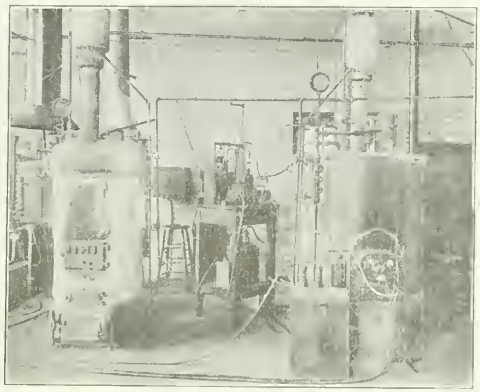
Quite likely each method of burning coal will keep on developing, side by side. When the electrical telegraph was invented it was thought that the telegraph would supplant the mail in carrying messages, but no such thing happened. Both the telegraph and the postal system kept on developing, each taking care of a certain class of business. Again when the long-distance telephone was invented, it was thought that the telephone would supplant the telegraph, but it did not. As the business for the long-distance telephone increased the business for the telegraph increased at the same time. In a similar manner the application of stokers and powdered coal to different classes of furnaces will keep on developing side by side.

Colloidal Fuel

Within the last year and a half the attention of the fuel engineers has been called to a new kind of fuel called colloidal fuel. This fuel consists of a mixture of powdered coal and fuel oil. The making of this colloidal fuel consists of a certain process which keeps the powdered coal in suspension in the oil so that the coal does not settle to the bottom of a tank supplying the furnace with fuel. Numerous demonstration tests were made, which showed that there is a possibility of using such fuel successfully. However, the writer does not know of any test on a large practical scale showing that success with this fuel has been already attained and it is therefore difficult to foretell what may possibly happen in the future along this line. The main advantage of the colloidal fuel seems to lie in the fact that the process would increase the effective supply of the available fuel oil by 40 to 50 per cent. Colloidal fuel appears to have the same advantage in burning as the fuel oil alone.

Electrification of Railroads

The electrification of railroads is hardly a subject for discussion by a fuel engineer. Many investigations have been made along this line by competent men. On the whole, the conclusion reached by these investigations seems to favor the steam railways as far as economy is concerned. It seems that if any electrification takes place within the near future it will not be so much from the standpoint of economy but more from the standpoint of cleanliness and convenience, as well as comfort of the passengers. More of the electrification that we are likely to see within the next few years will be around the terminals of large cities. It will be done largely with the object of eliminating smoke and cinders from the atmosphere. If there was any considerable saving in the electrification of railroads, surely the railroads are the most competent to see it, and they would make the necessary changes to increase their dividends. So far, however, the



FUEL LABORATORY AT U. S. BUREAU OF MINES

railroads always look with disfavor on any pressure by the public to bring about electrification. In some of the large cities the railroads meet the objections of the public to smoke from locomotives by burning coke in switch engines.

Another very promising solution of the smoke problem is the application to locomotives of properly designed mechanical stokers. The powdered coal also offers the possibility of solving the locomotive smoke problem, although the fact that in burning powdered coal a large part of the ash is discharged with the products of combusion, may meet with serious objections. There are, however, certain locations where electrification will show economy. These are the parts of the country where good locomotive fuel is scarce and hydraulic power available close at hand.

Carbo Coal or Coke as Fuel

Carbo coal is prepared from bituminous coal by driving out the volatile matter at a lower temperature than is done either in the gas retort or in the by-product plant. The yield of the carbo coal is somewhat higher than the yield of coke made from the same coal. Because of this fact the percentage of ash in the carbo coal is lower than it is in the coke. The carbo coal burns without smoke and ignites somewhat more readily than coke. It is therefore an excellent fuel for heating houses, cooking, for smaller plants, and in furnaces where clean, sootless fire is demanded. In making carbo coal, light oils and gas are obtained as by-products, although generally not in such large quantities as in the by-product coke oven.

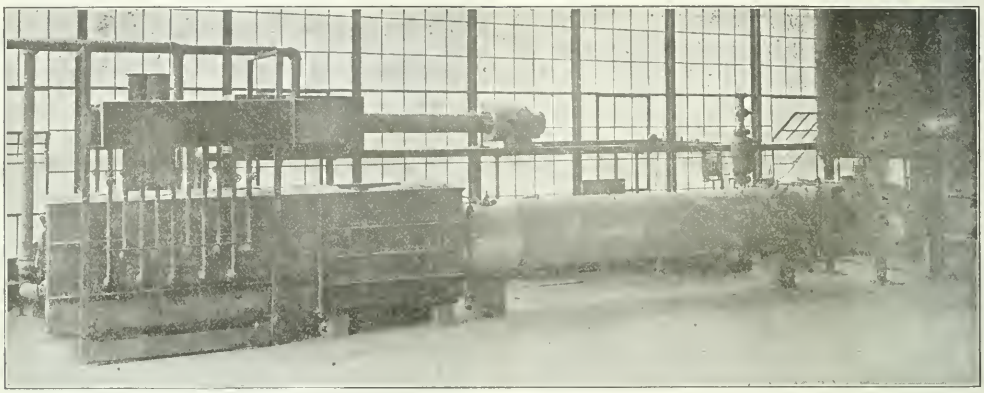
The preparation of carbo coal will therefore develop in localities where there is a large demand for solid smokeless fuel and only a small demand for gas and oil. It is likely that the manufacture of carbo coal will develop along with the by-product plant, each being chosen on account of the existing local economic conditions.

Better Combustion

The ideal of good combustion is to burn all the combustible ingredients in the fuel with no excess of air in a furnace of practical dimensions. All devices for burning any kind of fuel strive to come as near to this ideal as possible. Excess of air used in combustion wastes heat because the extra air has to be heated to the temperature of the gases discharged from the apparatus in which the fuel is used. Incomplete combustion wastes heat because part of the combustible ingredients in the fuel escape from the apparatus unburned. Usually, when the excess of air is reduced incomplete combustion comes into play, and if the reduction of the excess of air is carried to extremes, that which is saved by reducing the excess air is lost by incomplete combustion.

The more perfect the fuel-burning device the smaller can be the excess of air without causing incomplete combustion. Thus, in hand-fired furnaces it is difficult to obtain nearly complete combustion with less than 50 to 60 per cent. excess of air. A well-designed stoker will operate with 20 per cent. excess of air and still obtain nearly complete combustion. With a well-designed oil burner and furnace, the excess can be reduced to 15 or even 10 per cent. and at the same time lose very little by incomplete combustion. Powdered coal has been burned nearly completely with the excess of air reduced to 10 per cent.

Low excess of air and complete combustion are accomplished by high furnace temperatures which is hard on the furnace lining. Therefore, with the strife for complete combustion with low excess of air will go the demand for high grade fire brick that will stand the high temperatures and the slagging action of the coal ash. In a boiler furnace the effect of the high temperatures will be combatted by exposing much of the boiler's heating surface to radiation from the fire and thus keeping the furnace temperature low. This is a departure from the practice of several years ago, when every effort was made to obtain high furnace temperature, which was believed necessary for complete combustion.



COMBUSTION CHAMBER OF HEAT, TRANSMISSION APPARATUS AT PITTSBURGH STATION

Efficient Low Cost Coal-Barge Loading

A spur of the Monongahela River R. R. runs back from the river as far as the Lambert Mine of the H. C. Frick Coke Co. Another spur extends to Edenborn, Lecrone, and other mines of the same company. These are all railroad mines, and load their coal into railroad cars, which are hauled out to the river at Adah Siding, where they are dumped into river barges, and towed to Clairton, Penn.

The company saves about $9 a car by making the change from the railroad to the river haul, for a portion of the distance to Clairton. The Monongahela railroad delivers the loads at the siding, and takes the empties away from it. The Frick company handles the cars at the siding, using its own locomotive.

One side track is built out over the river. It is loop shaped, both ends of the track being connected to the river bank. The foundations are cofferdams filled with rock and cement. Sawed timber uprights support a steel-beam frame work, which serves as the floor of the siding, and the support for the track. The timber uprights are set in two parallel rows, one being on the edge of the river bank, and the other out in the river. The distance between the two rows is sufficient to allow the widest barges to float between them easily.

The steel-beam frame resting on these uprights is high enough above the barges to allow plenty of head room. The railroad track is high on the river bank at this point, and a slight incline to the siding gives it plenty of elevation. Two hoppers, with chutes, are placed between the rails so that two cars may be dumped at one time. The locomotive hauls the cars out over the barges on the river, the bottom of the cars are opened, and the coal allowed to flow through the hoppers and chutes into the barges.

A steam dinkey engine is placed on the siding over the river for moving the barges about under the track. This engine carries cables on two drums. These cables are carried over suitable sheaves to each end of the dumping siding, and down under it to the barges, a cable being fastened to the end of each barge.

The barges are loaded in three layers, or installments. A layer of coal is dumped into it as it is moved down stream, another as the dinkey engine with its cables pulls it back up stream, and a third layer as it is again drawn down stream, and out from under the loading chutes to make room for another barge.

The Labor Problem in the Coal Mining Industry*

BY CHARLES L. FAY
Cumberland, M. D.

THE labor problem in coal mining is receiving more constructive thought now than at any time heretofore. Many plans are or have been offered to solve the labor problem. The problem, however, is too deep seated to respond to a "cure-all" method of treatment, and the time has come when both employer and employee must study economics. Leaders seeking to weather the industrial storms, some through fear, others through interest, are laying aside prejudices, preconceived ideas and foolish notions, and are giving the best they have in them to meet fairly and successfully the problem now facing them. What is true of the labor problem in coal mining is true of the labor problem in all industries. In fact, it does not stop there. We of the mining industry are not in a class by ourselves.

Confining ourselves to the matter of employer and employee in the mining industry, however, what are the needs of the employer? We would answer that by asking what does the employer want? And to that query of what the employees need, we would answer by asking the question what do the employees want?

PRIMARY CONSIDERATIONS ARE INVOLVED

We will say that these questions are answered as follows: The employer wants: Peaceful industrial relations insuring the minimum of labor turnover; maximum of quality production; maximum of efficiency from plant operation without undue strain upon labor.

The employee wants: Assurance of regular work and income; the fear of dependency removed; management methods which guarantee representation, fair dealing and square treatment, and which provides means for self-development and expression for himself and family; opportunity to secur the maximum financial return for his labor.

The progressive employer of today endeavors to secure what he wants by answering the questions of the employees, and this answer, broadly speaking, may be made by installing policies of scientific management and by the development of industrial good will. The management will use every means available to provide regular work, and when business is dull the work will be distributed so that as nearly as possible all the men get their fair share.

The fear of dependency will be removed by installing in addition to state compensation insurance what is known as group life insurance, which tides the dependents of deceased employees over a period of time that enables them to readjust themselves so as to be able to make their own way.

HEALTH INSURANCE SUGGESTED

Health insurance through relief funds or otherwise can be operated so as to provide means of support to employees when sick, but so organized as not to put a premium on absenteeism.

Profit sharing appears to possess constructive values, one of which might be that of further contributing to means for the employee to provide against dependency in his old age.

The bringing about of this "security" sense in the consciousness of the employee results in "good will." In other words, the employer is selling good will to the employee, which means for the employee less labor turnover.

In answering the desire of the employee for security in regular work and income and the removal of fears of dependency, the employee answers the employer's desire for a minimum labor turnover by "staying put."

In the matter of management methods which guarantee to the employee representation, fair dealings and square treatment and which provides means for self-development and expression for himself and his family, the management faces an intricate problem.

The chief executives must take the initiative in installing representation plans, industrial relationship methods, and improvement mediums. The problem is intricate and its bonds complex. After a plan has been decided on, it becomes a matter of educational promotion. First of all, the official organization of the company must be educated, and the first objection met with is the fear of various subordinate officials that "these new ideas of the big boss" will take away their authority, and what's the use of being a boss if you lose your "authority"?

DEMOCRATIC METHODS ENCOURAGED

The next objection you run up against is that "I'm worked hard enough now and this highbrow plan will keep me going day and night." Yes, it would seem that scientific management and industrial good will require more effort on the part of company officials. They do, as they cause them actually to do that which they should have done before. It is the difference between autocratic control and democratic direction. The autocratic method commands, the democratic method confers. Instead of autocratic commands, matters are discussed at conferences with employees, investigations are made, and the results are followed up and reported to those having general supervisory responsibility for the successful operations of the plans. Often it will be found that the subordinate officials are not honestly carrying out the spirit of the plan, but the education of officials and bosses is finally on the way to completion, and in spite of their previous objections they now see wherein these plans are good for them. They learn that there is a bigger field for their efforts than in autocratic and unintelligent domination—a new opportunity open before them. They find that they are more necessary, more important than before, and that they are rendering a valuable social service that transcends petty authority. They realize that they are the keystone of the arch of industrial good will.

No less arduous is the establishment and conduct of an educational propaganda among the employees. It requires a definite policy adapted to their needs. It requires patience—patience on the part of all officials and bosses, as they are now to be teachers. Not only patience is required, but reasonableness and good horse sense.

A few leaders among the employees become awakened to the new plan and its opportunities, and then they become teachers of the new methods and salesmen of industrial good will.

SUSPICIONS ARE AROUSED

At first employees are suspicious, and believe the company "has a knife up its sleeve." And why not? After many years under autocratic domination, of political subterfuges and the general "bunk" that has in too many cases been handed to them, why should they not think these new plans but "another scheme of the company" to "do" them? And so it takes time along lines and by methods that have been proved by practice to be successful, to educate them to know all the ins and outs, the reason for and the benefits of the plan itself.

And right here we may say subterfuges will not succeed. Tricks won't work, schemes fall down, "bunk" is useless. Unless as an employer you are ready to go into scientific management and industrial good will, honestly straight from the

*Paper presented before the Coal Mining Institute of America. Pittsburgh, Penn., Dec. 3 and 4, 1919.

shoulder, all open and aboveboard, leave it alone, for using it as a cloak to "pull something over" on your employees will only widen the present wide gap.

The modern methods of management are not just "glad-hand" methods; they go deeper. They go to the roots of industrial unrest and uncertainty.

Speaking of the "glad-hand" idea, an employer noticed that the stables boss had marked the name of each mule over the peg on which its harness hung, so that each mule should always have the right harness. This gave the employer an idea. He had brass name-plates struck off and had them placed on the machines in the shop. Each plate bearing the name of the man who operated the machine. Then he would go through the shop and speak to each man by name. Knowing the names of your men is good, but "bunk" won't go. One day a visitor asked one of the men what the name-plate on his machine signified. The workman replied: "Well, you know the boss saw how Bill tabs the harness pegs of the mules, and I guess he rates us about the same as mules."

"Hello, Bill!" glad-hand stuff won't go unless the heart is back of the hand. Men *think*, and they don't want patronage, and can readily detect the counterfeit of good will and genuine interest.

Employees do not want paternalism; they want democracy. But in that democracy employees do not desire to be separated from the employers. They want a democracy that is broad enough to comprehend employer and employee co-operating together for their mutual good, a true, democratic partnership.

POLICY OF SEGREGATION IS FALSE

In times past many well-meaning employers have believed that the employees wanted to segregate themselves from the employer, and such employers have urged that point in dealing with employees, and, in fact, employees were sometimes led by policies which destroyed the chance of the same true partnership arising, but all the while there was in the consciousness of the average employee an inherent desire for that partnership. Because of his training and the mistaken attitude of the emloyer, however, he set aside his innermost desire as being outside the realm of realization.

One of the big jobs of the employer today is to get down to fundamentals and not be controlled completely by the apparent, and consequently he must have a true concept of the subjective as well as the objective state of mind of the employee.

So, when installing conference, council and committee organization machinery to handle representation, industrial relationship, living and working conditions, mediums for recreation, means for betterment of health, general safety, individual improvement or development and opportunities for self-expression, it must be predicated upon the basic principle of human rights and formulated so that employer and employee have the means of meeting upon a common platform, while the various committees and medlums are so constituted as to breathe forth the reality of individual democracy.

As Mr. R. B. Wolf, formerly manager of the Spanish River Pulp and Paper Mill, Limited, says: "We are confronted with the problems of correcting the repressive or selfish character of civilization so that it will serve the mass of humanity," and again: "We must learn to change the industrial environment from one that repels to one which attracts. In other words, the incentive to work must be inherent in the nature of the work itself." It is, then, the putting of a soul into business —into industry, into a corporation. In other words, during the great mechanical and engineering strides of big business, the human element was looked upon as negligible and the result was normal or spiritual bankruptcy, hence the problems we now face. The job now is to readjust so that the human element has its rightful place in industry.

The employee wants opportunity to secure the maximum financial return for his labor. He wants the maximum rightful wage, but he wants democracy with it. Profit-sharing will more and more receive the careful attention of progressive employers. But while considering these things, we must more and more look into the working conditions themselves for the answer. The work must be handled so as to attract the workman, whether salaried man or wage-earner.

C. M. Schwab says: "If managers of industry can develop some universal plan which will make labor not only well paid but happy in doing the work itself, one of the greatest possible boons to mankind will have been realized." Thomas A. Edison tells us that "Problems in human engineering will receive during the coming years the same genius and attention which the nineteenth century gave to more material forms of engineering." We have laid a good foundation for industrial prosperity. Now we want to insure the happiness and growth of the workers through vocational education and vocational guidance and wisely managed employment departments. A great field for industrial experimentation and statesmanship is opening. George H. Shepard says: "If an employer buys labor merely as a commodity, with no more feeling than he buys coal, he can expect to get just as much loyalty from his workers as he would from a coal pile with a few sticks of dynamite scattered through it."

DETAILS OF PLAN NOT OUTLINED

We will not attempt to outline in this paper the details of plans and procedure for the installation and application of the methods suggested herein. An inherent value of these plans, however, is the fact that the education of employers and employees in this application and practice is never finished. It's an unfoldment, allowing for originality. It's a progressive revelation responding to human interests, as the testimony of both employers and employees who have tried it out shows.

Representation and good will through scientific management then answers the questions of the employer and employee. And when honestly and intelligently applied it provides the industrial democracy which meets the needs of both employer and employee, and relates properly to the general public. It's a true partnership. It opens a constant source of research, pleasure and information. It puts a soul into business and industry. It's human.

Black Damp

Carbon dioxide is generally called black damp by mining men. Strictly speaking, however, black damp, as Haldane, an English chemist, first pointed out, is a mixture of nitrogen and carbon dioxide. As stated before, when outside air enters a coal mine it undergoes certain changes. Among others, some oxygen is absorbed and some carbon dioxide is given off by the coal. When oxygen is taken away from the air of a room, the "air" left in the room, of course, contains a smaller percentage of oxygen and more nitrogen than ordinary air. A mixture of this excess of nitrogen with the carbon dioxide that comes from the coal constitutes black damp. Although carbon dioxide sometimes may be largely responsible for the effects produced by black damp mixtures, yet, as regards the effect of black damp on lights, it is the lack of oxygen, not the presence of carbon dioxide, that makes a light go out. Average black damp contains 10 to 15 per cent. carbon dioxide and 85 to 95 per cent. nitrogen; the proportion of carbon dioxide is seldom more than 20 per cent., or less than 5 per cent.—*Bureau of Mines, Miners' Circular No.* 14.

Coal now is being mined at the Eska and Chickaloon mines in Alaska at the rate of nearly 900 tons weekly. The Navy has not yet undertaken the mining of coal in the Matanuska field for which Congress appropriated $1,000,000.

Henry Clay Frick

AN OBITUARY

HENRY CLAY FRICK, organizer of the corporation of Frick & Co., now knowu as the H. C. Frick Coke Co., operating some 50,000 acres of coal lands and 15,000 coke ovens, with a daily capacity of nearly 35,000 tons, died at 5:15 a. m. on Dec. 2 at his New York residence. The financier, who had suffered from an attack of ptomaine poisoning in the early part of last month, but had practically recovered, succumbed finally to another and more serious illness.

With simple ceremony, he was buried in Pittsburgh on Dec. 5, in the same plot where lie the bodies of his two little daughters, whose death is said to have greatly saddened Mr. Frick's life. The body was escorted by a number of prominent men, the honorary pallbearers being United States Senator Philader C. Knox Andrew W. Mellon, Henry C. McEldowney, R. B Mellon, William Watson Smith, Asa P. Childs, Jr., Judge Joseph Buffington of Pittsburgh, and John P. Grier of New York.

The life story of Henry Clay Frick reads like another of those romances of business for which America has been notable. Between the boy born on a little farm, of hardworking, thrifty parents, meagerly possessed of this world's goods, and the man who a year ago could pay an income tax of $7,160,000, lay a span of seventy years of astonishingly successful commercial effort.

Mr. Frick was born near West Overton, Penn. on Dec. 1, 1849. His grandfather, Abraham Overholt, was a miller and distiller and the founder of what has since become one of the famous whiskey distilling houses. As a boy he disliked farming and was eager to go into business so his grandfather put him to work in his distillery as a bookkeeper. He was a pretty good bookkeeper, but that was not his idea of business. He left his grandfather's firm and went to work for Morgan & Co., coke dealers, in a rather small way. They sent him to Pittsburgh as their agent, and that was the beginning of young Frick's real career, he being then in the early twenties.

His imagination, as applied to the coke business, being more robust than that of any one in the Morgan & Co. firm, he managed to acquire a small interest in a coke plant. He saved his money and invested his savings in other coke holdings. His small fortune grew perceptibly, and he expended some of it in the building of a railroad to penetrate the Connellsville coke region. Then he started in business for himself and organized the corporation of Frick & Co.

The coke industry became intimately connected with the steel industry, and the great Pittsburgh steel manufacturers had to take cognizance of Mr. Frick. In 1882 the Carnegies took him into the Carnegie Steel Co. in the management of which he became active.

During the Homestead riots in 1892, Mr. Frick was singled out for attack by Alexander Berkman, the anarchist, and was shot twice and then stabbed three times. But thirteen days later Mr. Frick was able to get about and resume his duties in his several companies, and much to the astonishment of the world at large a pardon for Berkman was requested by Mr. Frick himself.

The loss of Mr. Frick was felt greatly, not only by men such as Judge Gary of the United States Steel Corporation, and other men who figure prominently in the coke and steel industry, but also by the employees of his plants, whose welfare had been greatly aided by the deceased financier.

Effective Use of the Cement Gun

BY DONALD J. BAKER
Pittsburgh, Penn.

THOUSANDS of dollars are being saved annually to the coal industry through the application of a cement covering to the ribs and roofs of mine entries. The majority of the "falls" that occur in entries are due to the reactions of the everchanging air on the shale, slate or superimposed rock, which causes a rapid disintegration with resultant "dropping." As a result of the roof being in this condition, timbering is necessary, and eventually retimbering. Naturally, this results in the enlargement of the entry with each successive timbering step.

The method of handling the disintegration of the roof and rib by timbering is not only expensive, but it furnishes food for the flames in the event of a fire. Furthermore, timbering makes no appreciable headway against the disintegrating process, it being at best but the means of guarding against a "fall." Quite often the best roof support is the original overhead arch of a firm slate or shale, which will eventually become decomposed.

FIG. 1. ENTRANCE TO SPRINGFIELD MINE

In keeping the original top in a perfect state of preservation, the cement gun has found successful application. The worst feature of the roof decomposition is the cracks that form in the strata, as through these the air circulates, thus paving the way for a larger "fall" at some later date, with its consequent endangering of life or the temporary crippling of the haulage system at some important point. By applying a cement covering to the roof and rib the air is excluded from contact with the coal and disintegration is completely arrested. However, applying a cement lining by means of a cement gun is not restricted to entries, but the process may be used wherever it is desired to halt the reaction of the roof.

In the construction of sumps, air-tight stoppings, pumprooms, brattices, etc., the cement gun has earned a well-deserved niche. In entry work, aside from the saving of timber, a cement covering does away with innumerable crevices and ledges that serve as places for the accumulation of coal dust. Overlooking the minimizing of the possibilities of a coal dust explosion, the factor of greater cleanliness is introduced that goes hand in hand with greater efficiency. It is possible also to stop up those places in the roof where water is continually seeping through by applying the cement dry and allowing the water itself to act as the hydrating agent in forming the cement cover. This has been done in many entries and in forming a waterproof lining for shafts.

An interesting example of a cement-lined entry may be found in the main slope of the No. 1 mine of the Springfield Coal Mining Co., at Nanty Glo, Penn. (Fig. 1.) The mine in question lies in the "Miller" bed in Cambria County and is operated by Peale, Peacock & Kerr, of St. Benedict, Penn. W. D. Dunsmore is superintendent and George Bateman is foreman. The slope is 14 ft. wide by 400 ft. long, the height varying considerably, due to the fact that soft rock was encountered in the driving. This rock has been disintegrating ever since the beginning of operations and "falls" have been frequent. The slope is on a 35 per cent. dip with the coal lying at the bottom. The mine at Nanty Glo is not a large one, having a capacity of 850 tons daily. The coal is developed on the double-entry system of heading and back heading.

GUNITE APPLIED ON THE SLOPE

From the beginning of operations at the Springfield mine trouble was experienced with the roof of the slope often resulting in the closing of the haulageway from falls of rock. Timbering had never been resorted to, but disintegration had proceeded until the width and height had nearly doubled in size over the original opening. It was finally decided to give the slope a cement covering in the hope of arresting the movement of the overhead rock. The work as carried out was primarily in the nature of an experiment. The results have been very gratifying; not only has the fall of overhead rock been completely stopped, but the slope is cleaner and gives an impression of neatness that is convincing.

A cement gun, N-1 model, manufactured by the Cement Gun Co., of Allentown, Penn., was chosen as the most practical method of applying the cement. There was no time lost at the mine, as the work was done at night. The sides and roof of the slope were given no preliminary treatment before the cement was applied other than the scraping down of all loose or overhanging rock. Two coats were put on, each about ½ in. in thickness. Air under a pressure of 50 lb. to the square inch was taken down the slope in a pipe from the compressors on the surface. Water was carried in a tank mounted on a mine car, at a pressure of which was from 15 to 20 lb. in excess of the air. An expert from the Cement Gun Co. was in charge of the operation of the gun during the first day, after which the regular employees at the mine completed the work.

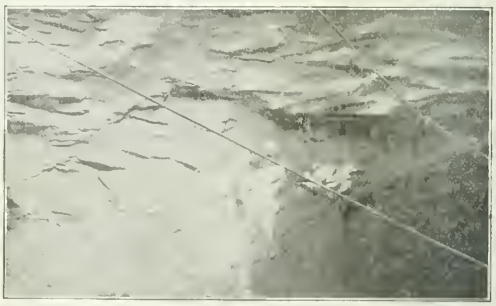


FIG. 2. SECTION OF SLOPE AT NANTY-GLO

An outstanding feature in the operation of a cement gun is its simplicity of control and the small amount of time required to instruct an inexperienced man in its operation. In the work on the slope there was no appreciable rebound to the cement, the waste of materials amounting to practically nothing. As can be seen in one of the accompanying illustrations, the roof and rib are sealed off from the damaging air currents. A point in connection with the thickness of cement applied is that a ¾-in. coat should serve as a minimum to guarantee the proper unity of strength.

After the slope had been lined at the Springfield mine, the gun was further utilized in the construction of an underground pumping station. Its effectiveness was demonstrated just as clearly as in the case of the work on the slope. A brattice of rough lumber was constructed between the rib and the water at the pumproom location. Over the brattice chicken wire was stretched, forming an excellent reinforcement for the cement, which is a typical construction wherever cement or "gunite" is used over wood. The pumproom is 40x20x8 ft. high. The operation of the gun within the pumproom was entirely by employees of the mine. The result has been just as perfect as if the gun had been operated by experts. As in

FIG. 3. ANOTHER SECTION OF THE SLOPE

the case of the work on the slope, there was no waste, and Mr. McDonald estimates that but a handful of sand could be found in a distance of 20 ft. of overhead work.

Another interesting example of where the cement gun has been used effectively may be found at Red Lion, or No. 2 shaft, of the Washington Coal and Coke Co., at Star Junction, Penn. W. E. Lahm is superintendent and T. M. Zimmerman is engineer. The coal under development at that place is the Pittsburgh bed of the Connellsville Basin and has a general thickness of 8 ft. Operations at the No. 2 mine were begun in 1898, when a tract of more than 5000 acres of coal was placed under development. The main entry of the mine is on a 6 per cent. slope, which is approximately 4700 ft. long, haulage being by cable from a steam-driven engine. The remaining distance of 1300 ft. to the bottom is on a 3 per cent. grade with haulage by electric locomotives. A distance of 2 miles is recorded to the upper end of the slope, which is the extent in length of the main entry. The coal lies in a smal local basin or fold, running away from one of the main anticlinal formations. As is to be expected in an operation of this size, the drainage problem at the present time is one of no small proportions.

A centrally located pump station was constructed at the bottom of the slope, which allows practically all the water from all parts of the mine to collect by gravity. A sump, 125x10 ft., was built. Excavation was made 8 ft. below the coal and 4 ft. above, giving a total depth of nearly 20 ft., of which but 10 ft. is utilized for the actual holding of the water. Falls from the roof had been experienced ever since the sump had been built, due to the smooth overhead "checker" (local

FIG. 5. VIEW OF PUMP ROOM AT NANTY-GLO

term for a slate with right-angled cleavage), slate continually breaking off and falling into the water.

A somewhat ingenious method was employed for cementing the sides and controlling the incoming water at the same time. A frame bench was built along one side of the sump and rails were placed for the passage of a car. It was necessary first to clean the bottom of the sump, as there had been from 3 to 4 ft. of sediment deposited. A trough was carried to the side of the bench and at the bottom of the sump to direct the water to the pumps and at the same time exercise a better control over it. As the structure of the frame plat-

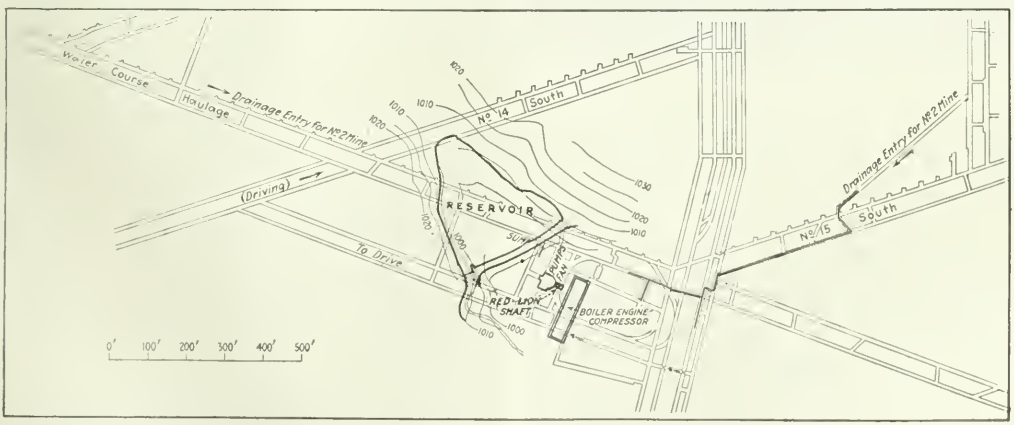


FIG. 4. PORTION OF UNDERGROUND LAYOUT AT STAR JUNCTION, SHOWING LOCATION OF SUMP

form proceeded down the sump, the sediment ahead was removed, after which the cement covering was applied to the rear. As in the case of the work at Nanty Glo, the sides and roof were first cleaned of any loose material before the cement was put on. Cement was applied from the roof to the bottom of the sump and over the floor. The frame bench was carried to the opposite side of the room when the retreat

began down the other half of the sump. A covering of ¾ in. was given the roof, sides, and bottom. A compressed air line running throughout the mine was tapped for use with the gun. The water line from the pumproom furnished the water under pressure, which simplified the operation and did away with the use of portable apparatus.

The completed sump is one of the first in the Pittsburgh district to have a cement lining. It is believed that the sump is now large enough to hold all the water that may accrue from any new developemnt work. If it is not, however, it may be enlarged without any difficulty presenting itself from the lining, as the thickness of the covering is not so great that any problem would arise from an adjoining excavation.

Because of the equipment therein, it might be interesting to note that a firm construction is necessary at the underground pumping plant at Star Junction, one of the largest in western Pennsylvania, being composed of five separate rooms, 35x15x10 ft. each. The rooms are of brick construction, four of which are of overhead arch construction, while the roof of the fifth is supported by 80-lb. rails spaced at intervals of 1 ft. Three of the rooms adjoin each other, while the other two are in close proximity. Rooms No. 1, 2, 4 and 5 contain single plunger, horizontal, Yough pumps, manufactured by the Boyts-Porter Co. of Connellsville, Pennsylvania. The size of each pump is 30x15x36 in. The No. 3 room contains an 18x10x24-in. Jeannesville pump of the same design as the others. All work against a head of 285 ft. Pumps No. 1, 2, 3 and 4 are fitted with two dischargeways, one an 18-in. line and the other a 16-in. The No. 5 pump has a separate discharge line from the others in a 14-in. line direct to the surface. All of the pumps are steam driven from a special boiler plant located directly overhead on the surface. Seven 100-hp. boilers supply the steam for operation, which is taken underground through a single bore-hole from the surface.

FIG. 6. MAIN TIPPLE AT STAR JUNCTION

NOVEL METHOD OF CLEANING DISCHARGE

The water from the mine has a high acid content and all of the pumps are equipped with wood-lined water ends. In dewatering the mine, it has been found almost impossible to prevent sediment from collecting on the inner corroded surface of the discharge lines. A rather unusual method of removing this material from the inside of the pipe is employed. A drilling machine is located directly over the outlet on the surface, and put in operation. The main discharge line is in nearly perfect alignment which permits this practice to be used. From 6 to 8 mine cars have been loaded at a single cleaning in collecting the refuse from the drilling. An 8000 ft., 8-in. cast-iron pipe line has been laid from the coking plant on the surface to the No. 5 pump. During the summer months when water is scarce on the surface, connection is made and water supplied for coke quenching.

Returning to the subject of cement lining, it might be mentioned that no trouble has been experienced with the cement sticking to a smooth roof without the aid of wire mesh as a background. Experiments at the experimental mine of the United States Bureau of Mines, located near Bruceton, Penn., show that a ¾-in. coat applied in 1914 has retained its ortginal form and is in as good a condition as when first laid on. In fact, many of the demonstrations and experiments in coal dust explosions have been made possible at the experimental mine because practically all of the entries are cement lined. The heat and shock resulting from these explosions has subjected the work of the cement gun to a critical and exacting test, yet in no instance has it been found wanting. In some mines where the cement has been put on too thin, pieces of the roof have fallen, but wherever a thickness of at least ¾ in. has been applied after all loose pieces have first been cleaned off, there is yet a single instance to be reported of where a "fall" has occurred. That the United States Bureau of Mines has indorsed the employment of the cement gun is a significant fact.

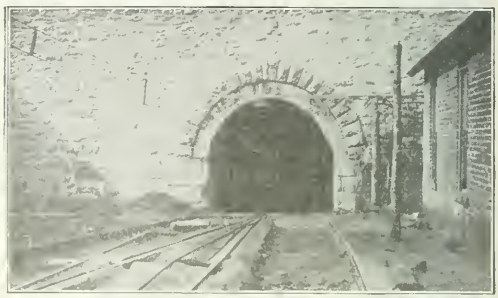


FIG. 7. SLOPE ENTRANCE AT STAR JUNCTION

The expenses connected with the use of the cement gun are quite moderate and vary according to whether the mine is equipped with compresesd air lines or not and whether water under pressure is available. By using the portable air compressor and water tank that is supplied in connection with the gun if desired, the average cost will run about 36c per sq. yd., at present day prices. This includes all materials, labor, etc. This figure was reduced in the work at Star Junction as the air and water lines were available at the point of operation.

Corporation to Export Coal

A report favoring the formation of a coal export corporation for foreign trade was submitted to the coal section of the American Mining Congress on Nov. 17 by Dr. Henry M. Payne of New York, chairman of the Coal Export Committee at St. Louis.

As to export conditions, the report said it would probably be five years before Great Britain resumed normal export tonnage, and that the annual European shortage is now 90,000,000 to 100,000,000 tons. It is estimated that the United States should have a permanent annual export trade of at least 22,000,000 tons to Mediterranean ports for 10 years, and a steady growing demand of at least 9,000,000 tons annually to South America.

With more than one combustible gas of simple molecular structure, the combined velocity of combustion can be obtained by adding together their individual velocities. However, care must be taken not to add these velocities without first multiplying each by the proper constant for that particular gas. At present not all of these constants are known, therefore it is not feasible to formulate an expression for the comparative total velocities of combustion of all the constituents taken together at several points along a flame.

Coal Mining Institute of America Holds Interesting Session at Pittsburgh

By R. DAWSON HALL
Managing Edtior, Coal Age

Synopsis—There has been no wane in the great interest shown in the Coal Mining Institute of America's annual session. . .In fact the institute grows stronger year by year. Dr. Thiessen introduced a new departure in the pale botanical determination of coal seams. A. W. Hesse delivered an unusually good address on "Pillar Drawing" and Prof. H. C. Ray showed how a man, well versed in metal-mining can serve the coal-mining public by taking of that industry's best and recommending it to the coal men for their adoption.

THE Coal Mining Institute of America in its meeting of Dec. 3 and 4 started its sessions at the Chamber of Commerce Auditorium, Pittsburgh, Penn., in its usual way—namely, by discussing business first and technical matters afterward. That there is no lack of interest in the business end of the program is shown by the large number of persons who were on hand early to take part in it and the keen interest they all seemed to take in its conduct.

Joseph Williams, who received 67 votes for president for the ensuing year as against E. N. Zern's 43, was elected president to succeed Mr. Zern. Mr. Williams is mine inspector of Pennsylvania bituminous district No. 10 which has headquarters in Altoona and embraces Cambria and all of Blair Counties.

In the vote for vice presidents, E. N. Zern received 85 votes; J. T. Ryan, 62; F. W. Cunningham, 54; W. E. Fohl, 52; J. B Hanford, 48; and John Thomas 38. The first three were declared elected. In his presidential address Mr. Zern introduced the subject of the nationalization or federalization of the institute, and the matter was referred by resolution to a committee, the president, E. N. Zern stating that the committee he would appoint would be the executive committee of the coming year.

JUNIOR INSTITUTES TO BE FORMED.

Another reference in Mr. Zern's address was to the badge of the Coal Mining Institute of America, the letters C.M.I.A. on a blue oval background. Much contention arose as to the proposal for the formation of junior chapters of the Coal Mining Institute in the various colleges and schools of the state. Everyone was satisfied to have these chapters organized, but the by-laws prohibited action till the regular meeting, and that is a year away.

Thomas K. Adams, the mine inspector of the third Pennsylvania bituminous district, suggested making the chapter men honorary members, but that would cheapen an honor that has been reserved for those who have been distinguished in industry and the activities of the institute. H. M. Austin would have had them made associate members, but that, again, would have created a new order of membership and was clearly unconstitutional.

E. H. Coxe proposed that a committee of five be formed to bring in resolutions regarding the matter, in which would be outlined by-laws such as could be presented and voted upon at the next annual meeting. W. L. Affelder suggested that a retroactive provision should be contained in the by-laws that would arrange for the return of the excess dues paid by those who were accorded only a junior, or chapter, membership. This plan was adopted and the resolution was presented and acted on favorably at a later session.

The election of the executive-board members resulted as follows: W. E. Fohl, 86; W. L. Affelder, 80; Moore, 63; J. I. Pratt, 63; Rush Hosler, 60; Alexander McCanch, 49; Thomas Thompson, 38. The first four were declared elected. Henry Kreisinger, fuel engineer of the Bureau of Mines, then read his paper on "Probable Fuel Developments in the Use of Coal", and the meeting, after a short discussion, adjourned.

In the afternoon session Question No. 1 was introduced, Thomas K. Adams presiding. The question runs as follows: "In a room more than 20 ft. wide, should timber be uniformly spaced between the track and the gob rib, or should they be set more closely near the center of the room than the gob."

Richard Maize, Jr. in discussing the matter advocated the placing of the props near the center of the room more closely than near the ribs and also urged that a prop should be placed between the car and the working face, saying that the mine worker, spent most of his time at that point and that many lives would be saved.

Mr. Maize wanted at least two safety posts placed in a 20 ft. place. T. K. Adams asked if there would not then be great danger of an accident when the safety posts were removed to permit the operation of a cutting machine along the face, and Mr. Maize assured him that it was his (Mr. Maize's) intention to put up another post on the other side of the machine whenever it was necessary to remove either of the safety posts.

Returning from the digression, Mr. Affelder said that putting posts close in the center of the room might tend to throw the weight on the roadway. It was stated that there was no desire on the part of any one to set posts unduly far from the road. The question was really: "How far should the post be set from the gob rib?"

J. I. Pratt said that if posts were not set within reasonable distance from the gob rib, it would shear. The chairman, quite naturally, pointed out that: "If there was no need to put props near the road rib why put them close o the gob rib, for everyone traveled along the road rib and only officials traveled along the space in the gob?"

R. D. Hall pointed out, on the other hand, that the spacing of props along the road was regulated by the exigencies of transportation, but the spacing along the road rib was at the discretion of the inspector, foreman or miner and that the props could be placed in practice as near or as far from the rib as was thought advisable. The passing of the car made a certain clearance between the road rib and the first prop in any given row obligatory, but on the goh side there was no such restriction. One member urged that an excess in the use of timber was not a mistake as the more timber placed the more could be recovered.

The next question, one for which E. N. Zern acknowledged that he was sponsor, ran as follows:

"What is a reasonable water-gauge reading for a mine operating under favorable conditions and circulating 100,000 cu. ft. 200,000 cu. ft. and 300,000 cu. ft. of air per minute?

This developed but little valuable discussion because the

pressure depends not only on the number of feet of air circulated but on the resistance of the circuit. When a mine begins to operate the resistance may be such that 300,000 cu. ft. can be circulated at a low water gauge, yet when the mine develops this will have to be increased.

If the author of the question had made it read, "What water gauge is the limit that it is desirable to have on reaching the confines of the property when the various quantities of air specified have to be supplied," it might have been more clearly discussed. As Mr. Zern well said, when we inquire as to the resistance of a mine, we usually consider that the air will travel only those passages that are known as airways.

The air travels not only along these but along the working faces, along the rooms and through the room-to-room crosscuts. In a mine newly opened about 57 per cent of the air may so travel, and 25 per cent may take the straight road along the airways. When the mine gets older the conditions are reversed. There may be 25 per cent going through the rooms and 75 per cent through the headings.

Under such circumstances the apparent coefficient of friction being based more largely on the heading capacities will be higher than the same coefficient when the air is largely travelling rooms and not entries. The air travels slowly in the rooms, and this fact reduces the friction of travel.

Question No. 10: "What are the advantages and disadvantages of the half-advance and half-retreat method of drawing pillars?" Prof. Stoeck said that he observed that some were not using the method just mentioned while some were opening up new work in accordance thereto. The general opinion seemed to be that the plan pleased those only who desired to open up the mines with great rapidity so as to be in shape for the lake season. It was by no one apparently regarded as a scientific method of pillar drawing. It placed the work in pillaring between two gobs, and so made recovery incomplete. The panel system, wherever delays can be endured, is the safer and better plan and the one to be invariably adopted when the measure lies deep.

Dr. Reinhardt Thiessen, research chemist of the United States Bureau of Mines, Pittsburgh, read an article on "The Constitution of Coal as Seen with a Microscope." Dr. Thiessen showed how coal for the most part consists of two parts—broken wood fragments (attritus) and resins.

SCENE FROM THE ANNUAL BANQUET OF THE COAL MINING INSTITUTE OF AMERICA

In it are some of the coatings of seeds, if the expression may be pardoned. Dr. Thiessen would call them exines of spores. If he were asked, Dr. Thiessen would doubtless not admit for a minute that spores are the same as seeds.

He would declare that some years ago the idea was exploded. Spores, he would say, are nothing else than spores or the reproduction organs of cryptogams or flowerless plants. You can see them lying thickly on the underside of the fronds of the female fern. They are full of protoplasm, a substance that rots away in the coal bed leaving only the coatings or exines. They, however, robbed as they are of their included material and distorted by pressure can be readily identified by characteristic markings.

Strange to say they are of a different character in every

bed of coal. Dr. Thiessen can tell you how they look under the microscope as seen from different points of view. To him they are labels which differentiate one bed of coal from another. The Brookville bed may try to pass as the Kittanning, but Dr. Thiessen will look at the coal through a microscope, make a careful investigation of the many spare exines and tell from them, as from a Bertillon mark, what bed he is examining.

Strange to say the cryptogams of the period during which one bed of coal was laid down have spores different from those at another period when another coal bed was deposited. Perhaps it is too early to state this as a positive fact. If it is true there is a wonderful opportunty afforded of identifying coal beds where the correlation has been in dispute or analyses unusually similar.

of Pennsylvania State College, presiding. It ran: "How should amusements and recreation for miners (white and colored) be provided in isolated camps?" Fay spoke on the artistic perception of employees especially of some groups of foreigners. He stated that some Italian miners would come all the way to New York City to hear Grand Opera. The introduction of "rainy" films and those cheaply obtained because of their advertising accompaniment would not readily pass muster in coal camps.

One member said that the films were doing much harm throughout the country by spreading an untrue story of the wrongdoing and high living of city dwellers and of the virtues and humble living of those who live in the country. Much of the unrest is due to misrepresenting the hard-working executives of modern business life. The faults of

HELD AT THE WILLIAM PENN HOTEL, PITTSBURGH, P ENN.

However, we must accept the promise with caution for the work of cutting and grinding samples is slow and expensive, and the whole United States coal fields can be covered by the xylotomist only with difficulty. In a few years we will learn if this rule is like many others—one with exceptions.

Charles L. Fay then read a paper on the "Labor Factor in Mining" urging the importance of welfare work and the necessity of sincerity and patience in its adoption. It is a fact that welfare work only pays when it is conducted with no consideration of ultimate advantage. If the employer shows more interest in welfare than he evinces in dividends welfare work pays handsomely, but not otherwise.

Question 3 was then discussed with Dr. E. S. Moore, dean

these men are perhaps not few but it is a mistake to represent them as invariably more base and more leisure-loving than the members of the laboring classes.

C. L. Fay stated that the Davis Coal and Coke Co. had introduced Group Life Insurance, and it is received with much favor in union and nonunion mines alike. It just happened that the policies were written a few weeks before the influenza epidemic occurred, and the value of the provisions for the happiness of the employees was much appreciated.

Policies are issued for $500 after 6 months of service. After one year the policy is for $600. After the second year it is for $700. It reaches a maximum of $1000 after 5 years of service. The insurance is additional to that of

the Employees' Relief Fund and the State Workman's Compensation, but in the case where workman's compensation is paid the group insurance granted is only 10 per cent of the face amount.

Question No. 4 "Why do not coal companies employ more college-trained men on their staff?" aroused quite a little discussion. Several declared that the college men were afraid of the discomforts of hard work. One instructor declared that the West had always welcomed college-trained men and paid them well but that the East seemed disposed to seek for men who learned their work in the hard school of experience. Metal-mining engineers were better paid and more highly regarded than the college men of the coal industry. As a result the pupils at mining colleges would never "see coal mining".

THE QUESTION OF COLLEGE TRAINING

Apparently the inadequate courses of training at colleges are not the source of distrust that some would have them to be. If all the new studies so highly commended are introduced, and if higher mathematics is ditched, as is being advocated, it will not save the college man from being undesired in the mining industry. So long as he continues to hope that the industry will furnish him a white-collared job and a chance to run things from the very day he leaves college, he will find that no one will want him whether he studied cost accounting or the calculus methods of mining or conic sections.

It is the man rather than his lack of knowledge that jars—his pose, his lack of patience, his desire for ease and authority. He has sneered at his "prexy", and when he gets into the mine office he speaks lightly of his boss. He forgets that though he helped to pay his "prexy", he is drawing a pay envelope from his employer and he is surprised that the results of his self importance are consequently not what he expects. The college instructors are patient because they have to be and because they are paid for the tuition of their students; the boss is not patient, for he has to pay for the time the college man is learning to perform the task that is set him, and if the man does not justify expectations his employment is a debit and not a credit.

THE BANQUET WAS WELL ATTENDED

The banquet in the evening of Dec. 3 proved more than usually attractive. It was held in the ballroom of the William Penn Hotel, W. E. Fohl being the toastmaster. E. W Parker, of the Anthracite Bureau of Information, here as at the American Mining Congress, advocated the method of conciliation in force in the anthracite region. Dr. Parker will pardon the suggestion that it is as doubtful a remedy for the ills of the bituminous coal industry as it has proved for those of the anthracite mines.

He also advocated the differential price rate of the anthracite region that has done so much to steady operations in that field and to make the summer a busy season in all but the most abnormal years. No one can question the advantage of a differential in price, but, as far as coal at the mines is concerned, it is possible only when there is a fixed circular. There is reasonable doubt as to the advantages of having fixed prices and of the possibility of inducing the Federal authorities to permit of such private price fixing.

It is possible that the government might set prices permanently and in the common lingo "fix" the industry as it has "fixed" the railroads by regulating the reward for rendering a service to the public without any due consideration of the actual cost of rendering that service. The word "fix" in America has acquired a somewhat ominous meaning, similar in fact to that rightly belonging to the word "spoil" and no one can say that this use of the word is not well merited, if he studies the effect of price-fixing on the railroad industry.

Dr. Parker closed by suggesting that a railroad differential between summer and winter be provided as was long ago advocated in *Coal Age*. (Dec. 2, 1916) and as was proposed at a banquet of the Coal Mining Institute on Dec. 8, 1916 by myself. Eugene McAuliffe and Van H. Manning have recently urged the desirability of the measure and the American Mining Congress has approved it. It seemed favorably received by the National Conference of Business Paper Editors in New York City, when I presented it to them on Nov. 13 of this year though no corporate action was taken or indeed suggested.

There seems to be no reason why this wise provision should not be put into effect as there does not appear to be any serious objection to it. In fact in earlier days when railroad rates were more fluid than today freights were lower in the summer than in the winter, at least on some roads.

Dr. A. A. Hammerschlag, president of the Carnegie Institute of Technology in Pittsburgh, delivered an address on the new mining school at that institution, and its prospects of creating a favorable coöperation between operators and the faculty. He had succeeded in establishing a close touch with leading mining men who are now actually assisting to direct the work of the faculty along practical lines, and he had so impressed the coal companies with the value of men, who being practical added theory to that practice, that several companies were paying for the tuition of employees whom they hoped would make for them superintendents and executives of great value.

ADDRESS BY HENRY M. PAYNE

Following Dr. Hamerschlag, Henry M. Payne made an address on the history of export associations and of the Coal Export Corporation in particular, directing the attention of his hearers to the fact that foreign trade in coal would relieve the pressure of the Appalachian coals on the more westerly markets, and would tend by the greater export demand in summer to stabilize the coal industry.

All thought seems directed toward the 306-day year and it is bound to come if the proper provisions are made and the public is duly educated to its combined duty and advantage in securing steady work, steady buying and the steady production from the large body of men in the coal industry.

R. Dawson Hall then addressed the banqueters with a few remarks on education. In his view the industry and the nation are just barely sensing the value of education and character in the progress and happiness of the Commonwealth. The physical predominance of the United States may be after all only an idea derived from the greater perfection with which the resources of the country have been examined and developed.

Russia and Siberia are larger and quite possibly physically more promising than the United States. The measure of production and the measure of exploitation and the degree to which the riches of the mine and surface have been made known cannot be regarded as measures of the actual wealth buried beneath the Russo-Siberian soil.

Moreover the people of the United States are as children eating at a table at which their elders have already voraciously partaken. There is no longer the wealth here that there was once. All that makes the United States a land of promise and accomplishment is the education and the character of the general run of people, their mental and moral equipment.

The savage lived in this land that we vaunt as a physi-

cal miracle before it was in any way despoiled and yet the savage starved to death. America was sparsely inhabited when discovered, and the people were not multiplying. Today with a people, educated and enlightened, the country is growing and the people are prosperous. For all these reasons we are compelled to believe that the greatness and happiness of the people rest most largely in their education and character and not in the land and its treasures.

Mr. Hall then referred to the mining schools that were training the future superintendents and foremen of the country for their work in the coal mines. He said, however, that industry ever lagged behind its great opportunities because it lacked a well-distributed skill.

Trained executives and foremen are all very well but they cannot make a well-rounded industry unless we have trained men to execute the work—trained men to drive rooms and headings, trained men to timber working places, trained men to care for storage-battery locomotives, trained workmen to weld and to repair, trained tracklayers to lay track and maintain it, trained electricians to bond rails and keep them bonded, to erect trolley wire and insulated lines, trained blacksmiths and carpenters and so forth.

WHAT ABOUT SKILLED WORKMEN

Where shall such men come from? They cannot all go to college but we can transform parts of our colleges into normal schools where men can be trained to teach workingmen how to perform their tasks and can further teach them safety, hygiene, care of their houses and homes, thrift, healthy living, the English language, Americanism and the principles of good citizenship. Each mine could have some such man, taught to teach, to develop men, to convert aliens into real citizens and to labor in every good work leading up to that trained industrialism without which labor is mere toil without adequate result.

Such men would transform our mining communities, make mere workmen into skilled artizans and make foreigners an integral part of our democracy, converting them from men careless of the work they perform into thinking individuals, able and willing to put mind and character into the work that they do, feeling their obligation to contribute service to America and to promote the happiness of our citizenry. To these men and their pupils might be entrusted with safety the future of our nation.

The next speaker was Mr. Ashley. Many of those assembled saw George H. Ashley for the first time. *Coal Age* has not always found itself in agreement with the brilliant geologist who with George O. Smith set the value on Western lands. But a competent man he surely is, despite his valuations and the State of Pennsylvania has reason to be proud of its choice in selecting him as its State Geologist. He will do, every one is sure, a large work in making a careful inquiry into the resources of the state.

There is oil in spots throughout the commonwealth. It is his business to indicate where it may be found in places far distant from those spots in which it is now obtained. There are other resources in large quantity that are not discovered or suspected. There are also opportunities for improving and developing our coal industry. Mr. Ashley is spending much thought and some time in looking for worthy work for which he will be justified in asking for appropriations. The public is putting before him its many problems. He will try and answer them as promptly as he can and within the limits imposed on him by the financial support he receives. He will try to hasten the topographic and geologic surveys of the state now being made, none too rapidly by the United States Geological Survey because appropriations are none too generously furnished by the state. This is sufficient cause for delay.

In securing George H. Ashley the state has annexed a vast fund of practical ideas, and the people of the state will unquestionably be rewarded thereby. That the promise of his personality convinced every one present was evidenced by the interest with which he was heard after a long session of speechmaking.

At the meeting of Thursday, Dec. 4, P. J. Walsh, one of the bituminous state mine inspectors presided over the question box, the question being: "Has the steel mine car made good"? In the discussion the all-steel car seemed to have the worst of the argument, while the steel car with wood bottom appeared to have a number of firm adherents among users. Mr. Patten said that the steel cars at the mine of which he had charge had been destroyed in nine years of wear. However, that seems to be a satisfactory term of service. The car has not been found that will have an unlimited life.

DISCUSSION OF STEEL MINE CAR

A member stated that the steel car holds 10 per cent more coal and is lighter than the wood car. While he held that the steel car had proved a failure, he declared that the composite car with wooden bottom and steel sides, that can be renewed by sections, has proved a complete success. Mr. Beck said that the sectional steel car cost only as much for repairs as the wood car. The sections when bolted together could quite readily be replaced. Mr. Little stated that at a Wellston (Ohio) mine the bottoms of steel mine cars had suffered from an enlargement of the bolts and from the sulphur-water corrosion. Mr. Smiley declared that the original objection to the all-steel car was based on its rigidity making it disposed to run on three wheels when it got out of condition. This made the car easy to derail. The composite mine car having a wood bottom is not subject to this important defect. He said that it was announced that the car makers had a non-corrosive steel that removed the objection to the steel car that in time would corrode beyond repair.

Professor H. C. Ray, of the School of Mines of the University of Pittsburgh, then read an interesting and exhaustive paper on "Modern Practice in Coal Washing" in which he described many innovations in the art of washing derived from experience in the washing of ores.

Question No. 6, "Under like conditions which is superior for attaining a large output—a drift or a shaft mine?" revealed the fact that there was a change in sentiment in favor of the latter. The advantages provided by modern hoisting and dumping equipment is steadily increasing the favor shown to shaft mines. The slope or drift mine does not start in the center of a field of coal and its one sidedness delays the attainment of a maximum tonnage. However, one could not say that there was such a consensus of opinion that from the discussion it is safe to answer the question with an unqualified approval of either drift or shaft. The question "Can electric bonding of rails be recommended as effective and economical" fell somewhat flat as no one seemed to be present who could testify as to the success attained in electric bonding.

In the afternoon question No. 8, "Is alternating current more satisfactory than direct current for the operation of coal-cutting machinery"? was presented. W. L. Affelder, who has used the alternating current for cutting coal, pumping and ventilation with direct current for locomotives, declared that the arrangement was entirely satisfactory. The alternating current, he averred, gave as little trouble as direct current in the operation of the shortwall mining machines.

Mr. Mitchell, on being appealed to for his knowledge of the use of alternating current said that, in Illinois mines,

alternating current was making large advances and prophesied that in five years the big mines would all be using that kind of current.

A. W. Hesse, chief mining engineer of the Buckeye Coal Co., Nemacolin, Penn. read a paper of great value on "Pillar Drawing", exhibiting some admirable illustrations of various methods, the Gay method being especially interesting and giving a wonderful example of longwall pillar removal, well adapted to the conveyor method of loading though used at present with hand-loading methods.

He instanced a case where the first break in the roof on the surface was over the excavated area and at right angles to the line of pillaring. He accounted for the break by saying that it occured along the line of contours.

Question No. 9: "How much coal should a coal-loading machine employing three to five men in its operation produce daily to warrant its use? Should a guarantee of performance be exacted before purchase?

Those who were using coal-loading machinery not only showed satisfaction in the work of these machines but also regarded the prospect of their further introduction with much favor as likely to remove, in large degree, the drudgery of mining. One member said that he believed that the seller of such machinery should not be required to give a guarantee because the work could only be satisfactory where the executives at the mine backed up the machine with proper facilities for its operation. If it was not given an opportunity to do its work efficiently no one could blame the machinery if it did not measure up to expectations.

A vote of condolence with the families of E. C. Lee, chief inspector of the Associated Companies, and Leon Harmon, mine foreman at Alicia, Penn., members of the Institute who had died within the year was passed by the members. The society also expressed its regret that Dr. J. A. Brashear, described as "Foremost Citizen of Pennsylvania" in the program, could not be present at the banquet because of his illness. With these and other appropriate resolutions the meeting adjourned to meet in the winter of 1920.

Taxing Anthracite

BY W. E. JOYCE

Sandy Run, Penn.

The taxation of coal lands in Luzerne county has passed the stage of moderation and is now forcing the serious attention of big mining men. This phase of mining expense has been overlooked by that department which has handled the more intricate problems, and such things as rents and taxes delegated to the land departments; doubtlessly while able men have been employed therein, the fact remains that taxation has increased to a point where, figuratively speaking, it is out of sight. An advance of 480 per cent in a comparatively short time is certainly "going some," but that figure was arrived at before this year's duplicate was arranged.

COAL DEPOSIT VALUES DETERMINED

When the first Board for Revision and Assessment of Taxes in Luzerne County was appointed, a system originally conceived by a single taxer, revised by a socialist, and perfected by this board, was mapped out. Their engineers tackled the job of fixing coal-deposit values upon a broad hypothesis based on Henry George and improved upon by Carl Marx. One of the distinguishing features of their work promises to lie in the fact that they thoroughly aroused the men higher up, and forced a closer union of the mining and land departments of the various coal companies.

The members of this board hit upon a plan for enriching the county exchequer quite as marvelous as would have been possible, had they possessed themselves of Aladdin's lamp. And yet, if these men were "top-notchers" in the work of gathering public funds, their successors have so improved upon the adopted system, that it is scarcely recognizable.

In the process of mulcting the coal companies, the new board retained the original engineering force. The work accomplished and the methods pursued are explained by the chairman of the board who, when asked how the wonderful results were obtained, said: "Yes, we have allowed for the coal taken out of your property during the past three years even if the values have increased. You see, it's this way: If it were not for the township school boards wanting so much money we would have no trouble at all with the county taxes. The county is so big and so rich no one would feel the burden of county taxes, but in the townships the school boards make their own tax levies and they make the rates high."

Responsibility for an anomalous rule is thus divided. The above explanation does not explain, however, why a property value is 40 or 50 per cent. greater after extracting several hundred thousand tons of coal from it, despite the assertion of the board that allowance is made therefor by the new system.

The engineers stand by their work and the members of the Board of Revision are no less loyal to the system. The land agents handling the tax question in the past for the various coal companies failed to secure an application of the new tax system on an equable basis. The mining heads are now figuring on giving them assistance.

When the triennial valuation was arranged for tax purposes the old board of revision believed they had performed a good job because they had increased valuation 400 per cent. That did not satisfy some of the public bodies drawing upon the fund and the following year a readjustment was secured. That the law did not allow changes of an arbitrary nature beyond the triennial year made no difference. They simply ordered a readjustment, and means were found for increasing the rate without disturbing coal areas.

In the succeeding efforts at readjustment tracts of coal land that bore the full burden of taxation in 1918 were relieved of that responsibility, and tracts previously reported as barren were used to take up the difference, with different rates for the same beds on different tracts. Thus the scientific features of engineering were embellished and the coal companies are ordered to pay accordingly.

The taxes paid by one of the large companies now amounts to 20c. per ton on its product. As it requires a tonnage of some 10,000 per month to yield such a profit, there would appear to be good reason for activity and closer inquiry on the part of the various departments in order to ascertain just tax on coal.

The higher commercial value of liquid fuel is due to its being available for more purposes. Oil seems to have all the advantage of gas and solid fuel and none of their disadvantages. Gas, on account of its simple molecular structure, can be burned readily and without smoke in any commercial apparatus from a boiler furnace to a gas engine; also, the feed of gas can be made automatic for any apparatus and can be easily controlled. However, gas has the great disadvantage that it is not concentrated enough for convenient storage. On the other hand, coal contains large amounts of heat in highly concentrated form and can be easily stored. Its complex molecular structure and the many solid impurities tend to limit its use. In its marketed form, coal lacks sufficient adaptability to delicate adjustment or automatic feed control.—*Bureau of Mines Bulletin No. 135.*

Modern Pillar Drawing Practice*

BY A. W. HESSE
Nemacolin, Penn.

WE formerly thought a 1000 or 2000-ton production from a mine was going some, and you have probably noted the advertisement the Illinois mines have been receiving as the biggest producers of the world, yet at Lynch, Harlan County, Kentucky, I am told that a year after coal began going over the tipple, 5000 tons per day was the output and 15,000 tons per day is to be the capacity of the plant! Several openings, however, contribute to the one tipple. Nevertheless, this goes to show that we are setting a rapid pace for the world's production of coal, and in this period of unrest and policy of conciliation, when nobody wants to work and the law of supply and demand still rules, who knows but what necessity will bring forth methods of mining and mechanical means whereby the miner may sit at the entry and direct his car to the room face, or pillar stumps, and tally it as the car goes out.

Synopsis—Pillars in mining operations contain from 60 to 75 per cent. of the available coal. Attaining and holding a large output figure can only be accomplished by highly effective methods of pillar drawing. The various practices of removing pillars are discussed in this article.

The straight work, or entry driving, has been receiving considerable attention by the mechanical minds of the country to speed up development and output; but since the pillars of a mine in which the maximum recovery is sought represents from 60 per cent. to 75 per cent. of the coal field, it is worth while to give this phase of mining considerable thought before the mine work is projected. Of course, there are some things for which the mine management is not responsible, such as the impatience of the Board of Directors for early returns; but it is possible in nearly every case to become familiar with the physical and chemical properties of the coal and the coal-bearing strata to such an extent as to forewarn the operator of the things which might happen when he comes to drawing pillars.

We know there are two general systems of coal mining: Room and Pillar, and Longwall. The longwall system contemplates the entire extraction of the seam without leaving pillars, and inasmuch as this method is a subject in itself, no attempt will be made in this paper to treat of it.

MARGIN OF PROFIT INTERVENES

In room and pillar work, the margin of profit determines just how far we should go in our efforts to recover the pillars allowed to stand in the first mining. That is the foundation of all good business. But there is considerable diversity of opinion among mining men as to the proper plans to follow preliminary to drawing the pillars, and it is very probable that exceptions will be taken to what I may present; but this paper is founded upon observations of different plans tried and it is just possible that somebody may get some good of it.

There are several factors that affect pillar drawing which are not new but worth repeating, namely:

(a) Mining Rights and public feeling; (b) Labor conditions; (c) Incompetent management; (d) Impatience of owners for quick returns—previously mentioned; (e) Market value of coal; (f) Insufficient or incompetent engineering; (g) Movement of mine cars or cars per man per day; (h) Width and capacity of mine cars; (i) Weight and character of overburden; (j) Roof and bottom conditions.

The first of these factors represents a condition imposed upon the operator by the deed or lease he holds, or the laws of the State in which he is mining coal. If he cannot break the surface, then the only way he can draw the pillars is by substituting some artificial roof support, which is now the practice in the anthracite field, by flushing in the culm considered waste. To use sand or gravel for this purpose is uneconomical, and to use ashes brings up the problem of supply. This method of flushing culm is described in the Coal and Metal Miners Pocket Book, page 314. As to drawing the pillars, the process consists of simply splitting them.

The second factor has to deal with labor unions who dictate how wide a room must be driven, whose wage scales do not cover drawing of pillars and make the cost of driving safe places prohibitive; so that must be passed up also in the final judgment.

The third factor is readily understandable by all, for unless a man is familiar with the details of any scheme, he cannot do justice to the work nor to himself.

The fourth factor, I believe, is applicable only to the smaller sales companies; at least there is a growing tendency to give the mine manager an opportunity to line up his work safely before furnishing too much room coal or "hogging" out the field.

Fifth: There is considerable to be said about the market conditions affecting pillar drawing, especially when the physical conditions of the mine are bad. There was a time when I believed it unwise to attempt to draw pillars in all cases. This conclusion was based upon the cost of production at five mines working the Pittsburgh bed, measuring 6 to 7 ft. thick, on the room and pillar system. One mine, as an example, was the first to feel the effects of dull markets that called for off days. The men were hard to hold while other mines continued to work. The roof is composed of soft shale and boulders and fire clay bottom.

LAW OF DIMINISHING RETURNS

For eight years the cost of production was followed. The first three years, the costs ran about the same, the pillar extraction amounting to only 9 per cent. of the output; the following year, pillar extraction increased 12 per cent. with an increased cost of 9 per cent. and a drop in recovery per acre to 84 per cent. This diminishing return continued through the balance of the 8 yrs. with corresponding increased costs until the increase amounted to 62 per cent. of the initial cost, notwithstanding the fact that the net actual increase of mining and loading in this same period amounted to only 10c. per ton! The rooms were first driven on 50 ft. centers and 250 to 300 ft. long, but owing to difficulties in maintaining roof, the length of rooms was shortened and room centers increased to 80 feet.

The overburden being only about 200 ft., these pillars appeared ample, and were, so far as protection went; but it was seldom that the roof remained intact long enough to permit completing the rooms and drawing out the pillars, and from the time the room was completed it was clean up, retimber, cross-out and split, until the pillar was out. Even

*Paper presented before the Coal Mining Institute of America, Pittsburgh, Penn., Dec. 3 and 4, 1919.

10 ft. places made little or no difference in holding the roof; besides, room work went faster than pillar drawing, which, together with off days, helped make matters bad.

Sixth Factor: Some of you may wonder where a mining engineer can come in on pillar drawing. Until a few years ago he was considered a necessary evil, as he added to the expense, and all he was good for was to follow the mine foreman's workings and put them on a map to keep the District State Inspector informed as per the law. I could give you reproductions of actual mines where the driving of rooms left the pillars in such conditions that it would take a superman to draw them, owing to a large rib on one side and

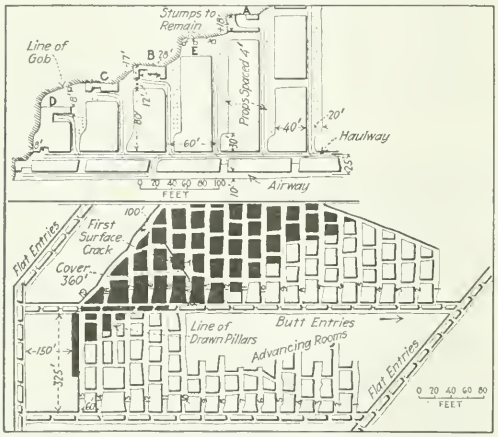


FIG. 1. SHOWING MEETING OF CUT THROUGHS

practically no rib on the other, or too light a rib under heavy cover, or rooms to the dip with ribs standing in water. Also, has it occurred to all of you that there is a relationship between the percentages of coal taken from entries, rooms and pillars which must be observed for economical production?

The developed area of a field is that coal directly tributary or accesible to the entries driven. Every year this area should show at least the acreage equal to the sum of all the coal acreages extracted until the field is fully developed, otherwise you will soon be in a position of redeveloping your mine. Also, if the room pillars amount to 53, 61, 67½ or 78 per cent. of the area off the butts, then the pillar drawing should amount to those percentages respectively, otherwise there will soon be standing rooms to repost or clean up, if nothing more serious occurs, when the time for pillar drawing is possible. These conditions should be shown yearly by the engineer and the operator should observe and appreciate their values.

A BIG FACTOR OF SUCCESS

Seventh: No douht the mine inspectors present here today have visited working places in the mines and found men sitting around waiting for cars. It is a prolific source of discontent and a source of danger for the success of pillar drawing especially. There is a mine in the 16th District of this State achieving wonderful success in drawing pillars, and half of it, I am told, is due to the rapid movement of mine cars and keeping the miner supplied. You must either increase the equipment or move it faster to accomplish the desired end.

Eighth: One of the first things I learned in regard to pillar drawing was in driving the room to keep the track as near as possible to the rib intended to be brought back on that track and to set the first line of props as near the track as feasible for the free movement of the mine car. The tendency of the age is to increase the capacity of mine cars as it means so much to the haulage in large producers, but where the roof conditions are bad this means increasing the distance of the span between the rib and the first line of posts and spreading these at the turns into the cross-cuts or "scutching" the rib corners, which makes each turn a source of danger from falls or greater care must be observed in timbering.

Ninth: The weight and character of the overburden naturally affects the size of pillars to be left for protection. The Coal and Metal Miners Pocket Book gives different authorities' views and tables on pillar sizes, but my opinion is that with pillar drawing in view these sizes are all too small. You, who have seen pillar drawing under conditions of a creep would not take chances on a 20x66-ft. pillar for a 350-ft. depth, nor 42x78-ft. pillar for 1000-ft. depth. I have seen smaller pillars drawn successfully under covers up to 400 and 500 ft.; but it leaves no factor of safety, and one stump lost may be the nucleus of a general squeeze. One mine in the Fairmont Field lost the whole one side of its workings in one night, losing mine cars, men's tools and everything else which happened to be in that side, due to squeeze. Some of you may recall the Twin Shaft disaster in the Wyoming Region of this State, where men were buried alive and never recovered. Therefore, it is a good rule to adopt pillars of a size which will leave you "better safe than sorry."

The roof and bottom conditions have as much affect upon the selection of pillar sizes as the overburden. I believe I am safe in saying that with a few exceptions all coal seams are underlain with fireclay. This may be hard as rock when the coal is taken out, but moist air soon starts a swelling and gradual disintegration. I have seen this occur as early as two months after an entry was driven. If the roof be poor and pillars small, there will be a driving down of the pillars, heaving of floor, causing at the same time a roof movement which soon fills rooms and entries with slate. In the case of sand rock roof, which is hard to break, large pillars of

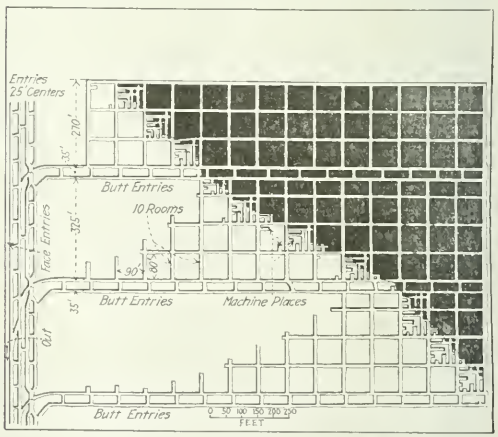


FIG. 11. THE BLOCK SYSTEM

coal are necessary to avoid crushing when carrying the additional weight thrown onto them temporarily by the extraction of pillars behind until the break occurs.

I have seen excellent pillar falls behind such work as you see in Fig. 1, and the fact that a surface crack appeared a trifle over a year after the pillars were started back showed clean work. The peculiar direction of the break in relation to the mine work was probably due to the fact that the contours of the surface just about paralleled the break. Never have I seen the surface break even with the edge of the pillaring which covers over 50 feet.

The rooms advancing made about 36 ft. per month, while the retreating pillars made on an average about 23 ft. per

month. The entries were driven from both flats, thus making it possible to start driving upper rooms as soon as reached. The work here shown is so lined up that barrier pillars between panels are eliminated and the rooms of one butt drive to the gob of the next. Even the chain pillars can be drawn from the rooms driving through.

The details of the method of drawing these pillars are shown above; and these methods can and are followed in other systems than the one here given. At "A." the machine cuts the coal about 4 ft. back from the end of the rib for a width of 10 ft. This place is driven by machine half through

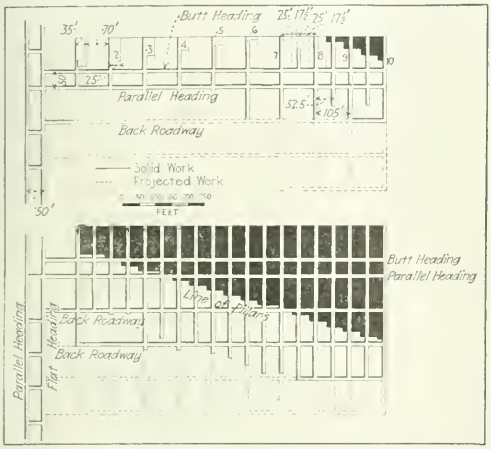


FIG. III. DRAWING THE PILLARS BEHIND

on a slight slant toward the rear, then turns and cuts through to the gob. When the machine man comes back, he takes a cut on the face, swings his machine and cuts through the stump as shown before leaving the spot. This leaves four small stumps to be removed by pick, which was always rather difficult to get away with, as the miner could not trim down one stump without throwing additional weight on the already heavily burdened remaining three stumps. This practice, I believe, has been abandoned, and is not recommended.

At "B," where the crosscut caused the condition making it impossible to cut another place through the 17-ft. stump, a slab is taken out for a distance of about 28 ft. before the cut is made through to the rear gob. The track is swung over and more props set for protection. The rear stump is trimmed down by pick work and another cut-through made to the rear gob by machine, conditions permitting. After the stumps are trimmed down, a situation as shown at "E" is allowed to remain until the weight of the overburden crushes these stumps. When the pillar drawing reaches the haulway, an 8-ft. place is started through the heading stump, leaving an 8-ft. barrier on the inby side, while the stump is being attacked at "D."

The chain pillar is drawn from a track laid up the airway and the same system of leaving about 8 ft. of coal behind the cross-cut is followed here also. You will note that the entries are driven on 25-ft. centers and in my entire experience in the Fairmont Field, practically no trouble has been observed in protecting the headings; and the cut-throughs were made without putting in curves. However, by increasing the centers to 35 ft. it has been found more expedient, in case of falls, to take a skip off the rib than to clean up the slate, and I believe these centers on butt or room entries have been pretty well adopted.

Owing to the greater depths being reached and the desire for more machine coal, a block system of mining has been advocated for the Fairmont Field, which is shown by Fig. II. Since the West Virginia Mine Laws require cut-throughs not over 90 ft. centers, the rooms are laid off the same and the cross-cuts in the rooms likewise. But instead of making the rooms 20 ft. wide as commonly done, they are driven the same width as the entries. The intention is always to start the rooms at the rear first and pull the pillars as soon as the rooms finish, being careful to line them up to leave as much protection on the outby side as necessary. When the room is finished, a cut-through is started about 8 or 10 ft. from the end of the last stump, at the same time a cut-through is started from the first cross-cut back to drive up through on the face, leaving about 8 or 10 ft. on the right. These cut-throughs meet, leaving two slabs to bring back, which is done as shown by details of Fig. I.

By this system and using 8-ft. cutting machines, it should be possible to load out about 600 tons per day off one section, by cutting, drilling and shooting at night. This also means keeping the loader supplied with cars.

The system just shown is similar to the concentrated method explained by Mr. W. H. Howarth in a paper read before this institute in December, 1916, in which he tells of the remarkable success attained at the Bridgeport mine of The H. C. Frick Coke Company. Fig. VI shows a layout of this system, and you will note that the blocks are 90 ft. square, whereas the West Virginia blocks are 80 ft. square. The estimated daily output expected from each section amounts to 705.6 tons at this mine, which is the more remarkable for pillar drawing, as a great many mines do not get this on room driving.

There is one thing, however, to be noticed about this method which may be affected by roof and bottom conditions, mentioned in factor 10, namely, there are practically 10 butt rooms driving off each face room at the same time, leaving 15-ft. pillars for support just back of the gob. As the late

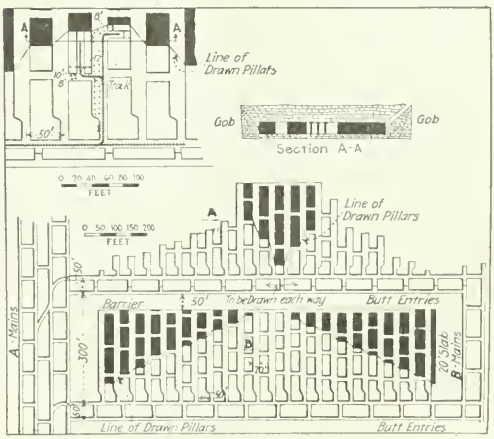


FIG. IV. TWO METHODS OF EXTRACTION

Mr. Keighley has said, "In deep mines after the ribs have been drawn back 100 or 200 ft. from the point where the rib-drawing started and a general fall or movement of the roof occurs, the rupture or disturbance does not run up more than from 5 to 30 ft. above the coal.

Very often such falls not only take place in the large open spaces where the coal has been withdrawn entirely, but extend into the roof of both rooms and cross-cuts for 100 ft. or more back from the rib line. Why, then, would it not cause considerable cleaning up and timbering in these short butt rooms or cross-cuts in the concentrated method, unless the roof were good?

Mr. Keighley offers a remedy under these conditions in the plan as shown by Fig. III. The object of this method is to drive the rooms only as you need them and draw the pillars behind, following the advance of the rooms and using the cross-cuts for new hauiways as the former ones are destroyed by pillaring. This should reduce the consumption of props, if the rooms are not advanced too rapidly.

The end of the area to be worked is reached before any room entries are turned off the face or flat entries. As the

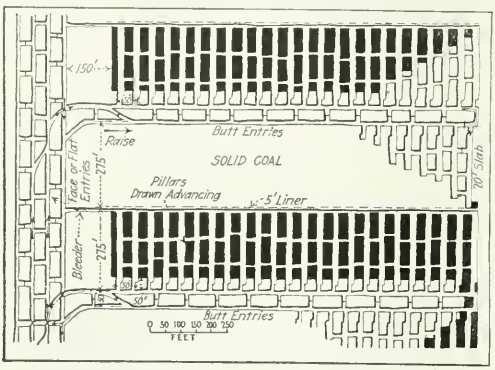


FIG. V. HALF ADVANCE AND HALF RETREAT

butt entries advance, 105 ft. distant and parallel to the edge of the area, rooms 10 ft. wide are turned off on 105-ft. centers and driven to the boundary. When completed, a 25-ft. slab is immediately brought back to within 30 ft. of entry and room allowed to cave. When the last room is reached and driven off this side and about the time the 25-ft. slab is started back, the room between, or the split, as I shall call it, is started and the pillar drawing lined up for retreat work. The back or parallel heading has the first rooms started opposite room No. 6 and driven with the advance of the headings.

Then as the pillars are drawn back, additional rooms are started ahead of them. At the same time, a cross-cut is started from the flat to pick up these rooms as the pillars are drawn. The disadvantage apparent in this method is due to the irregularity of the coal seams. While we may start on the level, a change soon takes place and we are either driving rooms to the dip or pulling pillars out of water, which is unnecessary in the methods previously shown.

While I am not familiar with the character of the coal in the Connellsville Field, yet the question has come up in my mind as to the success of drawing two ribs from the one track. You notice the 95-ft. blocks are split by a 10-ft. place and apparently a 25-ft. pillar on the right and a 17½-ft. pillar on the left are to be brought back together. I have never seen this done successfully.

DETAILS OF FIGURE IV

I am presenting by Fig. IV two situations, designated by A and B, which sometimes arise, where a pair of butts is driven from two face entries and the grade permits hauling each way. If the first pillar is drawn at the middle of the panel it can be attacked from two tracks and a fracture line established to draw pillars on the retreat, allowing double the number of men to work on this butt and adds the chain and barrier pillars to the others to make it worth while sending in a motor.

In the situation presented by "B," it is evident the rooms were driven advancing and fearing caves, the pillar work followed advancing also. Eventually the pillar work met at a point, with the weight thrown onto the depreciated block of coal between; and one of these tracks had to bring back two ribs. The result was: a situation as presented in the upper left-hand corner of Fig. IV and the section A-A of same. Roughly, I figure across this 52 ft. of coal there must have been at least 8 tons per sq. ft. of weight, and Mr. Chas. Enzian in his investigations of artificial roof supports found by compression tests on various material that 8 tons per sq. ft. would compress a pile of large-sized broken sandstone 10 per cent. rectangular piers of mine rock nearly 20 per cent.; so you may readily understand that this section of coal was constantly under serious compression, and I know that it was a race to keep ahead of trouble and the percentage of recovery was lower in this section than in others of the "A" line up. Besides, when the pillars were brought down to heading stumps, the number of working places gradually reduced to three: a heading stump, chain pillar and barrier. These required about 3 years to extract if drawn all one way, or a year and a half if split and pulled in opposite diections.

Man should have a good reason for doing a thing or he certainly has a good reason for letting it alone, and I believe there are many things not apparent to us when we start to criticize another's system of drawing pillars.

Some may think it cheaper to do additional cleaning up and reposting than to wait until the end of the butt entry is reached before starting to drive rooms; some may consider it cheaper to pump and take chances of losing men than to drive another pair of butts in order to turn the rooms to the rise. Thus it goes.

Fig. V shows a method of "Half Advance and Half Retreat," which means the half of the panel has the rooms driven and pillars drawn as the entry advances and at the extreme end the rooms on the parallel or back heading are started and ribs drawn on the retreat. The latter rooms can be driven through to the gob of the panel below, but where gas is liberated, it has been found advisable to leave what is called a liner, consisting of about 5 ft. of coal at the ends of the rooms, along which the air travels to a "bleeder" cross-cut to the return main aircourse. On the advance the roof is broken

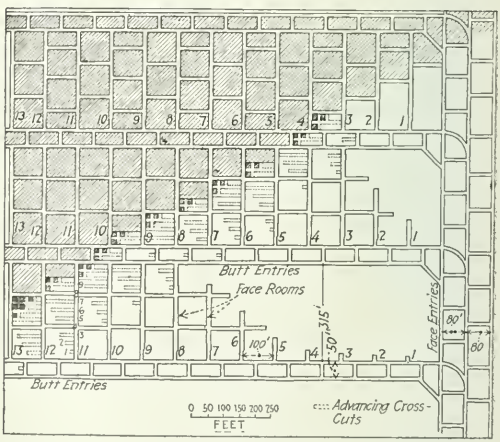


FIG. VI. SHOWING BLOCKS 90-FT. SQUARE

against an immense block of coal, and unless the roof is extremely friable will leave a space next to the solid coal for the air to seep through, thus ventilating the gob. When the set of rooms from the next butt drives up and pulls back from the liner, the assumption is that the roof will have settled in the old work to such an extent as to protect this 5-ft. barrier and serve as a weep hole for the air to get back to the main aircourse.

I believe this method is employed by the Pittsburgh Coal Company in some of its mines with smaller room centers than

here shown, evidently with success or larger pillars would be used; also the dewatering of the rooms and pillar work must compare favorably to that of driving another pair of butts to get one set of these rooms and pillars.

A modification of this system is to drive three entries, using the middle entry as a return airway and overcasting to the main return.

For extracting coal under a sandstone or thick hard slate, a method with attractive results is employed by The Gay Coal and Coke Company in Logan County, W. Va. Figure VII shows a general and detailed plan of the process of recovering the pillars. As the roof consists of heavy sandstone, rooms may or may not be driven with the advance of the entries, as they are spaced on 100-ft. centers and driven only 10 or 12 ft. wide. When the butts reach their limit, a longwall cutting machine is employed and the 90-ft. room pillars are attacked at the upper end by "skipping" the pillar for the entire length of the room. As each skip is loaded out, the track is moved over and the machine takes another cut. Each machine cut is followed by an electric drill and shot

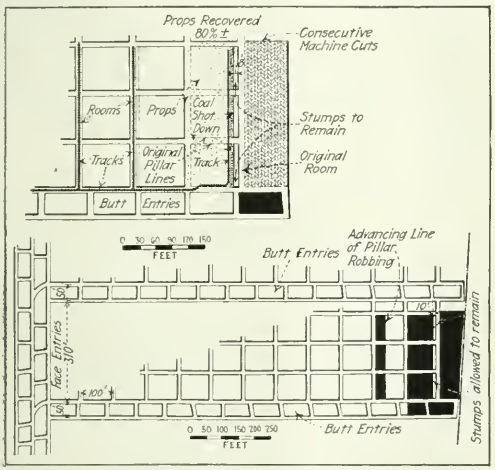


FIG. VII. THE GAY SYSTEM

firers. When the pillar is reduced to 10 ft. it is split at about 150 ft. from either entry and as much as possible is drawn each way, but not much is recovered.

I have seen the roof break made by this process, and it compares favorably with anything produced by other methods. The coal is 6 ft. thick and from one entry the usual run is 500 tons per day. Strange to say, foreign labor will not work on these walls and "green" labor will load from 16 to 18 tons per day per man. At one time 20 tons per man per day was quite common for a day's run.

ADVANTAGES OF THE METHOD

The recovery by this method is about 89 per cent. and the advantages claimed are: Lower cost of production; a larger output per dollar invested; concentration of operation; employment of more mechanical devices; more efficient supervision; less accidents.

The last is proven by the fact that nearly 2,000,000 tons of coal have been removed without the loss of a single life!

In the pillar drawing of thin seams, yardage of course affects the size of the pillar; besides, the law of the "ratio of slenderness" applies to coal pillars as well as to steel or timber columns, but not to the extent imagined. The main advantage in pillar drawing in thin beds is that it takes less time and distance to close up the space between floor and roof line to take the weight off the pillars behind. However, with heavy cover and excellent roof, it is advisable to keep ample coal area behind the drawing pillars for squeeze protection.

There are some general points to be followed in all cases of pillar drawing, but every mine has its individual conditions, and a study of results obtained at other places with a comparison of the factors heretofore mentioned may be the means of solving others' troubles.

Nearly all mining men are advocates of driving all entries to the boundaries before driving rooms and drawing pillars in order to get all coal on the retreat. There are very few instances of companies carrying out this policy, and the only one to my knowledge would not recommend, or if it had the work to do over again, would adopt this system. This particular mine has about 30 or 40 ft. of white sand rock over most of the coal, yet it scaled off and in places where draw slate came in it was worse, so that by the time they were ready to mine on the rooms and pillars, the entries had to be cleaned and reposted and changes made in the system to speed up production caused by the delays.

Therefore, with the ordinary type of roof it is probably wise to take the sections necessary for the desired tonnage and develop correspondingly, so as not to keep territory outside of the mains open too long.

I have considerable correspondence in my files relatives to the recovery of coal in the different fields of the United States, showing recoveries from 50 to 97 per cent., and I could possibly interest you with some of the details; but I have found that the best impressions are made by actual visits to mines in which successful pillar drawing is in progress, and certainly I could not conclude this paper with better advice.

Electric Lighting at the Working Face

The mines of the United States Coal and Coke Co., at Gary, W. Va., and Lynch, Ky., are lighted throughout with electricity. Along all haulageways, including all room headings, the lamps are connected directly between the trolley wire and the rail, using three 100-volt lamps in series and spacing them at intervals of about 100 ft., the lamps being connected by weatherproof wire.

In the rooms the lamps are hung in sets of three, suitably spaced along the face suspended from the posts. The lamps are connected by a duplex weatherproof cable of No. 14 wire to the trolley wire at the mouth of the room. The proper length of cable to extend the full length of the room is placed on a light wooden reel, which can be moved up as the room advances, paying out the cable as it is brought forward. Forty-watt Mazda lamps are now used, three 100-volt bulbs being used in series, as the voltage frequently rises to 290 when the load is light. The illumination, of course, fluctuates with the voltage but is much better than that of carbide lamps and is much appreciated by the men using it.

The exact manner in which coal absorbs oxygen is not clearly understood. A solid substance can hold gases actually dissolved in its interior. With coal, the absorption of oxygen is complicated by the fact that, in addition to this physical action, there is also a very complex chemical action. Part of the oxygen is converted into water, part into carbon dioxide, and part is retained as combined oxygen, producing compounds richer in oxygen than the coal itself. Part of the carbon dioxide is retained by the coal, for coal at ordinary temperatures has an enormous capacity for holding carbon dioxide.—*Bureau of Mines, Bulletin* 105.

Necessity for a Mining and Industrial Education

BY H. H. STOEK†
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Synopsis—It is becoming more and more the tendency of the principal coal mining states to give educational tests to workmen in mines and to issue certificates of competency when merited. In addition, vocational educational work is receiving attention, war practice in this respect furnishng an object lesson. The Smith-Hughes Act became operative in 1917 and its workings, as well as that of the U. S. Educational Bureau and Board, are fully explained. The purpose and administration of the Smith-Hughes Act especially are gone into in detail; considerable progress has resulted from the operation of this act along agricultural-educational lines, but as yet much less in industrial and trade lines.

During the period of the war the necessity of getting out a maximum amount of coal (often with a minimum number of men) led to the employment of men insufficiently trained to combat the dangers of mining and to produce coal efficiently. In spite of this handicap, the output of coal during the war period was most flattering, both to the miner and to the operator, and showed what could be done under the urgent conditions prevailing, particularly with the stimulus of patriotism behind the industry.

Never before has the importance and value of training and skill been better appreciated than now, and various tests given by the Government in selecting men for special duties have given great emphasis to the fact that there is material difference in the aptitude of men for various kinds of work. One of the prominent and most important topics under consideration by the industrial and educational world at the present time is what is known as industrial or vocational education—that is, such education and training as will produce more skilled workmen, better foremen and bosses, and will give also a better general knowledge of the coal industry (for example) to the whole population. The necessity for such training is not confined to any single industry, to any particular locality, or to a nationality of workmen.

EDUCATIONAL TRAINING DIFFERENT FOR MINERS

The various operations in a mine and their supervision are carried out under conditions different from those that exist in an ordinary factory. In a mine the men work in small groups, usually not more than two in a place, and these groups are frequently fairly widely separated, or at least not within seeing or speaking distance of each other; hence, it is impossible to have that close supervision that obtains in a factory or shop where the foreman can see a large number of men from a central point, where the dangers are common to all and where each one can get prompt assistance from his fellow workman, if needed. It is possible in a mine for a man working in a room alone to be injured and not be discovered for a considerable period of time. It is therefore important that all employees about the mines should be so trained that they can best take care of their own safety and not prejudice the safety of their fellow workers; and also that the coal may be most efficiently mined.

In connection with coal mining, there are several reasons why vocational education is urgently needed; possibly even more than in some other industries. Foremost among these reasons is the fact that mine laws in practically every coal-mining state of importance prescribe certain educational tests that must be passed by any one aspiring to a position of authority, and in at least two states—namely, Pennsylvania (anthracite region) and Illinois—every miner must hold a state certificate before he can work at the face. Having thus set up an educational standard, it is only just that the state should provide some means by which the men engaged in mining and the young men who aspire to become miners may have assistance in preparing themselves for the tests prescribed by the states.

In 1870 the legislature of Pennsylvania passed the first general coal-mine law for the anthracite mines of Pennsylvania, and this law provided for the appointment of mine inspectors based upon a state examination. In 1885 the legislature of Pennsylvania provided that mine foremen, assistant mine foremen, and firebosses should pass an examination before being granted certificates of competency. Other coal-mining states have since passed similar legislation, and now practically every state of importance in coal mining as well as the Canadian provinces and European countries require an educational test. In fact, there is probably no other industry so surrounded by educational qualifications as is coal mining.

CERTIFICATES OF COMPETENCY ARE ISSUED

The positions for which examinations are required, in order to secure certificates of competency, are briefly as follows: Mine inspector, mine foreman or mine manager of the first or second class, firebоss or mine examiner, hoisting engineer, shotfirer and miner.

In the United States and Canada the following number of men were examined during the years noted, the figures being the totals for the foregoing positions with the exception of miners, the figures for which are not available: In 1904, 2,046; 1906, 1,740; 1909, 4.595; 1912, 3,790.

No later figures have been compiled, but those given show that even for the supervisory positions about the mines the demand is great; while if the miners examined could be included, the total would be increased. This educational requirement is not local, but widespread, as is shown by the fact that in 1912 examinations were held in Alabama, Illinois, Indiana, Iowa, Kentucky, Montana, Oklahoma, Pennsylvania, Tennessee, Utah, British Columbia, and Nova Scotia. Since that time West Virginia has been added to the states in which examinations are given regularly.

Aside from the desire to pass the state examinations as a prerequisite to hold managerial positions, much good can be done the men in the coal-mining industry by giving them more specific knowledge of the dangers which are incident to mining and the way in which such dangers may be avoided. A better knowledge of the technology of mining will make not only for safety, but for lower costs of production and less waste in the amount of coal left in the ground, which now amounts to at least 50 per cent. of the coal in the bed.

The recent activities in connection with mining education of the Federal Board of Vocational Education and the United States Bureau of Education suggest the timeliness of a consideration of mining education in some detail. The two federal agencies mentioned, acting in co-operation with local representatives of the mining industry in Pittsburgh, Pennsylvania and Cumberland, Md., have recently held conferences in these cities to discuss the application of the Smith-Hughes act to mining conditions, and also the general educational and sociological conditions in mining communities.

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Three similar conferences are planned to be held in Illinois in the near future to cover the same topics. Although interest is thus shown to exist, conversations with mining men in a number of centers have shown a hazy knowledge of the Smith-Hughes act and the work of the Vocational Education Board. The following synopsis of that act is therefore offered in an effort to bring before the mining industry the salient features of the act applicable to mining education.

The Smith-Hughes act was passed by the National Congress, approved by the President Feb. 23, 1917, and amended slightly Oct. 6, 1917. Since these dates a considerable amount of instructive work has been done along agricultural educational lines, but much less progress has been made in industrial and trade lines. These latter phases of the work have not received the same attention as have the agricultural phases. This is due probably in great part to the better organization of the agricultural interests for carrying on propaganda; also to the fact that during the war period educational and sociological matters have necessarily been kept in the background insofar as they affected manufacturing and other industrial pursuits.

A number of questions have been asked in connection with the Smith-Hughes act; first:

What is the purpose of the Smith-Hughes Act? This is probably best expressed in the title to the act, which describes it as "an act to provide for the promotion of vocational education; to provide for co-operation with the states in the promotion of such education in agriculture and the trades and industries; to provide for co-operation with the states in the preparation of teachers of vocational subjects; and to appropriate money and regulate its expenditure."

DETAILS OF ACT ADMINISTRATION

How is the act administered? The administration of the act is vested in the Federal Board for Vocational Education, which consists of the Secretaries of Agriculture, Commerce and Labor, the United States Commissioner of Education, and three citizens of the United States appointed by the President by and with the advice and consent of the Senate. The civilian members of the board only receive salaries of $5000 each. The duties of this Federal board are: (1) To co-operate with state boards of vocational education. (2) To make or have made studies, investigations and reports that will be helpful in establishing and carrying on vocational schools and classes. (3) To co-operate with the Departments of Agriculture, Labor, Commerce and the Bureau of Education in making such studies and investigations as are outlined in (2).

How is the work financed? To provide for the administrative expenses of the Federal board an appropriation of $200,000 per annum is made. For co-operation with the several states, appropriations have been provided by the Federal Congress as follows:

Ending	Industrial Subject*	Fiscal Year	Trade, Home Economics and
June 30, 1918.....	$ 500,000	June 30, 1923.....	1,750,000
June 30, 1919.....	750,000	June 30, 1924.....	2,000,000
June 30, 1920.....	1,000,000	June 30, 1925.....	2,500,000
June 30, 1921.....	1,250,000	June 30, 1926.....	3,000,000
June 30, 1922.....	1,500,000		
Annually thereafter.	3,000,000		

*Annual appropriations are made for agriculture.
In 1918, $500,000; 1919, $700,000; 1920, $900,000; 1921, $1,000,000.

Of these amounts not more than 20 per cent. shall be paid for the salaries of teachers of home economics, leaving 80 per cent. for trade and industrial teachers.

How are these appropriations allotted among the states? The allotments to each state for trade and home economics instruction is based on the proportion between the urban population and the total urban population of the United States, according to the last census, not including the outlying possessions.

Although not so stated in the law, the definitions of urban and rural given in the census publications will presumably hold—namely, urban applies to cities and incorporated places of 2500 people and over, including similar unincorporated towns in New England. Rural presumably applies to towns under similar conditions of less than 2500 population, and to persons not resident in towns.

In addition to the foregoing amounts, for purposes of co-operation with the states in the training of teachers, supervisors and directors of agricultural subjects and teachers of trade and industrial and home economics subjects, the following appropriations have been made, to be allotted to the several states in the proportion that the population of any state bears to the total population of the United States, not including outlying possessions: In 1918, $500,000; 1919, $700,000; 1920, $900,000; 1921, $1,000,000.

The state treasurer shall be the custodian of the federal funds. The question is asked:

How can a state secure its portion of the Federal appropriations? (1) The legislature must accept the provisions of the Smith-Hughes act. (2) It must create or designate a state board of not less than three members with power to co-operate with the Federal Board for Vocational Education in administering the act. (3) The state vocational board must prepare plans showing the kinds of vocational education for which it is proposed to use the appropriation from the Federal Government; the kinds of schools and equipment; courses of study; methods of instruction; qualifications of teachers; and in case of agricultural subjects, the qualifications of supervisors or directors; plans for the training of teachers; and in case of agricultural subjects, plans for the supervision of agricultural education. These plans must be submitted by the state board to the Federal Board for Vocational Education for approval if they conform with the provisions and purposes of the Smith-Hughes act.

APPORTIONMENT OF THE APPROPRIATIONS

How may the state boards use these Federal appropriations? The appropriation for salaries of teachers of trade, home economics and industrial subjects shall be devoted exclusively to payment of salaries of teachers having the qualifications set up by the state board and approved by the Federal board. Every dollar appropriated by the United States shall be equaled by a like appropriation from the state or from the local community in which the instruction is given, and all costs for equipment and instruction other than salaries shall be met from the state or community funds. The total amount expended in any school or class receiving the benefit of the Federal appropriation shall be not less annually than the amount fixed by the state board with the approval of the Federal board at the minimum for such schools or classes in the state.

What shall be the character of the instruction given? To receive Federal money the instruction given must be: (1) In schools or classes under public supervision or control. (2) The controlling purpose of such education shall be to fit for useful employment. (3) Such education shall be of less than college grade and designed to meet the needs of persons over 14 years of age who are: (a) Preparing for a trade or industrial pursuit (full-time schools); (b) for those who have entered upon a trade or industrial pursuit (part-time schools and night classes).

Continuing as to the character of the instruction given under full-time schools: (4) If such schools or classes give instruction to persons who have not entered upon employment, they shall require that at least half the time of such instruction be given to practical work on a useful or productive basis, such instruction to extend over not less than nine months per year and not less than 30 hours per week. For cities and towns

*A state may accept the benefit of any one or more of the funds now appropriated as noted above, but after June 30, 1920, no state can receive any appropriation for salaries, unless it has received meanwhile at least a minimum amount appropriated for teacher training.

of less than 25,000 population, the state board with the approval of the Federal board may modify the conditions as to length of course and hours of instruction per week for schools and classes giving instruction to those who have not entered employment in order to meet the particular needs of such cities and towns.

In connection with part-time schools: (5) At least one-third of the sum appropriated to any state for the salaries of teachers of trade, home economics and industrial subjects shall, if expended, be applied to part-time schools or classes for workers over 14 years of age, who have entered upon employment. (6) The subjects taught in a part-time school or class may be any subject given to enlarge the civic or vocational intelligence of workers over 14 and less than 18 years of age. (7) Part-time schools or classes shall provide for not less than 144 hours of classroom instruction per year.

Finally, under evening schools: (8) Evening industrial schools shall fix the age of 16 years as a minimum entrance requirement and shall confine instruction to that which is supplemental to the daily employment.

How are vocational teachers trained? The teacher of any trade or industrial subject in any state shall have at least the minimum qualifications for teachers of such subjects determined upon for each state by the state board with the approval of the Federal board. For a state to secure Federal money for the training of teachers, such training must be carried on: (1) Under the supervision of the state board; (2) in schools or classes under pubilc supervision or control; (3) training shall be given only to persons who have had adequate vocational experience or contact in the line of work for which they are preparing themselves as teachers, supervisors, or directors, or who are acquiring such experience or contact as a part of their training; (4) the state board with the approval of the Federal board shall establish minimum requirements for such experience or contact of teacher; (5) not more than 60 per cent. or less than 20 per cent. of the money appropriated under the Smith-Hughes act for the training of vocational teachers shall be expended for any one of the following classes of teachers: teachers, supervisors or directors of agricultural subjects, trade and industrial subjects, and home economics subjects.

The Coal Shortage in Europe

By DR. PAUL BARTHOLOW
New York City

It is a truth universally discussed in Europe that upon the supply of coal depend the reconstruction of states, agriculture trade, railway transport and manufacture of all kinds. The truth indeed seems obvious enough, but the far-reaching consequences of a coal famine are difficult to grasp except by careful study of the conditions where it actually exists. In an article upon this subject in the *Journal de la Foire de Lyon* of September 27th, an account is given of the coal crisis in one of the new states, Czecho-Slovakia, with consequences that astound the reader and in many ways show some of the difficulties of President Wilson's program. As a means of promoting trade and peace there is now no more powerful instrument than a free distribution of fuel, whether coal, wood, lignite, pulverized coal, artificial coal, and electricity. The *Journal* says:

"The coal crisis is general throughout the world, but in Central Europe its reciprocal effects or repercussion are much more serious because they are accompanied by two crises: that of revictualing and that of transport. The principal source of the coal for Central Europe is the basin of Upper Silesia which before the war exported two-thirds of its production (43,000,000 tons) to Czecho-Slovakia, Poland, and Austria. The production from this basin has now dropped to 2,000,000 tons a month, scarcely enough for the pre-war supply of Austria alone. Before 1914 Czecho-Slovakia also exported some of its coal, but these exports were only possible on condition that coal and coke from Upper Silesia and Westphalia were imported for the needs of its industry. At present the production from Czecho-Slovakia must be requisitioned, not only for its proper requirements but also for those of Austria. Before the war Austria imported from Germany 13,000,000 tons of coal, 9,000,000 tons of coke, 1,500,000 tons of lignite. These quantities were for the most part destined for Czecho-Slovakia."

As a country, Czecho-Slovakia has no such requirements as other more largely industrial states. It is a country half-agricultural, half-industrial. But since it depends chiefly on agricultural products, it happens that it is in autumn that industrial work is the most intense. The sugar refineries, steam mills and other factories for the utilization of products from the soil begin their chief activity after harvest. Similarly, the manufacturers of machinery resume their output in order to furnish agricultural implements for the farmer, while there is a greater demand for the construction of locomotives, and rolling stock. All this necessarily depends upon coal.

It is not a matter of very great difficulty to find other explanations of the effect of coal shortage not only on industry but on the health and morale of nations. The disasters involved come suddenly and, as a German writer observes, produce a state of mind which is hardly sane. The matter would seem to be thus—that while the effect of a coal shortage on industry may be obvious after a little reflection, it is not so well understood how cold and hunger, its other consequences, affect the health and spirits of nations and reduce their energy and powers of work. "The diminution of production," according to the *Holz Zeitung*, "is accentuated steadily, because the distribution of coal is made with less method and because men work less. The gravest problem now, and will be, is the lack of coal. The mills must shut down longer than the work permits; what is worse, no one knows when the furnaces may be relighted. All calculations and all the measures taken lead to nothing. The result is that production is reduced to the lowest point, and remains far below requirements. Again, idleness, which rules, also contributes to the diminution of production." Hence it is not surprising to read that although reserves of coal have increased in Rhenish Westphalia, improvement of industry and distribution have not been observed.

It is suggested that coal be pulverized, so that each particle is burnt and in burning unites with the greatest amount of oxygen giving the greatest amount of heat. The waste of steam and of heated exhaust gases is also condemned, while it is also suggested that a force of experts be appointed to factories and furnaces to inspect the washing and analysis of coal.

Meanwhile Europe is seething with a spirit of rebellion over the coal shortage. France, for example, produces 25,000,000 tons less than her requirements, and she must now provision Alsace-Lorraine. Thus coal has a political as well as an economic significance. "The results of a continued shortage," says a French journal, "will be regrettable and may lead to further outbreaks of war."

New Coal Loading Machine at Montour No. 10 Mine of Pittsburgh Coal Company

By R. W. MAYER
California, Penn.

THE Montour No. 10 plant, which will be the largest producer of the Pittsburgh Coal Co.'s mines, is located between Library and Finleyville, in Pennsylvania. The Pittsburgh Railways Co. (Charleroi Division) gives a half-hourly service on its trolley line which passes the mine, Coal Bank being the stop at the tipple. Freight for the plant is hauled over the Montour Railroad.

The coal mined here is the Pittsburgh thin seam, which lies considerably above the bottom of the valley. A tipple and approaches, nearing completion, are being built to span the valley, some coal having been dumped from it already; it crosses the Montour Railroad, a street-car line, public road and a creek. There is a steel span over the street-car track; but the rest of the tipple is constructed of wood as the cost of steel was considered prohibitive. The timbers on the tipple and trestles were painted with Carbolineum, which adds considerably to the life of the structure. The Pittsburgh company has used this wood preservative before, and it has proved quite satisfactory. Reference is made to this matter in an article entitled, "Montour No. 8 Plant of the Pittsburgh Coal Co., in the Mar. 30, 1918, issue of "Coal Age".

FIG. 1. THE MONTOUR NO. 10 TIPPLE

There are two dumps on the Montour No. 10 tipple, the coal being delivered to the tipple from both sides of the valley; however, each dump handles the coal from one side only. The tipple is designed for an output of 5000 tons per day, but one cross-over dump is capable of handling more than half of this amount under favorable conditions.

The coal will be delivered to the tipple from four openings on one side of the valley; no rooms have been turned off these entries as yet, development work only being done. The entries extend toward Bridgeville, where the company has other operations. The coal obtained from this development work has been dumped in a small valley and stocked, the tracks running directly from the mine on a level out over the dump.

The tipple is also supplied with coal from the opposite side of the valley, as stated. This opening extends for about five miles underground, connecting with the Lick Run mine, owned by the same company. About three miles of this entry is through solid coal, no rooms being turned. All the coal from this development work was also stocked, but on the side of the valley nearest the opening. A short entry was driven from this main haulage road to a side valley on which the seam outcropped. This entry followed the coal seam until the outcrop struck the bottom of the valley, which was quite narrow. A hoist pulled the cars up an incline on the opposite side of the valley.

The coal from preliminary operations of development work was dumped from tracks running out over the brow of the hill, a simple but effective kick-back dump being used for this purpose. This dump was constructed by mounting on four car wheels (C, Fig. 2). The front of this platform was cut beveled and shortened at the top. Another platform carrying the dump was hinged on top of the bottom one and carried the track rails for the car to run upon. A flat piece of ½x4-in. iron was fastened to the side of the bottom platform and passed through a loose guide on the side of the dump, to give greater steadiness to the platform when dumping.

The car-dumping outfit runs on a track which is extended as the dump advances. Track rails run from the top of the dump car to the track on which the dump car travels; the ends of these rails are beveled to a point and project down over the track rails. The loaded car of coal thus can be run right up to the top of the dump car, from which the coal is discharged. This method practically does away with the work of leveling off the bank for the next length of rails.

About 30,000 tons of coal are stacked in one pile from the single mine opening, and at least one-third as much more is stacked on the other side of the tipple from the four mine openings on the other side of the valley.

The Joy Loading Machine Co., of Pittsburgh, Penn., has a machine at work on the stock-piles loading the coal into mine cars at the Montour No. 10 plant. The coal is then dumped on the tipple and loaded into railroad cars. The Joy company has two other machines of the same type at work at the Belle Vernon mine of the Pittsburgh Coal Co. The loading machine weighs between six and eight tons and stands 5 ft. high; however, it can be lowered to 4½ ft. in height by an adjustment on the hopper. At present the Joy company is testing this machine to learn whether it can be improved in any way.

The Joy loading machine (*D*, *E* and *F*, Fig. 2) is mounted on a truck so that it may run on track. A conveyor carries the coal from the level of the ground, at the base of the coal pile, to a circular hopper into which it discharges it. This hopper holds about three tons. Another conveyor takes the coal from the bottom of this hopper, elevates it to a point over a mine car, and discharges it into the car. The car-loading conveyor is shown in the background and to the right of *F*, Fig 2. The mine cars are shifted back and forth to the loader as required.

The distinguishing feature of the Joy loader is the method used to get the coal on to the conveyor from the pile. The flight conveyor is of regulation construction with iron slats attached to endless chains. This conveyor is shown in the

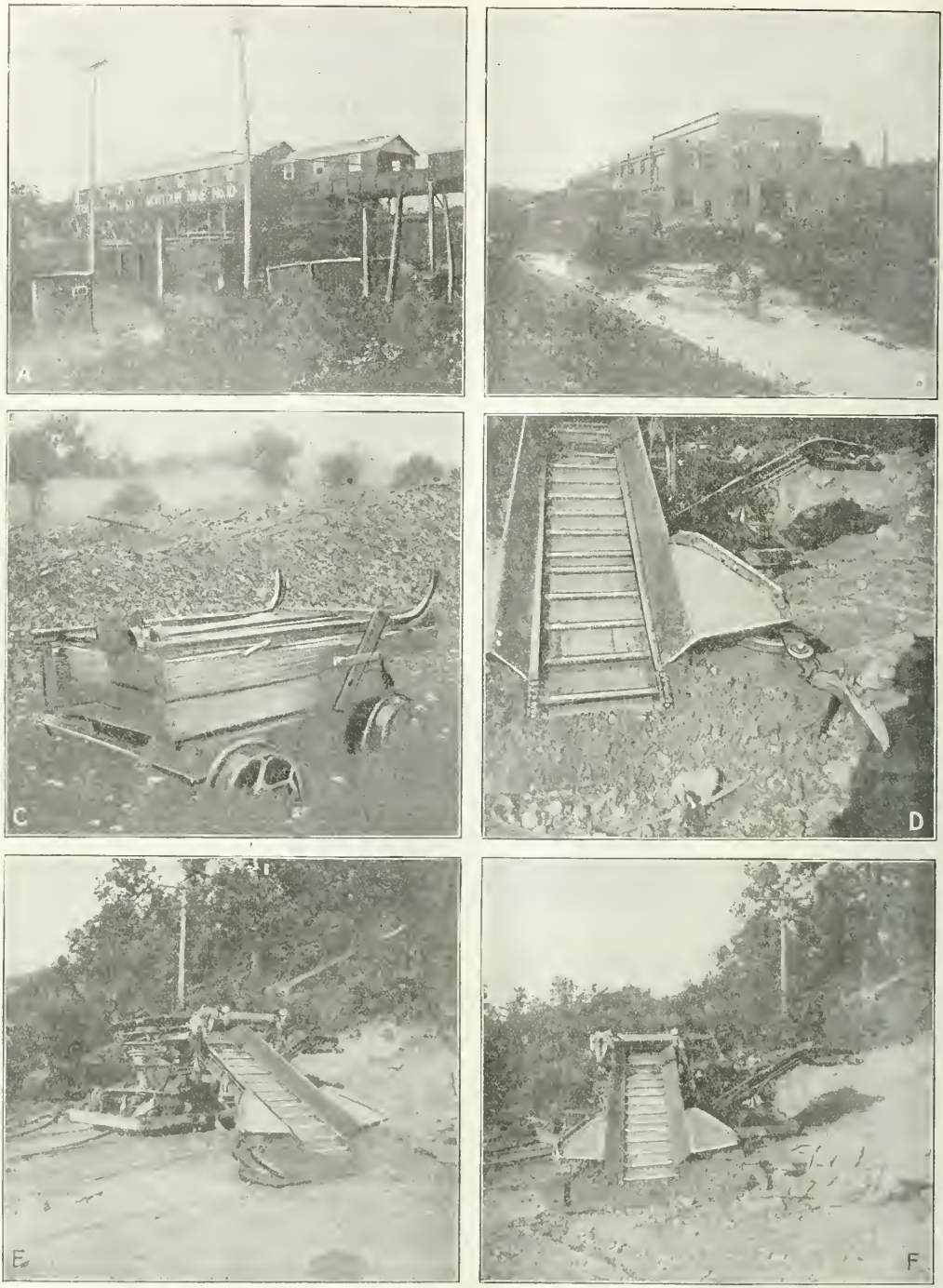

FIG. 2. VIEWS OF THE PLANT BUILDINGS OF THE MONTOUR NO. 10 MINE. THE LOADING MACHINE.
A—The Tipple. B—New Office and Shop. C—Kick-Back Dump. D, E, F—Views of Loading Machine.

foreground of *D*, *E* and *F*, Fig. 2. The end of this conveyor is made wedge-shaped so that it will enter the coal pile. As the conveyor is shoved into the pile, the coal falls down upon the belt and is carried up to the hopper.

Special provision is made to handle compact piles or large pieces of coal. At the bottom end of the conveyor (on each side) there is an arm whose motion is much the same as that of a person shoving both arms into the coal pile, then curving the arms toward each other and scraping or pulling the coal back on to the belt of the conveyor. These arms can be made to dig into the bottom, or at any part of the pile, by raising or lowering the conveyor. The conveyor not only can be raised and lowered, but it can be swung through an arc of 180 deg. This machine is supposed to do all the loading from the track and not be taken from the rails.

DETAILS OF FEED ARMS

The arms feeding the coal to the conveyor are made from 3-in. bar steel. The part which enters the pile has spurs, or spikes, on its upper side to help loosen and scrape the coal toward the belt. The spurs are about 4 in. long.

The arm is L-shaped and is pivoted at the angle of the L to a revolving eccentric. The arm of the L which has the spurs is forced into the pile of coal. The other arm of the L is hinged to a traveling rod which slides back and forth in guides. The rod which enters the coal has a slight curve to it and is about 2 ft. long. This mechanism gives the spurred arm a straight-ahead endwise movement, changes it to a sidewise swinging movement and then to a sidewise backward movement; this loosens the coal and scrapes it on to the belt. The ends of the two arms meet in their backward movement.

The Joy loading machine is run with General Electric motors, and the inventor claims a capacity of 200 tons a day when loading coal in a mine. Loading from a stock pile on the surface, its capacity should be much greater when everything runs smoothly.

The Lick Run mine is on the Baltimore & Ohio Railroad, and its output has been shipped over that line. It will now be run over the Montour No. 10 tipple and be shipped by the Montour Railroad, with which the Pittsburgh Coal Co. is closely affiliated. All haulage is by electric motors, mostly of the Jeffrey make. Morgan-Gardner machines are used to undercut the coal. The mine cars hold about three tons. The rails used on the main haulage roads are of 60-lb. steel; 40-lb. steel is used on the entries and 25-lb. steel in the rooms.

IRON PIPE FOR SUSTAINING TROLLEY WIRE

The frame for carrying the trolley wire on the approach to the tipple is made from 2-in. iron pipe. Wide bases having a socket are fastened to the floor planks, and the upright pipes set in these sockets are held with a set screw. The electric power used at this plant has been taken from the Pittsburgh Railways Co., but this will be changed in the near future.

The opening from the Montour No. 10 tipple runs to the Lick Run mine, as stated, and a person can travel underground from there to Keeling shaft, through coal all the way, to the incline at 12th Street, South Side, Pittsburgh.

A large office building and machine shop is being built at the Montour No. 10 mine, constructed of brick, concrete and steel (*B*, Fig. 2). A corridor separates the office portion of this building from the machine shop, thus making a more or less soundproof partition. This building will serve as headquarters for a number of the Pittsburgh Co.'s mines in this section. A town for the accommodation of the employees of this plant has not been built as yet.

Americanization Work in the Mining Towns

Though the war interfered to a large extent with the educational work carried on by the anthracite mining companies, and in some cases the suspended night classes have not been resumed, the increased interest shown in such classes as have been called together again is such as to indicate even better results than have hitherto been reached. This is particularly true of the "Americanization" classes wherein foreign-born mine workers are drilled in those branches which will give them the knowledge needed by an American citizen and enable them to pass naturalization examinations.

The Lehigh Coal and Navigation Co. is doing an effective work in this direction. This company's night classes, held in the Lansford High School three nights a week, had an average attendance of 192 pupils in October. All are employees of the company; none is under 17 years old, and there are instances of pupils as old as 42 years; and a large percentage are married men.

The beneficial results of this night school work in the Panther Creek Valley can hardly be estimated accurately, but one aspect of it is clearly shown by the attitude of the wives of the Slav miners. Their children are of course being educated as Americans in the public and parochial schools, the foreign clergy in that neighborhood being pronounced in their stand for Americanism. Now their husbands are being moulded into Americans by the night schools and are taking the first steps toward becoming real American citizens. In other words, their husbands and families are growing beyond them.

The Kingston Coal Co. is also doing Americanization work among miners and their families in the Kingston neighborhood. For about fifteen years this company has maintained its library for employes, and they have also maintained a night school for employes in the library building. This school is in operation this year with an added course, electricity. The Y. M. C. A. co-operates in this work by supplying instructors when needed.

In its general interest in citizenship and civic improvement work, the Kingston Coal Co. has taken up the policy of starting early with the alien. To this end it is the main co-operator in the Kingston kindergarten, which is under the general supervision of the Kindergarten Association of Wilkes-Barre. The association supplies a teacher and some of the supplies, while the coal company furnishes the building and acts as general booster and man of all work.

A CALENDAR INNOVATION

The company is also at work on its 1920 calendar, which is an institution of standing in the Wyoming valley. Instead of merely posting abstracts of the mine law, as required by statute, the company prints these digests on a calendar. The calendar itself is embellished with good engravings of improvements about the mines, of new buildings in the various towns, of churches and public works in which the miners, the company, or both, may have a direct interest. The idea is to have a man, every time he looks at the calendar to mark down his days worked, his cars loaded or any other memoranda, to see some part of the mine law before him, and to see a graphic reminder of what his working place, his community, or his church means to him and to all his fellow workers. So popular have these calendars become that the demand comes not only from men in the mines, but from their families and from other families throughout a wide area.

Miners and Operators Seek End to Strike Negotiations

WHILE there has been some difference of opinion among officials in Washington as to what constitutes a reasonable wage for coal miners and a reasonable profit for operators, there has been a very general desire throughout the entire strike negotiations for a showdown. The labor situation throughout the country has become such that certain precedents had to be established, and it is belived that out of the present struggle a procedure is certain to be developed which will make possible greater safeguarding of the public and at the same time will not give either capital or labor undue advantage over the other.

That the coal strike has destroyed much of the prestige with Congress which had been enjoyed by labor, is admitted generally. It is practically certain that legislation will be enacted at the present session which will place some bridle on the strike.

There are some who expect to see the strike bring about Government operation and control of coal mines for an indefinite period. Others, however, are convinced that the Government will avoid such a step to the last. Government operation would not in any way remove the danger of a strike, it is pointed out, and is certain to result in greatly increased cost of coal to the consumers.

INJUNCTION NOT EFFECTIVE

Many officials in Washington are of the opinion that the use of the injunction was a mistake. The practical effect of the injunction was of little value in that few of the striking miners returned to work. Had the Government been more active in providing protection for the men who desired to work, it is believed that the output of coal would have been much greater during the entire period of the strike.

Washington has been the scene of many of the more interesting phases of the most notable clash between capital and labor. Senator Frelinghuysen's investigation into the coal situation brought out many points which tended to clarify the minds of members of Congress as to the intricate situation existing within the coal industry. This was followed by the two dramatic speeches of Senator Frelinghuysen in which he told the Senate that the United Mine Workers of America were using their power in an autocratic and in ar entirely indefensible way. There have been few times in the history of the Senate when a body of citizenry—particularly one having so many votes—has been so thoroughly grilled.

When President Wilson's appeal for the suspension of the strike, pending further conferences, was rejected by the miners, Dr. Garfield was called to Washington and since that time has been the dominant figure in the coal situation. Unprejudiced observers are a unit in their conclusion that Dr. Garfield has displayed such ability in the handling of this situation as clearly to class him as one of the most able men in the country. Even the representatives of the miners are willing to admit that he is a man of great caliber. After the notable conference in the Red Cross Building, at which Dr. Garfield made his 14 per cent. announcement, representatives of the miners were indignant with themselves that they had not retired from the hall immediately. The more questions they asked him, and the more they argued with him, the "deeper in the hole" they got, to use the expression of one of the labor leaders.

The Central Coal Committee, which is looking after distribution, is essentially a railroad organization. There are two exceptions. C. E. Lesher, one of its members, is the geologist in charge of coal statistics for the United States Geological Survey, while H. Y. Saint is in charge of the coal division of the Shipping Board. Due to the fact that the Fuel Administration had no funds, it was not possible for it to set up its own distribution division.

PRAISE FOR REGIONAL COMMITTEES

It is admitted on all sides that the Central Coal Committee, with its regional committees, has done very effective and efficient work. This Committee is looking at the distribution problem as if the coal fields of the country were a doughnut. The central competitive field is the hole in the doughnut, while the rim contains the fields which are producing coal. Its problem is to get the coal, produced in the rim of the doughnut, into the hole. That this is a problem of magnitude may be seen from the fact that during the first four weeks of the strike, the coal produced in the Central Competiive Field was less than one per cent. of normal.

At this writing, the Central Coal Committee is on the point of taking steps to regulate the making of coke. Under present conditions, with a limitation on the price of coal and none on coke, an abnormal percentage of the coal in the Connelsville region is going into coke.

The most serious problem that the Central Coal Committee is facing at this time is the securing of payment for coal which has been diverted. While theoretically there should be no great delay in getting the money for the coal back to the operator, under the present system, it does not work out In practice. When coal is diverged, the consignee is required to put up collateral for payment. The probabilities are, however, that he never has heard of the consignor and, as often is the case, there may be delay in his learning who is to receive payment for coal. While ultimate payment is safeguarded, most shippers find that they have received but a small proportion of the amount due since the railroads began diverting the coal.

Fuel Inspection System Sought

An appropriation of $725,000 has been asked by the Secretary of the Interior for the establishment of a fuel inspection system. The work in this connection, should Congress approve, would be done by the Bureau of Mines. The request of the Secretary of the Interior specifies that a chief coal inspector is to be employed at a salary of $5,000; and assistant chief coal inspector at $4,000; six district coal inspectors at

$4,000, and 100 field coal inspectors at $2400. In justifying his request for the appropriation, Secretary Lane says:

"Inspection, sampling analysis, and certification of coal should be made by the government. This practice is followed in other commodities and would be a benefit to the producers of clean coal, the consumers, and to the interest of foreign commerce. This will assure the consumer the grade of coal which he pays for, protect the interest of those preparing clean coal, without discouraging the mining of poorer grades of coal and should exert an influence toward good preparation.

"This coal inspection system proposed by the Bureau of Mines contemplates as a salient feature advice as to the quality of coal shipped. It is proposed that each mining company set its own standard of quality, consistent with the particular vein preparation, and the market which the business affords, and that the government shall publish such standard and certify as to whether such standard is being maintained by the mining companies. There is not contemplated a certification as to each and every shipment, but the system does provide for the accurate sampling of full carload lots and for the inspection and sampling at irregular intervals of a sufficient number of cars of coal to indicate whether the declared standard of the mining company is being maintained. The coal mining companies would co-operate and enter the system and be privileged to advertise that their product was from a mine whose standard or preparation was certified by the government. In case the coal shipment was below the standard, the mine owner would be promptly advised of the fact, and, where possible, the consumer would receive a notice to the same effect. If the coal continues to fall below the standard, it would be removed from the certified list established by the government and the mine would be required to declare a new and different standard which its product could meet.

Aeroplanes for Mine Rescue Work

Plans looking to the use of the aeroplane in mine rescue work are being made by Director Manning of the Bureau of Mines and by General Menoher, Director of the Air Service of the Army. By transporting an engineer skilled in mine rescue work with as many sets of breathing apparatus as can be carried, it is expected to save much valuable time in case of a mine disaster. At first the Bureau of Mines district engineers will have to rely upon securing an aeroplane from the nearest aviation field. It is hoped ultimately, however, to have planes held in readiness for such work at each district headquarters.

Steps now are being taken to prepare landing fields at the mines. It is believed that the mine companies will be willing to arrange these fields. A landing field requires a fairly level runway of 1800 feet in two directions. While it is realized that it will be impossible in many instances to provide such a field right at the mine, there will be few cases where it will be impossible to provide the necessary runways in the general vicinity, from which automobile transport could be used to complete the journey.

Due to the fact that such a large percentage of mines are located in mountainous areas, much time is lost in reaching a mine after a disaster unless it happens that prompt railroad service is available. In a great majority of cases it is necessary to use automobiles to get breathing apparatus and experienced rescuers to the scene of the disaster. In many cases the wagon road is circuitous. The greatest saving of time could be effected in many cases where it is possible to take the direct air line at the rate of 100 or more miles per hour. Such aeroplanes as are available for this service at present would carry the pilot, the engineer, and 8 sets of breathing apparatus.

The idea for utilizing aeroplanes in mine rescue work came from F. J. Bailey, the Assistant to the Director of the Bureau of Mines, who among his other duties, is in charge of mine rescue stations. He conducted the negotiations, which resulted in General Menoher's pledge to co-oprate actively in this work.

Railroad Administration Providing Adequate Transportation

Criticism of the transportation furnished by the Railroad Administration caused Walker D. Hines, Director General of Railroads on Oct. 29, to issue the following statement as to the achievements of the administration during the period when operators were in sore need and hindered by other troubles:

During the first six months of this year an abnormally small amount of bituminous coal had been mined and transported because of the lack of demand. The demand began to improve in June and July. Slight car shortages for the movement of bituminous coal began to become evident in June, and became more pronounced about July 15. In a statement sent to the Senate under date of Aug. 14, in response to a Senate Resolution, I said that I did not anticipate any shortages in transportation which would be in any sense exceptional or abnormal or which would justify oppressive prices for coal. On Sept. 4 I appeared before a sub-committee of the Interstate Commerce Committee of the Senate investigating the coal problem and stated that the Railroad Administration would be able to transport the necessary coal and that the Railroad Administration proposed to adopt whatever expedients were necessary to accomplish that purpose. I called attention to the fact that while the highest production that had ever been made in a week was 13,000,000 tons, the highest that had been averaged for any considerable period of weeks was something over 11,000,000 tons.

Up to September not exceeding 10,000,000 tons of bituminous coal had been transported per week. The Railroad Administration early in September instructed that the Railroads endeavor to provide transportation for 11,000,000 tons per week. The result has been as follows:

WEEK ENDED	
September 13	11,046,000 tons
September 20	11,253,000 tons
September 27	11,613,000 tons
October 4	11,518,000 tons
October 11	11,881,000 tons
October 18 (estimated)	11,784,000 tons
October 25 (estimated)	12,900,000 tons

On Thursday, Oct. 16, or two weeks ago, I had a meeting with the Regional Directors covering the western territory, and the same day the coal situation was taken up with the Regional Directors of the territory in the east and south, and as a result instructions were immediately issued under which railroads serving coal mines were to make preferential efforts to furnish mines with empty coal cars up to the ability of the mines to load daily, and non-coal loading railroads should commence immediately to deliver daily to their nearest coal loading or coal route connections empty coal cars up to the maximum ability of such connections to receive such cars. Instructions were also issued the same day to the effect that open top cars should be immediately withdrawn from non-coal service in numbers sufficient to permit placement at mines and deliveries to coal loading connections as required; also that consignees not unloading coal within twenty-four hours after cars were placed for unloading should have no additional cars placed for unloading.

The result of these arrangements is indicated by the estimated increased production for the week ending Oct. 25. The indications are that the production and transportation will be at not less than a corresponding rate during the present week.

Miners Receive 14 Per Cent. Increase

In a message prepared on Nov. 28 by the committee of coal operators consisting of T. W. Guthrie, A. M. Ogle, Thos. K. Maher and E. C. Teals, who remained in Washington to represent the Central Competitive Field, the committee notified the operators to post the following notice of increase in wages as ordered by the Government:

The Government of the United States having decided that mine workers are entitled to a 14 per cent average increase to bring wages up to the increased cost of living, this company gives notice that a 14 per cent average increase in wages is hereby granted, effective at once. This average increase will be so divided as to preserve present differentials. No change will be made in conditions of employment. The new scale of wages will be posted as soon as possible.

Coal Strike to be Probed by Senate Committee

An investigation of the coal strike along the lines of the probe into the steel strike by the Senate has been requested by Senator Jones of Washington. It is his plan to have the investigation undertaken by theCommittee on Education and Labor, of which Senator Kenyon of Iowa is the Chairman. It is the intention to take the testimony, not only of the more important figures on each side of the coal controversy, but also the district officers of the unions; individual workers, and individual operators.

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With Your Kind Permission

THIS issue the reader will note is an amalgamation of two issues, Nov. 27 and Dec. 4. Only by joining issues together is it possible for us promptly to get back to our regular schedules after the long strike of the printing unions of New York City. We are including in this issue the accounts of the meetings of the West Virginia Mining Institute and the Coal Mining Institute of America, both of which took place recently and in which much information of interest to all mining men is contained.

We expect by Dec. 25 to be once more on our regular schedule and to be able to produce a paper containing all the departments we were running before the strike made the publication of the paper difficult.

Our reading public has borne patiently with us, just as the consuming public has endured with forbearance the long coal strike. Our readers knew we were willing to deal fairly with our men; that we had met them and made them a fair proffer (one acceptable to, and accepted by their international officers) and our readers stood by us from the very first to the very end.

The general public also know that the bituminous coal operators were willing to concede all that the Government ordered, even when in their hearts they questioned the fairness of the order and the advisability of it. In consequence the nation, prone to be unjust when annoyed and little disposed to consult with its reason when its interests are invaded, showed a sympathy, an insight and a patience that was surprising to those who confidently expected that the people would be governed by spleen and not by calm counsel.

By reason of the collapse of the strikes—those of the steel workers, the mine workers and the printing craftsmen—the strike mania is on the decline. Nothing could be better for the workingman. He cannot afford to pay these classes of workers what they asked for their services, and he cannot face with composure the continued loss of production and the increasing cost of output resulting from such disturbances.

In Russia the men work about three hours a day and spend the rest of the time hunting in vain for the food, clothing and comforts that they could easily produce in the other five hours if they would only work—and they cannot find them for they have not been produced. The Russian socialists have so successfully obtained concessions for the workingman that now he cannot afford to buy himself even a coffin.

Electric Mine Lighting

WE PRINT upon page 849 of this issue, a short description of electric lighting at the working face of the mine. This method of illumination has been in use long enough to have passed the experimental stage. In the mines described it has become an accomplished fact the utility of which is well recognized.

Sight, of course, depends upon light, in most instances reflected light. The interior of a coal mine has always been difficult of illumination because the black, or nearly black, surfaces of ribs, roof and floor reflected but little of the light striking them. The ordinary cap lamp was therefore apparently much less effective underground than it was in, we will say, the interior of a building with white walls and ceiling.

Uncertain or inadequate lighting is a potent factor tending toward accident. The employment of electric bulbs at the working face, through their much better illumination of coal and roof conditions, beyond the shadow of a doubt are a powerful influence tending to neutralize or offset the most prolific cause of accident encountered in American coal mines. This fact alone, regardless of the increased efficiency of the miner when they render possible, might in many instances be sufficient justification for their installation.

Another Factor of Education

THE great college professor strolled down the platform a few minutes before train time. Down at the head of the train he paused to watch the engineer oiling up his locomotive. For some time he watched this overalled engine driver unobserved. When the engineer finally looked up each recognized in the other a companion of earlier days. They had been boys together, their father's owning and working adjoining farms.

The men sprung forward and clasped hands. After a few casual remarks the engineer inquired if the professor (only he called him Bill) was going "down the line" and upon receiving an affirmative reply he invited the great educator to ride in the cab with him. And partly for the novelty of the experience and partly that he might see his old playmate "in action" the professor accepted the invitation.

After the run was over the professor went with the engineer when he made his report and modestly entered his train as "on time." In parting the professor pushed an admission ticket into his friends hand explaining that he was scheduled to deliver a lecture that night on education and he would be glad to have the engineer attend and give him his honest opinion of his views and treatment of the subject.

All through the lecture the engineer listened attentively. He was not however enthusiastic and sometimes gravely shook his head when others applauded. When the meeting was over he came to the professor and said: "Bill that certainly was a fine talk you made but to my notion you completely missed the backbone of the whole subject. To my way of thinking the really educated man, the man whose learning is of real value is the one who is onto his job. The education that don't make a person more efficient in the position he fills is not worth getting."

And the great professor, remembering his ride of the night before, was compelled to admit the truth of the engineer's assertion.

When will those who seek to improve and develop the minds and intellects of our mining folk, educate their pupils into instead of out of their positions in the mines? When will the night schools conducted in various mining communities seek to develop not mediocre foremen but efficient miners, and drivers and machine men? In short when will the course of study pursued tend to put a man onto his job?

DISCUSSION *by* READERS

EDITED BY JAMES T. BEARD

The Miners' "Keg Fund"

Letter No. 1—Believing that it may be of interest to many old timers in the anthracite region, particularly employees of the Delaware, Lackawanna and Western R. R. Co., allow me to use the columns of COAL AGE to refer to the reported conversation between E. J. Lynett and the late John Mitchell, relating to mine accidents, as published in the Scranton Times, Sept. 25, 1919. In the article to which I refer, Mr. Lynett quotes Mr. Mitchell as expressing the opinion that 60 per cent. of the general mine accidents are due to the carelessness of miners and inadequate scientific supervision.

After commenting on Mr. Mitchell's ideas relating to the compensation of miners and mine laborers injured or killed in the pursuit of their calling, which were practically a forecast of the present Compensation Laws and, at that time, not then even thought of as a feasible project, Mr. Lynett refers to the efforts of coal miners to establish what became known as the "Keg Fund," designed for the benefit of injured miners and their dependents. Mr. Lynett states, "I cannot recall, at this moment, if the keg funds were then in existence; but, to the best of my recollection, they were not."

It is not my desire to take any exception to the statement attributed to Mr. Mitchell, regarding the responsibility for mine accidents, or to deprive him of any honor that is rightly his for having pioneered the Industrial Compensation Laws. I would, however, call Mr. Lynett's attention to the fact that, long before Mr. Mitchell came to the anthracite field, the so-called "Keg or Accidental Funds" were in a flourishing condition, at least at most of the coal mines of the Delaware, Lackawanna and Western R. R. Co.

It is a rather strange coincidence that this reference of Mr. Lynett to the "Keg Fund," together with the announcement coming at the same time of the death of the late Arthur H. Storrs, brings to my mind some of the early history of the establishing of the "Keg Fund," which I will recite briefly for the benefit of those interested.

It was in the early 80's, I do not just recall the year, that a committee of the Delaware, Lackawanna and Western R. R. Co.'s employees, representing the Bellevue, Dodge and Scranton mines, called on W. R. Storrs, the father of the late Arthur Storrs and, then, general coal agent for the company, and laid before him and the general inside superintendent, B. Hughes, the general plan of the miners' "Keg Fund," explaining its aim and object.

Both Messrs. Storrs and Hughes were favorably impressed with the proposition and suggested to the committee that the company would be willing, on their part, to take over all the empty powder kegs of the miners and supervise the fund at no expense to the men, applying it for the benefit of any employees who might be injured or killed in the mines, according to the plan contemplated by the proposed organization.

The committee reported back the results of this interview to a joint meeting of the men, with the result that a great deal of fear was felt and expressed that the officials had "something up their sleeve," as the saying goes. It was thereupon decided to refuse the offer of the company, the miners preferring to retain the management of their fund in their own hands and control.

An organization was soon formed, including the employees of the Bellevue and Dodge mines, which continued until September, 1887, when the Dodge men withdrew and formed another organization of their own, electing the following officers: John C. Lowelle, president; William T. Williams, vice-president; Edward James, treasurer; H. G. Davis, secretary.

The election of Edward James, who was foreman at the colliery, as treasurer of the fund, was only in keeping with the usual custom. Membership in the fund was voluntary and, while some of the employees did not look upon the fund with favor, the fact that the boss was treasurer exerted a strong influence to induce the indifferent ones to become members and contributors to the fund. I am advised that the Dodge fund is still in existence and is in a flourishing condition today.

Let me say, in closing, that the "Keg Fund" has proved a great blessing to many of the mine workers who were injured in the early days, and to the dependents and families of those who were killed. These early efforts of the miners, in their own behalf, have doubtless done much to advance the idea of compensation for injury and the enactment of such laws by different states.

AJAX.

Kingston, Penn.

Problem in Coal Extraction

Letter No. 11— In the issue of COAL AGE, Aug. 7, p. 234, there appeared an article on the extraction of the coal from a seam 8 to 11 ft. in thickness and lying at a depth varying from 450 to 600 ft. Although not proposing to enter into a discussion of the method outlined in that article, as there are others more competent to do this than myself, I desire to suggest the trial of a longwall method of extraction that I will describe briefly as follows:

On a front varying from 500 to 1000 ft. the longer the better, start a longwall face, taking out from 3 to 4 ft. of the bottom coal and brushing sufficient roof coal on the road to maintain the desired headroom. Build and gob this coal on each side of the road, in the same manner as rock or slate brushing is built and gobbed, to form the main road. On a 1000-ft. front, there will be room for driving 33 places, on 30-ft. centers, extracting, say 3 ft. of the coal in driving up these places.

Taking out 3 ft. of the coal in the first operation, on a longwall face 1000 ft. in length will permit the top coal to settle gradually down to the pavement in the time that the face is advancing, say 50 yd. Props are set in rows along the coal and these are drawn and reset as the face advances. By a proper arrangement of the timbers, the pressure is kept uniform and the coal at no point is exposed to an excessive weight and crushed.

When the longwall face has advanced a sufficient distance, say 50 yd., the working places are cut off by a crossroad or entry. The distance between crossroads must be determined, by experiment, to suit the conditions. New roads are now branched off the crossroad, in the same manner as at first and driven forward another 50 yd.

By the time the first cross-entry has been driven 1000 ft., the top coal will have settled to the pavement over an area 150x1000 ft. Into this area, roads are now started backward in the top coal. The reason for working backward, or on the retreating plan, in the top coal is that there is now no material at hand for gobbing to keep the road open, so that the air will have a free passage along the face.

This plan of working out 3 ft. of bottom coal, first forward and then backward, between cross roads, can be applied successfully and continuously to seams of any thickness, say 20 or 30 ft. or more. When the places have been worked forward and backward once, this can be repeated again and again, as the coal above settles down to the pavement. The crossroads are worked backward in the same manner as the working places. I have simply outlined the method, which will be easily understood by those familiar with longwall work. The plan will prove successful on a grade up to 30 deg.

Cumberland, N. S. JOHN McNEILL.

Bolshevism in America

Letter No. 8— Whatever may have been the original idea or theory of Bolshevism, its practice has degenerated today into a form or principle that does not appeal to rational-minded people. The acts of its adherents indicate clearly that, as commonly understood, Bolshevism is opposed to constituted law for the protection of life and property. As such, the doctrine is bound to be condemned as a "menace to civilization."

The student of history cannot fail to observe that there is, today, a widespread spirit of reform, either in the political or the economic affairs of nations. Democratic principles are rapidly supplanting autocratic rule, and men are no longer governed and controlled as children. In the evolution of affairs, questions of vital importance demand consideration, and their solution requires the exercise of prudence and the best judgment, in attempting to reconcile the hostility that naturally exists between the different factions of society.

In the present unrest that so disturbs the peace of nations, impulsive action must be controlled by a calm judgment, in the settlement of economic affairs. The doctrine of force to which modern thought has become so attuned must give place to the principles of arbitration and cooperation if conflicting interests are to be harmonized and welfare and progress assured.

BOLSHEVISTIC PRINCIPLES UNSOUND

The more one looks into the theory of Bolshevism, the more confusing it becomes. Its principles and policy are based on the wanton destruction of both life and property. While its followers are made to believe that the aim is to crush autocracy and remove oppression, the truth is very plain that its advocates seek to establish an autocratic rule that disregards the right of another and strives for the overthrow of existing governments and the confiscation of property, both public and private.

Instinctively one knows that the destruction of life and property is morally wrong and vicious, a sheer waste of wealth that cannot fail to bring misery and suffering if permitted. Ruskin has defined the true principles of economics as a system of conduct and legislation founded on the sciences directing the arts and impossible except under certain conditions of moral culture. We find nothing in Bolshevism that conforms to this standard of ethics.

Spencer, that great student of economics, says: Every man has the right to do all that he wills, provided he does not infringe on the equal right of another. Had this principle of action prevailed, there would not be the turmoil and strife that is now rampant throughout the world.

It is a weakness in men to be contentious and harbor a spirit of bitterness against capitalism; but, instead, we should reflect that we are all capitalists to the extent to which our means, talents and energies are used for the production of wealth. It is a fallacy to imagine that reformation can be brought about through any action tending to embarrass capitalism and prevent its functioning for the common welfare of mankind. To destroy capital of any kind or nature is suicidal.

PRODUCTION WOULD BE CURBED

Bolshevism or, I may say, communism is a policy by which capital would be so disciplined as to check production and progress. It is essential to civilization that men shall govern and be governed on a broad basis of equality. The strength of government lies in its ability to so discipline a nation as to insure the protection of life and property, and to legislate for the common interests of the people. To any who are inclined to believe that Bolshevism provides a means of adjusting social and economical errors let me say, in closing, that such a thought is only imaginary and will lead to disappointment.

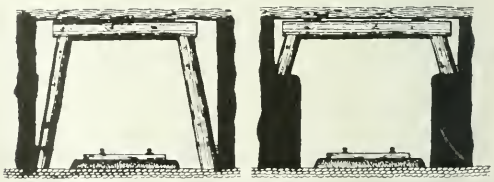
Ladysmith, B. C., Canada.

WILLIAM WESNEDGE.

Safety in Mine Timbering

Letter No. 7—Referring to the method of timbering a haulage road, by supporting the crossbars on siderails held in position by iron plugs that are driven into holes bored in the ribs of the entry, as described by J. Riley, COAL AGE, Sept. 25, p. 541, let me say that, while the plan he suggests is a good one, I very much prefer supporting the crossbars on short legs set in hitches cut high in the ribs, whenever the coal is strong enough for that purpose.

In the accompanying figure I have shown this method on the right, together with the usual form of double timbering on roadways, shown on the left. Supporting the crossbars on



TWO METHODS OF TIMBERING ROADS

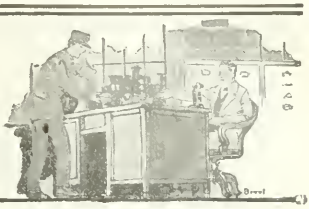
short legs, as I suggest, is a method much used in coal mining wherever timber is scarce or it becomes necessary to cut down the cost. While not as good as the old method where the legs supporting the bar rest on the ground, the short-leg method possesses much the same advantages as claimed by Mr. Riley.

Resting the legs of timber sets in hitches cut in the rib eliminates the danger of men being caught between a car and a post standing at the side of the road, or of a derailed car knocking out a post and causing a fall of roof and possibly a fatal accident, besides blocking the road. It also adds much to the safety of mine haulage, where the tracks are well ballasted and drained, which keeps the bottom dry and renders the timbering of the roadway more permanent.

Rawdon, Quebec, Canada. C. McMANIMAN.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD



Electric Mine Haulage Question

We have in operation, at our mine, a 6-ton, General Electric, double-armature locomotive. The drawbar coupling is at exactly the same height as that on our mine cars, which theoretically should cause a truly horizontal pull on the locomotive. This theory, however, is not supported by fact, in the actual operation of the locomotive, as the front end of the machine appears to lift when pulling a loaded trip. The tendency of the front end to lift causes the wheels to spin and throws the major portion of the load on the rear wheels, with the result that the back motor does practically all the work and becomes overheated, causing much trouble.

The locomotive in use is a single-end control, with the cab and controller on one end and the resistance on the other. Believing that the combined weight of the cab, controller, and operator were not balanced by the weight of the resistance, we turned the locomotive end for end, putting the operator and cab end of the machine in front instead of next to the load, but the results were still the same.

We are now contemplating lowering the drawbar of the locomotive, so that its end will be below the mine car hitching, thinking that this will serve to counteract the lifting tendency by throwing a greater load on the front wheels, thus equalizing both the load and the work of the two motors. Kindly advise if this will accomplish the desired result and, if not, how the difficulty can be overcome.

CHARLES F. SHERMAN, Gen. Supt.,
Peoria, Ill. Groveland Coal Mining Co.

The proposition here presented is an unusual one. It is possible that the difficulty mentioned is experienced when hauling on an upgrade, or when starting a heavy loaded trip. When a locomotive is hauling on a level track, however, there should be no trouble due to the lifting of the front end and consequent overloading of the rear wheels and rapid heating of the motor at that end, provided the locomotive is properly balanced and operated by a competent motorman. The habit of some motormen to accelerate the speed too quickly may have a slight tendency to lift the front end of the machine, or at least throw a greater proportion of the load on the rear wheels and motor. The same effect is caused by hauling on an upgrade.

In the operation of an electric locomotive, the controller should never be moved in a manner to cut out the resistance too rapidly and not giving sufficient time for overcoming the inertia and allowing the motors to pick up the load. The suggestion of lowering the end of the drawbar on the locomotive, so as to cause the coupling attaching it to the loaded trip to give an upward pull would have little effect to overcome the trouble and is not recommended.

There is a very slight tendency, which is almost inappreciable in its effect, for each motor to rotate the machine body in the direction in which the wheels are turning. This effect, however, would have an opposite tendency to that described as the difficulty experienced in this inquiry.

Taking the point of contact of the rear wheels with the rails as the center of moments, it is clear that the moment of the drawbar pull is opposed to the moment of the weight of the machine, acting through its center of gravity. But, as the drawbar pull can only be estimated as, say one-fourth of the weight resting on the drivers, under the best conditions, the ratio of the weight of the machine to the drawbar pull can hardly exceed 4; and, for equilibrium, this ratio must be equal to the ratio of the height of the drawbar coupling above the rail to one-half the wheelbase.

In other words, the half wheelbase cannot exceed one-fourth of the height of the drawbar coupling above the rail, if the drawbar pull is to cause the locomotive to lift at the front end. But the half wheelbase of a locomotive is always greater than a fourth of the height of the drawbar coupling above the rail, which would seem to indicate that the drawbar pull can never lift the front end of the machine, in ordinary mine-haulage practice. However, we shall be glad to hear from others on this point.

Utilization of Pyrite in Coal

Having been deeply interested in reading the article entitled "Coal Pyrite Resources of Tennessee," COAL AGE, Vol 15, p. 1077, I am anxious to secure still further information regarding the extraction of pyrite from coal and its utilization in the manufacture of sulphur. I am particularly interested in securing details of a plant necessary for this purpose and an outline of the methods required to carry on the work. Perhaps some of the readers of COAL AGE will be able to give information of value along this line, as the result of their own experience and knowledge.

Keelung, Formosa, Japan. K. OHTAKE.

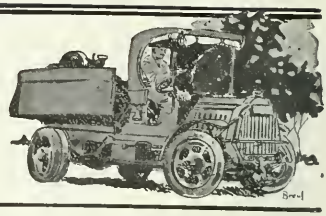
Some time ago, E. A. Holbrook, then connected with the Engineers' Experiment Station, of the University of Illinois, published a bulletin entitled "The Utilization of Pyrite Occurring in Bituminous Coal." The bulletin contains flow sheets, together with estimates of the cost of erecting a plant for the treatment of pyrite in coal. It is probable that this bulletin can still be procured by writing the University of Illinois, at Urbana.

Recently, there appeared in the August bulletin, No. 152, p. 1469, of the American Institute of Mining Engineers, an article by S. H. Davis, entitled "Utilization of Pyrite in Coal." This was a two-page article, which was read at the Chicago meeting of the Institute, September, 1919. An interesting discussion of the article by Edward Hart and E. A. Holbrook appears in the October bulletin, No. 154, p. 2948.

Mr. Davis' article was based on his experience in the operation of a plant under his charge, at Gillespie, Ill. The discussion of the article by Mr. Holbrook included full estimates of what might be considered as the possible pyrite recovery from the coal mines of the country east of the Rocky Mountains and shows a total of 1,456,000 tons of pyrite per year. This estimate is based on data collected by Mr. Holbrook, as engineer of the Federal Bureau of Mines, while engaged in a general investigation of the pyrite resources of the country.

The subject of utilizing the pyrite in coal is one of growing interest and importance, and COAL AGE will be glad to receive further information of value from readers.

COAL AND COKE NEWS



WHAT HAPPENED IN SEPTEMBER

[The bracketed figures in the text refer to the number and the page of the volume in which references to the matter noted may be found, and should the reader desire further information he can obtain it in the place indicated.]

Sept. 1—International mine-rescue and first-aid contest takes place at Nanaimo, B. C., under the auspices of the Vancouver Island Mine Safety Association [XVI-577]—Employees of Canadian Western Fuel Co. receive an advance of 25c a day [XVI-467]—Fourth annual first-aid meet of the Inland, Argyle and Mountain coal companies is held at the Belmont Field in Ebensburg, Penn. [XVI-576].

Sept. 3—H. Y. Saint, head of the export coal department of the Shipping Board, appears before the Senate Committee investigating the coal situation [XVI-451]—Judge Cildress, of Letcher Circuit Court, Whitesburg, Ky., dismisses action brought in important case [XVI-467].

Sept. 5—William C. Redfield, Secretary of Commerce, hands in his resignation to President, Wilson. Follows failure of Industrial Board (organized by Redfield) to stabilize prices—Grievance Committee of Powderly, No. 1, and Jermyn collieries, at Carbondale, Penn., meet with Hudson Coal Co. officials without securing concessions, and order general suspension at all mines of the company [XVI-455].

Sept. 6—Miners at larger operations on Kanawha & Michigan R. R., on Kanawha River, W. Va., start an invasion of Guyan Valley. Miners from other nearby points start for points in Boone and Logan Counties. Action taken by Governor Cornwall, of West Virginia [XVI-455 and 456].

Sept. 8—Most of miners who marched to points in Guyan Valley, W. Va., back to work [XVI-456]—Governor Cornwall issues a statement relative to further disorders of recent Guyan Valley raid order [XVI-498]—Some 20,000 men of 30 mining plants of Hudson Coal Co., in Lackawanna and Wyoming Valley, Penn., go out on strike [XVI-455]—An order is issued to start strike of mine workers of Delaware, Lackawanna & Western R. R. Co., Coal Department, to take effect on Sept. 9 [XVI-498].

Sept. 9—Convention of United Mine Workers of America meets in Cleveland, Ohio, to formulate a wage scale [XVI-454]—John Mitchell dies at the Post-Graduate Hospital in New York City [XVI-491]—The Twenty-seventh Consecutive and Fourth Biennial Convention of United Mine Workers of America, meets in Cleveland, Ohio [XVI-496-7].

Sept. 10—Senate Investigating Committee considers export coal situation [XVI-492-3].

Sept. 11—The locals of men employed by the Hudson Coal Co. vote to go back to work on Sept. 13 [XVI-498].

Sept. 12—The committee on Railroad Relations of the National Coal Association and representatives of the United States Railroad Administration hold a session at White Sulphur Springs, W. Va. [XVI-552].

Sept. 15—The mine workers of the Hudson Coal Co. return to work [XVI-539].

Sept. 17—The Delaware, Lackawanna & Western mine workers return to work [XVI-539].

Sept. 22—Investigation starts relative to conditions in Guyan field in W. Va.; also raid of Boone County by mine workers [XVI-539]—The American Institute of Mining and Metallurgical Engineers meets at the Congress Hotel in Chicago, Ill. [XVI-606]—Arthur H. Storrs dies at Pelham Manor, N. Y. His home was at Scranton, Penn. [XVI-696].

Sept. 25—The Chicago meeting of the American Institute of Mining and Metallurgical Engineers concludes its sessions [XVI-609].

Sept. 29—The Pittsburgh station building of the Bureau of Mines is dedicated formally at Pittsburgh, Penn. Many notables present [XVI-611].

Sept. 30—The preliminary mine-rescue contests of the national first-aid and mine-rescue meet is held in Pittsburgh, Penn., in conjunction with dedication of the Bureau of Mines building [XVI-614].

PENNSYLVANIA

Anthracite

Hazleton—J. W. Boyle has resumed operations in the removal of the old anthracite culm banks at Woodside, near here, which was a busy place during the war when the demand for fuel was unprecedented. The smaller sizes are again going to market with a rush, owing to the scarcity of bituminous, following failure of the soft coal miners to return to work.

Bituminous

Indiana—E. E. Creps, of this place, has purchased three tracts of coal land in White Township at a cost of $54,369. This deal includes the Margaret D. Gorman tract of 106 acres; consideration $15,994. Another property was the consideration $19,875. The third property was the George Snyder tract of 122 acres; consideration $18,500.

WEST VIRGINIA

Charleston—The mine casualty list of West Virginia for the month of October, according to figures compiled by the West Virginia Department of Mines, numbered 24, and of that total 11 deaths were due to falling slate and coal. The next largest number of deaths followed in the wake of mine car accidents, there being five deaths due to such a cause. One miner was killed by a motor, another was killed by a mining machine and a third was killed by electricity. Deaths outside of the mines from various causes came to a total of five. Nearly one-third of the fatalities, or seven, occurred in McDowell County; Brooke, Fayette and Logan counties had two each. There was one mine fatality in each of the following counties; Barbour, Clay, Harrison, Kanawha, Marion, Mercer, Mingo, Monongalia, Preston, Putnam and Tucker. Sixteen Americans in all were killed as against eight foreigners.

Fairmont—Construction of a short line coal carrying railroad from Flaggy Meadow to the Monongahela R. R. in Monongalia County is presaged by the organization of the Bias Coal Railroad Co., by Samuel D. Brady, a prominent Fairmont coal operator, and associates. The company has obtained a state charter with an authorized capital of $100,000. Among those associated with Mr. Brady in the enterprise are: F. W. Byrne, of Everson, Penn.; Frank E. Peabody, L. P. Monohan and Eugene S. Reilly all of Pittsburgh.

Fairmont — Improvements in and around the plants of mines Nos. 86, 87 and 88 of the Consolidation Coal Co. at Carolina, Ida May and Wyatt, respectively, were made while the mines were shut down during the strike. Streets in the three towns named were graded and cement pavements laid, the work being done by striking miners. A new chute and screen have also been installed as a part of the new tipple equipment at Mine No. 25 of the Consolidation company.

ILLINOIS

Duquoin—The Old Ben Coal Corporation, of Chicago, has just completed the work of sinking another shaft near Pershing, southeast of here, making a total of three mines within six miles of each other, operated by the same company. When about three-fourths of the way down quicksand was encountered, and this delayed the project somewhat, but after it was put under control the shaft was rapidly completed. The mine will be known as Old Ben No. 15, and will be equipped with electric haulage throughout. Work is now being started on the new tipple and engine room, and when the plant is completed it will be one of the principal enterprises of the community.

A deed indicating a $500,000 consideration was recently filed in Jefferson County from the West Frankfort Coal Co. to the Southern Gem Coal Co. (a new organization), conveying thousands of acres of coal lands to the latter concern. The land lies in the northern part of Franklin County and a portion of Jefferson County and extensive mining operations are expected to follow the deal.

The United States Reduction and Atomizing Co. has completed the construction of its large plant near Herrin, Williamson County. The plant, which has been under construction for some eight months, was erected for the purpose of treating the waste products of coal mined in southern Illinois, and is located in the heart of one of the most productive districts in the state. Machinery is now being installed and will soon be ready to begin operations.

The Ernest Coal Co., operating extensive properties near Johnston City, south of here, recently filed papers increasing its capital stock from $100,000 to $200,000. The mine which is operated by the Ernest people has a daily capacity of over 2,000 tons of coal with approximately 1,000 acres of good undeveloped coal land under lease.

Donk Bros. Coal Co. has finished the work of sinking its new mine near Edwardsville, but owing to strike times, no coal has yet been hoisted from the shaft. All necessary work on the bottom has been completed preparatory to operation. When the mine is opened up for work it is expected to employ about 100 men.

Almost without exception the mine owners in southern Illinois mainly in Franklin, Williamson and Perry counties, have all subscribed for the so-called "riot insurance," which became unusually popular during the last three weeks. On account of minor labor troubles here and there at the mines the owners throughout this section bought heavily. One reason of the heavy subscribing is because the premium on the insurance is rather low.

Galesburg—Wagon mines to the west and north of this city are supplying all the coal needed for local use, coal which the Burlington and Santa Fe railroads are unable to transport. There are local mines, the coal from which was supposed to be worthless, and the mines were abandoned several years ago; the people desiring to secure all of their coal from the fields of southern Illinois. Now the wagon mines are busy day and night, and the coal is hauled into Galesburg and to other surrounding towns. Strange to say, the coal which was considered so worthless a few years ago that the mines were abandoned is now found to be good and there is widespread demand for it. There seems to be a future for these wagon mines if they are properly handled by the owners, so that they will comply with the state mining laws and be managed in a conservative and

economical manner. It took the great strike to show to the people of Galesburg how valuable their mines at home really are.

Columbia City—In spite of the growing scarcity of coal, 60 tons of coal at the city power plant at this place have been burning from spontaneous combustion. To throw water upon it would only pack the coal together tighter and spread the flames. The only way the firemen had to save the unburned coal was to dig away to the blaze with shovels.

Hillsboro — Twenty striking coal miners from the Hillsboro district were refused citizenship by Judge Jett in the Montgomery County Circuit Court, who ruled that the men were striking in violation of the laws of the United States, and therefore were not fit for citizenship.

ALABAMA

Birmingham—The United States engineers who have been making a survey of the Mulberry Fork of the Warrior River have about completed this work and, according to H. R. Battle, engineer in charge of the work, it is probable that a recommendation will be made to the Federal Government for the building of a high lift lock near Sanders shoal. Such improvements would render the Mulberry and Sipsey forks of the river navigable for a considerable distance into the coal fields of Jefferson, Walker, Winston, Cullman and Blount counties and ultimately bring about extensive development of coal lands in tributary territory.

Industrial News

Seattle, Wash.—The Black & Decker Co. announces the opening of an additional office on the Pacific coast at 201 Maynard Bldg., at this place. This office is in charge of A. E. Nordwall, who will have charge of the distribution of Black & Decker products in the state of Washington, working under the direction of the main Pacific coast office, 918 Hearst Bldg., San Francisco, Cali.

Bradel, Ky.—The Power Coal Co., of this place, in Knox County, announces a change of name to The Wheeler Coal Co., and an increase in capital from $15,000 to $100,000.

Moundsville, W. Va.—The Fairmont Gas Coal Co. has been incorporated with a capital stock of $300,000. The incorporators are T. B. Cunningham, Connellsville, Penn.; A. J. Salzer, Weston; Z. V. Bartus, Pittsburgh, Penn.; H. H. Staggers, C. E. Hawkes, R. J. Conley, all of Fairmont, W. Va.

Charleston, W. Va.—The West Virginia Eagle Coal Co., of Boomer, W. Va., has been granted a charter with a capital of $1,000,000. The incorporators are: Wm. G. Conley, of Charleston; E. A. Charlton and J. R. Charlton of MacDonald, W. Va.; C. H. Martin and L. S. Tully, of Mt. Hope; of the state of West Virginia.

Seward, Alaska—Fifteen carloads of Alaska coal from the Matanuska fields, near Anchorage, Alaska, have been loaded on the naval collier and radio tender Saturn and will be taken to the Puget Sound naval yard at Bremerton, Wash. The coal was brought here by the United States Government Railway. Seward people celebrated the event, as the shipment was the first of its kind ever taken from here. According to word from Washington, D. C., the navy department expects to develop the Alaska coal beds next year.

Cambridge, Ohio—W. H. Young, of Columbus, has completed the organization of a coal company in which considerable capital is invested. He has secured a lease of a large tract of land north of Lore City, Guernsey County where he says he plans to open one of the largest mines in the Guernsey Valley coal fields.

New York, N. Y.—The Owensboro Ditcher & Grader Co., of this place, announces that it has moved its offices from 222 to 832 Singer Bldg., 149 Broadway New York City.

Fairmont W. Va.—The Dawson-Connellsville colliery is developing its mine at Tucker, near here, and soon will have one of the most important operations in the local field. The capacity will be brought up to 500 tons a day. Frank A. Tarr is president of the company, which already has expended $75,000 in improvements.

Washington, Penn.—The Union Coal and Coke Co., of Pittsburgh, Penn., has purchased from Annie E. Fulton 196.38 acres of coal in Amwell Township, Washington County, for $63,823.50, and from Emma B. Stewart, 137.173 acres, in the same township, for $44,581.33.

Charleston, W. Va.—The Green Brier Coal Co., of Elkins, has been incorporated with a capital stock of $50,000. The incorporators are: W. H. Green, A. F. Martin, J. F. Brown and E. A. Brown, all of Elkins, and R. A. Reid, of Tallmansville.

Toledo, Ohio—The lake season, as far as the Toledo & Ohio Central docks at this place is concerned, was closed Nov. 6. During the season the docks loaded 1,193,626 tons, as compared with 2,124,696 tons during the season of 1918. In 1917 the docks handled 2,343,761 tons. Up to Nov. 15 the Hocking Valley docks, at Toledo, loaded 4,163 408 tons, as compared with 4,990,815 tons in 1918, and 1,764,310 tons in 1917. On the whole, it was a fairly good year for the Lakes, although the tonnage moved was not as large as during the war years just past.

Columbus, Ohio—The Ohio Coal Service Association has been formed with a preliminary capital of $10,000 to develop a tract of 2700 acres of coal lands near Lore City, Ohio on the Baltimore & Ohio R. R. The incorporators are: William H. Young, A. E. Krauss, T. M. Schleesey, Harry Lewis and W. T. Lax.

Personals

Russell W. Stovel, formerly a Lieutenant Colonel of engineers in the U. S. army, has been appointed a consulting engineer for Westinghouse, Church Kerr & Co., Inc., of New York City. Mr. Stovel has had quite a comprehensive experience in the mechanical and electrical problems connected with central power station and steam railroad electrification. He had charge of the Paoli and Chestnut Hill electrifications of the Pennsylvania R. R. and the Elkhorn grade electrification of the Norfolk & Western R. R.

Gardner Pattison, of New York, has been appointed vice president of the United States Distributing Corporation, of New York, to assist George F. Getz, president. Mr. Pattison is one of the prominent figures in the coal trade in the East. He is now chairman of the board of directors of William Farrel & Son; he is best known as one of the firm of the late Pattison & Bowns Co. During the war he devoted a great deal of his time, unofficially, to the Fuel Administration.

Oscar Cartlidge has accepted a position as general superintendent of the Kresge Coal & Mining Co., at Knoxville, Tenn., beginning on his new duties Nov. 24. He will have six mines under his charge, and his headquarters will be at Williamsburg, Ky.

Samuel Steinbach, who was superintendent of the Pennsylvania division of the Consolidation Coal Co., at Somerset, Pa., for ten years, has resigned his position to go with the Bethlehem Steel Corporation.

Colonel W. E. Thompson, of Halifax, has been selected by the Dominion Coal Co. as its representative on the board of conciliation which is to investigate the grievances between the miners and operators of the Dominion Coal Co. **J. C. Walters** has been named by the miners as their representative. It is expected that a chairman will be selected shortly and that the board will commence its sittings.

John E. Crouch, formerly with the United States Fuel Co., at Benton, Ill., which company operates the Middlefork mine at that place, has accepted a position with the Valier Coal Co. at Valier, Ill. The United States Fuel Co. is a subsidiary of the United States Steel Corporation.

Thomas F. Holmes, of Lincoln, Neb., has located in Benton, Ill. where he is general superintendent of a large colliery owned by the Chicago, Wilmington & Franklin Coal Co., of Chicago.

J. E. Hartenfelt, of Chicago, has accepted a position with the Sixth Vein Coal Co., operating near Pinckneyville, Ill.

A. H. Shaw, a coal dealear of St. Louis, has been appointed superintendent of the mine of the Perry County Coal Corporation, at Coulterville, Ill.

L. R. Browning, formerly with the Valier Coal Co., Valier Ill., has accepted a position in the West Virginia fields. Mr. Browning will be employed by one of the largest coal companies in the field.

E. E. Jacobs, formerly superintendent at a mine at Christopher, Ill., operated by the Old Ben Coal Corporation, of Chicago, is now general superintendent for the Southern Gem Coal Co. at the mine near West Frankfort, Ill., which that company recently purchased.

W. C. Westermeier, formerly of the Southern Illinois Coal Co., at Herrin, Ill., is now in the Carlinville, Ill. offices of the Standard Oil Co., near that city. The Standard Oil Co. recently completed a large mine near Carlinville.

Catalogs Received

Bacharach "Easy Read" Pressure Volume Indicator—Bacharach Industrial Instrument Co., Pittsburgh, Penn. Folder. Pp. 4; 6x9 in.; illustrated. Notes use of this instrument in the control of air delivery to cupolas.

Pitot Tubes and Orifices for Measuring the Flow of Gases—Bacharach Industrial Instrument Co., Pittsburgh, Penn. Pamphlet. Pp. 8; 6x9 in.; illustrated. Notes use of special instruments in connection with hydro flow meters.

Electric Air Compressors — Portable Electric Drills—Electric Valve Grinders—The Black & Decker Manufacturing Co., Baltimore, Md. Fall catalogue. Pp. 32; 8½x11 in.; illustrated. Description of Black & Decker air compressors, drills and grinders.

The Nordstrom Lubricated Plug Valve—The Merrill Co., San Francisco, Calif. Catalogue. Pp. 15; 6½x9¾ in.; illustrated. Complete description of the valve.

The Plug Valve That Never Sticks—The Merrill Co., San Francisco Calif. Folder. Pp. 4; 6x9 in.; illustrated. Notes construction and advantages of the valve.

Davis Acetylene Flarelight — The Davis-Bournonville Co., Jersey City, N. J. Folder. Pp. 8; 3¼x6¼ in.; illustrated. Briefly describes the light generator and suggests some of its many uses.

Shops—Westinghouse, Church, Kerr & Co., Inc., 37 Wall St., New York City. Folder. Pp. 8; 8¾x11½ in.; illustrated. Illustrating some of the shops built by this company.

Platite Rigid Couplings—Smith & Serrell, 90 West St., New York City. Folder. Pp. 4; 6x9 in.; illustrated. Describes the use of the coupling and how installed.

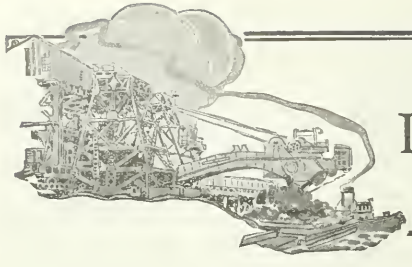
Coming Meetings

The Wholesale Coal Trade Association of New York will hold its next meeting Jan. 20, 1920, at the Whitehall Club, New York City. Secretary, Charles S. Allen, 1 Broadway, New York City.

Northern West Virginia Coal Operators' Association will hold its next meeting Feb. 10, 1920, at Fairmont, West Va. Secretary, George T. Bell, Fairmont, West Va.

American Institute of Mining and Metallurgical Engineers will hold its next meeting Feb. 16 to 19, in New York City. Secretary, Bradley Stoughton, 29 West 39th St., New York City.

National Conference of Business Paper Editors will meet at the Astor Hotel, New York City, Jan 16, 1920. Secretary, R. D. Hall, 36th St. and 10th Ave., New York City.



MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Soft Coal Market Inactive—Railroad Anthracite in Regard to Coal Purchases Now Rewarded—Much Suffering if Mines Stay Idle Much Longer—Anthracite Situation Favorable.

Market conditions, so far as soft coal is concerned, are lifeless. The output from the non-union mines, upon which the country has been forced to place reliance, is regulated as to price and distribution by the Federal Fuel Administration. Naturally, the railroads are being well taken care of in the matter of supply, as they confiscate whatever coal they require wherever they may find it.

It seems strange that the attitude of the railroad purchasing officials regarding their fuel contracts—an attitude which in great measure is responsible for the present deplorable situation—should be so handsomely rewarded. They have sown the wind. Instead of reaping the whirlwind, they are garnering an ample supply of fuel at prices outrageously low when the law of supply and demand is considered. Thus does the lack of virtue carry with it a material reward!

From present indications it looks as if the conference between the operators and miners' representatives will result in no speedy agreement. In the meantime the reserve stocks of fuel in the hands of the consumers are being depleted rapidly. The output of 300,000 tons weekly from the non-union miners is far below the normal state of consumption. Unless a satisfactory wage agreement is negotiated soon, and all the miners return to work, many industrial plants will be forced to suspend activities. Furthermore, there will be quite a bit of suffering on the part of those domestic consumers, principally in the Middle West, who depend on soft coal for household uses.

Only the large reserve of coal piled up by public utilities and manufacturing plants on the eastern seaboard permit these operations to function to maximum capacity at this time. In the Middle West the situation is not as favorable, for the miners in that section are idle, and little Eastern coal is flowing in. Restrictions in the matter of lighting and public meetings have already been placed, and it is not farfetched to conclude that even more stringent rules will be enforced if the deadlock of operators and miners prevents the working of the miners.

Anthracite production is well up to normal. The domestic sizes are eagerly sought, with stove coal in most urgent request. Steam sizes, such as buckwheat, rice and barley, are not moving so energetically as was expected. In the face of the lack of soft coal it was believed that consumers would rely more on anthracite.

No scarcity of anthracite need be looked for. The lake season is drawing nigh, and that will divert a large tonnage of hard coal to localities nearer the mines, such as Philadelphia, New York, points on Long Island Sound, and the New England States generally.

WEEKLY COAL PRODUCTION

Bituminous shipments for week ending Nov. 15 were 63,755 carloads, compared with 56,154 of week previous.

Anthracite shipments for the same period were 35,394 carloads, compared with 38,390 of week ending Nov. 8.

Production during the second week of the strike was 33.0 per cent of normal, as compared with 29.4 per cent during the first week. The output of the seven days, Nov. 9 to 15 (including lignits and coal coked), was 3,990,000 net tons. Compared with the week before, this was an increase of 138,000 tons, or 22.4 per cent. The average production during the four weeks ended Oct. 25, which may be regarded as normal, was 12,089,000 tons.

Since the strike order was withdrawn on the afternoon of Tuesday, Nov. 11, the week contained two days during which the order was in force and four days after it had been withdrawn. Production was not resumed during the week on a considerable scale, except in scattering districts outside the Central Competitive Field.

During the second week of the bituminous strike the anthracite mines failed to maintain their recent high level of production. The output is estimated at 1,818,000 net tons. Compared with the corresponding week last year, when the influenza epidemic and the celebration of the armistice cut heavily into production, this was a substantial increase. Compared with the preceding week, however, it was a decrease of 154,000 tons or 7.8 per cent. Indeed, the output was the lowest reported since Sept. 13, with the single exception of the week of All Saints' Day.

In the Central Competitive Field the strike was practically 100 per cent effective. Virtually no coal was mined in Illinois, Indiana, Michigan, Ohio and the Pittsburgh district, the only exception being insignificant tonnages from wagon mines, stripping pits and certain co-operative mines.

In the tier of states immediately west of the Mississippi—another stronghold of unionism—the tie-up was also practically complete. From Iowa south to Oklahoma, about 99 per cent of the capacity was closed. In Texas alone of the southwestern states, where incomplete returns indicate a production of one-third of capacity, was the proportion remaining at work significant.

In the northwest, North Dakota lignite mines continued to work during the first days of the strike, but closed down on Saturday. Operations virtually ceased in Washington and Wyoming. In Colorado 87 out of 108 mines lost time because of labor troubles, either directly through the action of their own employees or indirectly, as a result of the steel strike. The total production for the week was less than one-third of capacity. Of the Mountain States, Utah and New Mexico alone reported fairly continuous operation.

Of the districts to the east and south of the Central Competitive field, those which had been recognized as non-union, remained at work. The Connellsville, Winding Gulf, Pocahontas, Tug River, Logan, Kenova-Thacker and Hazard fields were virtually untouched by the strike. Fractions of the Westmoreland and Somerset fields were idle, not sufficient, however, materially to reduce their output. Seven operations idle in the St. Charles district caused a loss of tonnage in southwest Virginia amounting to 8.3 per cent of capacity.

Other fields in the Appalachians which have been recognized as union went out. The greater part of Central Pennsylvania, nine-tenths of Kanawha, practically all of Fairmont, New River and Cumberland-Piedmont were down.

Interest centered in the open-shop fields which up to the day of the strike were debatable ground. The reports now indicate that during the first week of the strike Alabama was working at about half capacity, and Western Kentucky at about one-third. The Butler-Mercer field, in Northwestern Pennsylvania, appears to have been closed down almost completely. Three-fourths of the capacity of the West Virginia Panhandle field was tied up by one form of labor difficulty or another. In Northeastern Kentucky the larger operations, embracing 70 per cent of the capacity, were down. Except for two properties all of Harlan County was down, and no large operations in Southeastern Kentucky and Tennessee were reported to the Southern Appalachian Association.

In all, approximately three-fourths of the country's capacity was paralyzed during the first week of the strike.

The closing of so many mines afforded to the others which remained at work exceptional car supply. Thanks to the efforts of the railroads, transportation disability as a limiting factor practically ceased to exist. The only district which reported serious shortage of cars was the small Hazard field of Kentucky, where losses were attributed to car shortage amounting to 20.2 per cent. There is little doubt that the percentage of loss on account of car shortage for the entire country

will be found to be less than one per cent, quite the lowest ever recorded in a period of active demand.

The losses due to "no market" reported from Colorado were confined to a group of mines whose output is commonly taken by the steel industry.

In marked contrast to the great drop in the production of coal, the production of beehive coke has increased during the strike. The total output during the week ended Nov. 15 is estimated at 398,979 net tons, a figure greater than the preceding week by 23,803 tons or 6.04 per cent. The most notable increase occurred in Pennsylvania and Alabama, but all districts reported larger tonnages except West Virginia, Washington and Utah.

A number of factors contributed to the larger output of coke. The great majority of the beehive ovens of the country lie in districts unaffected by the coal strike. Closing down the union mines created an ample car supply for those fields which remained at work. The gradual resumption of operations in the steel industry caused an active demand for coke. The fact that the wartime prices have been restored for coal, but not for coke placed a premium upon the conversion of coal into coke at the mine.

With the total production of coal far below normal and the production of beehive coke increasing, the proportion of the entire bituminous output now going into the manufacture of coke is without precedent. Whereas prior to the strike the beehive ovens consumed only 6 per cent of the 1919 production, since the strike began they have been taking 15 per cent of all the soft coal mined.

A limited tonnage of coal has been allowed to move to the Lakes since the beginning of the strike. The total quantity dumped at lower Lake ports in the two-week period ended Nov. 17 was approximately 370,000 tons, which was less than one-fourth as much as during the corresponding period in 1918.

Total dumpings since the opening of the season are reported as 22,240,000 tons, or roughly six and two-thirds million tons below those of the corresponding period last year.

Atlantic Seaboard

BOSTON

Market continues inactive. Buyers only mildly interested in current developments. Limited tonnages being offered from union mines. No instance yet of confiscation. Coal being moved over Philadelphia and New York piers on permit. Norfolk dumping almost normal, but New River ouput light. Tonnage in less demand. Anthracite practically unchanged. Signs of easing up on Egg.

Bituminous — Notwithstanding the threatening nature of newspaper reports, the New England market is without any urgent demand for steam grades. It is probable that if light production continues there will be developed some spot business during December, but trade at this writing is as inactive as last spring. A few cases there are of small consumers who will need coal from week to week, but in every instance the coal is forthcoming usually from some local dealer, and we have yet to hear of anything approaching distress for bituminous coal in any part of the territory.

Most of the large buyers are comfortably supplied for a considerable period, and there is a large amount of indifference over the issue of present labor discussions. On many of the contracts coal is actually being shipped from day to day, and quite naturally this has a soothing influence upon steam-users generally. Were all shipments shut off if only for a week, it is likely there would be a distinctly different attitude. As it is, the market is being canvassed by sales agencies very much as in normal times, and with stocks still in excess of the 60-day mark it is difficult to rouse any interest in a long continued suspension at the mines. It is felt so strongly that public opinion will not support the demands of the mine-workers that there is no pronounced uneasiness over the conference now being held at Washington. Very evidently the union organizations in the different districts are not holding together as it was feared they might.

Coal is now being offered freely from a large number of union mines where the men have returned to work the past week. The proportion of men at work is by no means even, and for that reason the output is undependable, but the fact that even limited tonnages can be sent forward is an encouraging sign. The government figure is of course the only price mentioned on new sales, and there is always the uncertainty whether the railroad and fuel authorities will allow the coal to be delivered to the original consignee. The actual carrying out of regulations assumed to be in force has been other than uniform in this section, and where the railroads here are so well looked after it seems idle to tie up indefinitely so many cars as are now being held at destinations throughout New England. One would suppose it would all have a bearing upon car supply a little later when a wage agreement is reached.

Thus far, in New England, we have heard no cases of actual confiscation of coal destined for commercial use. The cars have simply been held pending developments, and in the few instances that have come to our notice where food plants, etc., have asked for relief the regional committee has declined to seize any of these shipments merely for the purpose of helping out some consumer who has been less forehanded. There is enough tonnage in the hands of retail distributors to meet any case of actual need.

A moderate tonnage is being dumped over the various New York and Philadelphia piers, but almost exclusively on permits issued through the Railroad Administration and for requirements on the list of priorities. Coal for retail dealers is included in this list as well as for coastwise bunkering and other essential needs, and the result is that the car congestion of a fortnight ago has now cleared up. The Georges Creek and Fairmont districts have an especially large proportion of men at work and the Baltimore piers have about resumed their normal activity, even though most of the coal is destined offshore.

At Norfolk the usual tonnage is now being dumped, although it is possible that by weeks the average is less than normal. New River output continues light, and for that reason there is a heavier demand upon the piers at Norfolk. Reports from New River are more favorable this week and the agencies here are expecting much better returns in another week.

Coastwise tonnage is in somewhat less demand than a week ago. Up to now there has been enough anthracite business to make the call for steamers rather urgent, but now that bituminous buyers are less apprehensive over supply for the near future, there is a small surplus. Enough coal is coming forward all-rail to take the edge off the demand for prompt coal by the water routes.

Anthracite—Domestic sizes, especially stove and chestnut, are in urgent request. A fair tonnage has come to New England this season; the difficulty is that it has not been distributed as equitably as usual. This is largely because of the strikes of marine workers, engineers, etc., which have kept a very considerable part of the anthracite-carrying fleet out of commission practically three months of the season when the heaviest tonnage is moved. The result is that Boston Portland, Providence and other points where there are facilities for discharging anthracite from steamers have been favored with more than their just quota, while ports where there are no such facilities, have suffered because of the lack of barges.

There are beginning to be signs of less retail demand in some of the cities. This is shown in the decreased call for egg size. All the shippers now have a surplus of this and it is becoming increasingly difficult for retailers to accept the large proportion that they are urged to take. The soft coal labor troubles have had the effect of cleaning up much of the steam size anthracite that dealers have been carrying over from last year. There is still almost no demand for the different sizes of buckwheat at wholesale. The shortage of stove and chestnut is due in part at this time to the heavy movement to the lakes before navigation closes.

NEW YORK

Domestic coals rushed westward. Anthracite steam coals used to augment bituminous stocks. Demand for these coals increase but prices remain steady. Bituminous moves slowly in this market. Manufacturers have large stocks.

Anthracite—The eastern section of the country is not receiving all the domestic coals it can absorb, but this has been due to the demand from the West for supplies before navigation on the lakes close this week. In the meantime, this market has not been entirely neglected and no one has suffered from the lack of coal. The New England market is also out for a large tonnage and this will be better taken care of next month.

Shippers of anthracite look for a heavier demand for the domestic coals from the west than they would expect if the soft coal mines were operating, but even this demand will not be anything like the tonnage now being sent over the lake routes.

Local dealers are able to absorb all the egg, stove and chestnut they can obtain, but there is no shortage. Everybody seems to have some coal in the bins, and dealers do not look for any pressure for deliveries this winter.

One of the surprises of the local trade is the demand for chestnut coal, which, according to some dealers, is unprecedented even for the New York market. During the summer and early fall the dealers could not get rid of a comparatively small tonnage, but during the past few weeks it has been difficult to meet the demand, which has consisted mostly of small orders and the efforts of the peddlers to fill their bins.

Pea coal is moving steadily and middlemen who, a few weeks ago were complaining of the quantity of this size on hand, are now looking for cargo lots for quick delivery.

Inquiries for the steam coals have steadily increased, but prices are firm. There seems to be plenty of these coals to meet all urgent demands, and some shippers are urging part cargoes with shipments of the domestic sizes. With few exceptions all grades are bring company prices, the exceptions being in washery coals and the poorer grades of barley.

Dumpings of anthracite during the 7-day period ended Nov. 21 were 5,916 cars, as compared with 5,583 cars the previous week.

Retail prices remain the same.

Bituminous — Local manufacturers seem to be unconcerned as to when the strike ends. Most of them have large stocks of coal in their yards and have, so far, been able to keep their power up on their daily deliveries, although the shipments are being regulated by the Federal authorities. Many have augmented their fuel supply with the anthracite steam coals.

There is no lack of coal at the docks in this harbor because of the rules governing the exporting and bunkering of vessels. Reports of the railroad Administration show that on Nov. 21 there were 4,330 loaded cars at the loaded docks, which was 1925 cars less than on November 14.

With production slowly but surely increasing, shippers here expected a gradual loosening up in the regulations governing the issuance of permits. The reports from Washington regarding the possible settlement of the strike caused little comment here, except that some coal men said that the offer of the operators' committee of a 15% increase would mean a heavy addition to the payrolls.

Operators and selling agents who visited the coal fields last week said that the mine workers on strike were enjoying themselves immensely by making hunting expeditions, and that they did not seem to be worrying over the outcome of the strike. They were not disappointed at the small number of men who returned to work when the strike order was rescinded by direction of the Federal court.

Should the strike continue for a few weeks more fear is expressed by the officials of some of the public service corporations here that there might be a repetition of the scare experienced during the cold spell of the winter of 1917-19.8. It was stated, however, that some of the gas and lighting companies have sufficient stocks in reserve to last them for about six weeks.

Locally, the situation is quiet. Shippers are not being pushed for deliveries, and there is comparatively little movement of coal for either export or for bunkering purposes. The labor troubles of the longshoremen and boatmen, which it was thought had been settled, threatens to break out anew, because of dissatisfaction with the awards given them by the adjustment commission.

There were 266 cars of bituminous dumped at the local piers during the 7-day period ended Nov. 21, as compared with 5081 cars the previous week, an increase of 185 cars.

PHILADELPHIA

Anthracite trade stirred by freezing weather. Pea coal called for in good volume. Stove and nut is the cry of the trade. Fair shipments during the past week. Improvement promised Dec. 1. Outside territories to be cut down. Steam coals brisk, with even barley picking up. Bituminous grows scarcer. Little resumption of work in Pa. district. Little spot coal.

Anthracite—A week of freezing weather has served to impress every one with the need of more coal. In a manner the retail dealers welcomed the coming of seasonable weather, as it gave them a chance to cut into their pea coal stocks. There is more than one dealer who now feels that even with the good tonnages on hand there will be a time when they will wish they had more. The big company shippers are not at all backward in saying that in the course of about ten weeks this size will actually be scarce. The quantity in the storage yards is merely negligible and is being rapidly removed to meet current calls from the trade.

The cold weather also caused an increased demand for the larger sizes, particularly stove and nut. The quantity of these sizes on hand to meet the demand has been at all times extremely limited, and the dealers took advantage of the occasion to urge their customers to take some pea coal. As a fact, if it hadn't been for the stocks of pea coal, more than one dealer would have had his equipment idle for the lack of coal of any size. In many instances it took a good deal of persuasion to induce some customers to take pea, as they are firm in their demand for stove and nut. This is particularly true of consumers who heretofore have never used anything but pea, and this situation has caused much comment in the trade, and is explained on the theory that these folks have the price and are bound to enjoy the luxury of the larger size. However, usually by recalling the scarcity of coal of any size during the war winter, most of them are willing to unbend enough to take a little pea.

Stove and nut continues to be the one cry of the trade. Practically all the calls at the shipping office, in person or by letter, ask for these two sizes. Despite the fact that the operators state that they will never be able to meet the demand, the dealers are none the less firm in pressing their need for these sizes. On the part of the consumers the demand is shifting quickly to nut, and this size is now more desired than any other. There is still a lively call for egg, but not in the same proportion as existed a few weeks since.

The receipts of the large sizes have only been fair, and a tour of the city shows coal yards in about the same condition—big bins of pea coal and bare boards showing in the other bins. At this time some of the large shippers are holding out promises of better shipments beginning with the first of the month. Word has been passed out that shipments to the lakes will have entirely ceased by this time, and that in addition the orders have been sent out to cut down the supply to New England. It has been definitely stated that the local market is then to receive better treatment, but the dealers are warned that even then they must not expect to be flooded with these sizes.

With the likelihood of the bituminous strike being settled by an increase of wages being granted, the local anthracite trade is beginning to wonder what effect it will have on the miners in this trade, who have agreed to work on the war agreement until April. By some it is suggested that since the bituminous scale has been changed, it will likely cause some uneasiness among the anthracite workers, as the scale in the other district will be higher than theirs.

The fact that the fuel administration has ordered all exports of anthracite to stop will have little effect on the domestic market, as this order does not affect Canada, which country takes by far the greater percentage of exported coal. With that exception the shipments outside the country never have been sufficient to leave any impress on the market.

The steam coals are looking up very well and buckwheat is in strong demand with heavy shipments coming out of storage. If it were not for the big washery operations, which are now operating in good force, there would actually be a shortage of buckwheat. Rice coal is also being asked for in such quantity as to keep the shippers on the jump to fill orders for it. With the continuance of the bituminous strike barley coal is at last beginning to show more than ordinary movement, and should the situation continue this way for another two weeks this will be a hard size to procure.

Bituminous—The only real change in the bituminous trade is the growing scarcity of fuel in this market. The shortage of fuel is still far from the serious stage, but the accumulations in the pools are becoming diminished. This is due to the diversion of coal that usually comes to this market to western points, particularly gas coals from the Fairmont region, where the resumption of mining has been greater than in the Penn. districts. There is still a fair quantity of fresh-mined coal being offered by some commission houses directly to the trade, but usually these are low grade fuels and sales are not easily made, and for the further reason that no shipper is able to assure delivery even after an order is taken. With the coal all being distributed according to the priority list issued by the administration, putting public service plants on the bottom of the lists, all ordinary lines of industry are practically shut off from the operations of the salesmen.

At tide there is a heavy congestion of coal, as the foreign business has ceased under the ruling of the authorities and all of the coal standing is now being used for distribution on approved calls from the fuel directors.

Operators in the central Penn. field having offices in this city report that there is very little activity at their mines, as the expected resumption last Monday failed to materialize. Even if they were able to procure anything like their full working forces there would likely be considerable idleness on account of lack of cars, as so much of the equipment is tied up at destination loaded with coal.

BALTIMORE

Situation still complicated. Movement through Cumberland gateway increases. Troubles exist at a number of mines despite return order.

Bituminous—The situation here remains somewhat confused. On one hand talk comes through of shortages of coal in many sections of the country and with it comes an embargo against shipment to the piers here because of the jam of fuel already at tide. At Curtis Bay, Canton and Locust Point, at the outset of the past week, there were about 6,000 cars of soft coal, and this caused the embargo order. At that time there was agitation for a release of some of this fuel to export account. It is expected, however, that it will be held for use in other sections as needed. Meanwhile, there continues a limited distribution here under the permit plan.

The movement through the Cumberland gateway continues to improve, the present daily run being about 1,200 cars against about 700 at the end of the week previous. The usual normal run through the gateway is about 3,800. Troubles are reported at some of the mines despite the fact that the mandate of the court brought back some 80 per cent in many sections. In some sections of the state there were reports of dissatisfaction over the work assigned to some of the men who returned, while in others there was a dispute over a fine for failure to go to work, and the miners held a big meeting at Frostburg to discuss the situation.

Anthracite—The run of hard coal to this city is improving. The past week was mild and the demand from belated purchasers was light, so that the trade was able to keep well abreast of conditions without drawing on meager yard supplies. The colder weather came toward the end of the week and unless there is an improvement in the movement things will be tight in the near future.

Lake Markets

PITTSBURGH

Union mines still closed. Cancellation of rebilling order makes trouble. Consumers fairly comfortable.

There has been practically no return of miners to work at union mines in the Pittsburgh district in the past week. A union mine is defined as one that has the check-off. There are various other mines where union men are employed, and there are working variously, in general better than a week or two ago, while the strictly non-union mines are working full time. The Connelsville region, not a part of the Pittsburgh district proper, is probably producing more coal than ever; about half the coal being shipped, the other half being converted into coke.

The local coal trade is disturbed over the order just issued by the Fuel Administration, cancelling the rebilling charge of 15c, previously allowed, and making the cancellation order retroactive to Oct. 30.

There is not much activity in the local coal market. Well-connected brokers are generally able to pick up a few carloads daily, chiefly from non-union mines. A difficulty is that coal shipped on such sales is not always delivered, as the distribution authorities may seize it.

Large consumers of coal are getting along fairly well, chiefly by reason of their stocks. The steel mills, with occasional exceptions, had large stocks. There are about 3000 carloads of coal at Youngstown, releases being made when the prospective consumer proves that the coal is urgently needed.

We quote the market at government prices: $2.35 at $2.50 for mine-run and 25c higher for screened, per net ton at mine; Pittsburgh district.

BUFFALO

No change in the local coal situation. Bituminous plenty. Jobbers uneasy. Anthracite moving fast by lake.

Bituminous—The local trade is decidedly impatient, waiting to see which way the situation is going to turn. As it appears now almost any hour may turn out something that will shape the future of the trade. So long as there is no understanding between the operators and the miners almost anything may happen. There was seldom so much uncertainty at a time when so little is actually happening.

The strike is apparently having some effect in other districts, but that must have been because the shippers did not take care of consumers as well as they did here. The amount of coal available, with the great stocks on hand, is sufficient to keep everything here going a month or more. Many nonunion mines are running, and they turn out coal enough to supply consumers with small storage capacity. So far as can be learned not a single consumer is short, or likely to be right away. It is a strange state of things and cannot last very long.

There is neither demand nor coal to fill new orders if they should come in. Shippers are sitting still and doing nothing. Small operators ship coal promptly, though always with the supervision of the Government and railroad authorities, which in this case is about the same thing. In general, the belief is that the strike will end soon. However, the determination of the strikers not to go back to work till a new scale is in force does not look pleasant.

Bituminous prices are little more than nominal now, for no effort is making to shape them. Quotations remain at $4.55 for Allegheny Valley sizes; $4.80 for Pittsburgh and No. 8 lump; $4.65 for same three-quarter; $4.20 for mine run; $4.10 for all slack; $4.60 for smokeless; $5.70 for amithing all per net ton.

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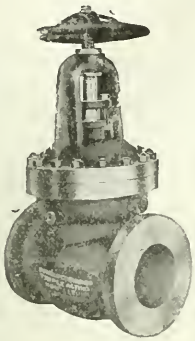

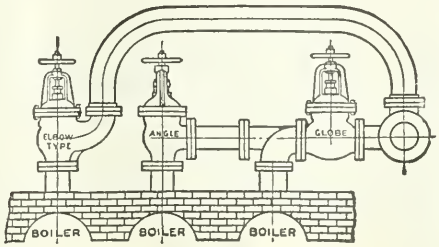

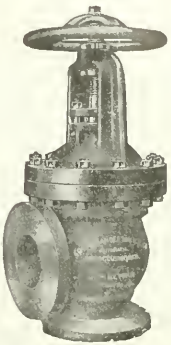

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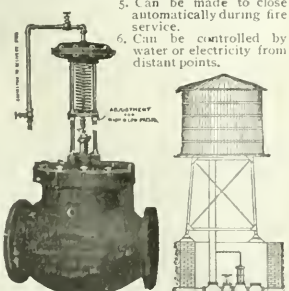

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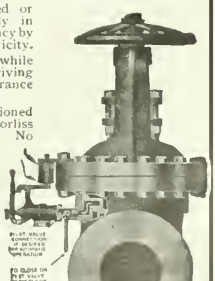
6. Can be adapted for automatic closing in case steam pipe bursts.
7. Double extra heavy and virtually indestructible.



"Host of References"

Golden-Anderson Valve Specialty Co., 1213 Fulton Building PITTSBURGH, PA.

Anthracite—The supply is still going to the lakes, only one company having closed up that trade and turned to the rail lines. The season is nearly at an end. So far as anthracite is concerned there ought to be sufficient for the needs of the upper-lake district, though bituminous coal may prove to be short. The lake tonnage is plenty, as other freights did not last till the end of the open lake season.

Lake shipments for the week were heavy, totaling 165,800 tons, of which 94,700 tons cleared for Duluth and Superior; 28,800 tons for Chicago; 14,300 tons for Fort William; 14,100 tons for Milwaukee; 7000 tons for Waukegan; 4000 tons for Manitowoc, and 2900 tons for Green Bay.

Lake coal rates remain weak at 60c. to Chicago; 47½c. to Milwaukee; 42½c. to Duluth, Fort William Waukegan and Green Bay.

The local supply of anthracite is as small as ever, but there is promise of a more liberal supply as soon as the lakes close. A single week of the amount now going up the lakes would make a large difference here, and that was the way the supply was turned in last year.

Natural gas is ordered out of all furnaces that can burn coal, effective Dec. 15, but it is expected that the coal supply will be in before that time.

City prices of anthracite remain as follows:

	On Cars Gross Ton	At Curb Net Ton
Grate	$8.55	$10.20
Egg	8.80	10.65
Stove	9.00	10.85
Chestnut	9.10	10.95
Pea	7.05	9.30
Buckwheat	5.70	7.75

COKE

Buffalo—Trading is dull on account of the small consumption during the strike of steel workers. The condition of the furnaces is now practically normal, but so much time has been lost that considerably less than the usual amount of iron ore has been brought down by lake. Prices remain dull on the basis of $8 for 72-hour foundry; $7.50 for 48-hour furnace; $7 for off grades; $7.75 for domestic sizes and $5 for breeze, all per net ton, f. o. b. Buffalo.

CLEVELAND

Bituminous coal stocks have melted away. Domestic consumers are being rationed. Less than 20,000 tons of coal are now in dealers' yards.

Bituminous—So little bituminous coal has been coming through the railroad blockade that the local committee in charge of distribution has denied this grade to all industrial plants. Not even fuel enough to keep pipes from freezing is permitted, as warning has been given all industrial plant officials to save enough for this emergency out of their present piles. A visit to leading retail coal yards reveals about 20,000 tons on hand, barely enough to keep utilities, office buildings and other essentials going.

No lump bituminous coal is coming through. One dealer is getting 30 to 40 cars of slack each week, but this is not more than one-fifth of normal. Occasionally a few cars of prepared sizes are received. To the retail trade dealers are not quoting bituminous prices, inasmuch as there is none to sell, while no new committments for steam coal are being taken on. Dealers are complaining that the margin allowed them by the Fuel Administration is wholly inadeuate. Wages, for one instance, have been advanced $5 a week since war time. Other cost increases have easily wiped out all profit in handling bituminous, they assert.

Under the wartime schedule, which has been restored, slack is $2.35, f. o. b. cars at mines in the Ohio No. 8 field. Jobbers' commissions come at 5c. a ton, while the freight from Southern Ohio to Cleveland is $1.40. On steam coal the dealer's margin is $1.58. This makes slack $5.48 a ton delivered in Cleveland. This paper's quotations on No. 8 slack recently have given the spread as $5.10 to $5.50. For apartment house delivery dealers are entitled to 57c. more and to residences 72c. more.

With industrial plants entirely cut off, the local distribution committee estimates enough bituminous is coming into Cleveland to meet demands of utilities and food companies. Railroad fuel stocks stored outside of Cleveland are dwindling fast, and another ten days will see train service curtailed. One big industry already is on half-time schedule, while scores more will be forced down within a week or ten days.

Pocahontas and Anthracite—In the past week practically no Pocahontas has been received because of poor car service, but the coming week is expected to see near-normal shipments. Anthracite too, has fallen away off, and dealers consider themselves lucky when they get a car. In substitution of these grades retail dealers are offering coke at $11. The cut in these grades of coal is regarded as temporary.

Lake Trade—No more bituminous coal is being loaded for Lake Superior ports, but some ¾-in. lump for engine fuel is being consigned to Lake Michigan ports. Last week Lake Erie docks dumped only 304,319 tons of bituminous and 15,118 tons of vessel fuel, a grand total of 319,437 tons—about 25 per cent of normal. Dumping of more than 500 cars a day at Lake Erie ports has been the exception lately. At most lower lake ports Nov. 22 was the windup of the bituminous season.

DETROIT

Bituminous coal receipts fall short of normal, but meet present needs.

Bituminous—Consumers of steam and domestic bituminous coal in Detroit are not suffering any hardship due to shortage. The uncertainties created by continuance of the mine strike occasions some anxiety, however, as to the future. The regional committee in charge of local distribution is endeavoring to avoid as much as possible any interruption of the movement of coal to buyers. Where the buyer is not in immediate need of additional coal, shipments are held on cars. This enables the committee to supply quickly any consumer whose need is urgent.

Few reports have so far come to jobbers indicating hardship due to lack of coal. Most of the Michigan towns outside Detroit seem to be quite comfortably fixed in the matter of supply. The exceptions are chiefly places that have been almost wholly dependent on the product of Michigan mines and where it has been customary to buy on a day-to-day basis.

The regional committee's distribution plan, it is explained, does not tend to create a shortage of cars at the mines, as the cars are unloaded with sufficient promptness to maintain transportation facilities, at mines that are continuing in operation. In the work of distribution, consideration also is given to the fact that some public service companies find it necessary to maintain stocks sufficient to assure operation 10 days or more ahead.

Anthracite—No noticeable improvement has appeared in the matter of anthracite supply. Stocks in yards of retailers are low and are not being renewed with a promptness that encourages confidence in adequacy of the supply. Dealers report that long delays are experienced after orders are placed before shipments arrive. Any sudden lowering of temperature would be likely to bring a pressure of demand that would exhaust supplies of prepared sizes.

Lake Trade—Coal is not coming forward to lake loading docks very freely. Shipments are small. Some are reported as diminishing in size. Some lake vessels are even finding it difficult to get sufficient bunker coal for their needs, though requirements for this purpose have been greatly reduced by the fact that a large proportion of the lake fleet has been sent to winter moorings, due to the lack of freight cargoes.

Coke

CONNELLSVILLE

Spot furnace coke market higher. Asking prices higher on contract. Consumers willing to pay higher prices.

The coke market continues to grow stronger, and the stiffening in the past few days has been particularly noteworthy, this applying both to prompt coke and to contracts for all or part of 1920. Sales of spot furnace coke are reported at $6.25, and while this may not be the minimum of the market, the average is certainly higher than a week ago, as then there was a possibility of shading $6 a trifle. In foundry coke, however, there is no higher market for prompt. Demand, which was produced by consumers desiring to accumulate stocks, has fallen off from its high level. Now consumers are buying no more than enough for current requirements, and perhaps not as much, since there are suspicions that some consumers are drawing from stocks. The outside prices are no longer in point but the $7 minimum for standard brands remains.

Coke operators' views as to 1920 contracts for furnace coke have experienced a further elevation, while the blast furnaces that must buy Connellsville coke seem quite reconciled to the payment of much higher prices than obtained for the current half year, the average having been about $4.25. The only uestion is how great the advance is to be and how prices shall be determined. Ratio contracts are being considered, at 5 to 1 on basic pig iron, valley, last ratio contracts having been at 6¼ to 1. With basic pig iron at $20, valley, as at present, 5 to 1 contracts would make $6 coke, with higher settlement prices in prospect. It is reported that $6.25 flat was done with two eastern consumers for the first half of 1920. Some operators are proposing a contract with a flat price, based on present costs, the price to advance by whatever percentage the wage cost increases.

The market is quotable at $6@6.25 for spot furnace and $7@7.25 for spot foundry, per net ton at ovens, contract prices being unquotable.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Nov. 15 at 253,924 tons, an increase of 5248 tons.

Middle West

MILWAUKEE

No excitement in the coal market because of the mine situation. Stocks will be ample for the winter unless there is requisitioning by theGovernment. Prices unchanged.

Milwaukee coal dealers are not allowing themselves to become excited over the possibility of a serious coal famine pending the adjustment of the labor situation at the mines. Several are now in the East doing what they can to send coal this way. Dealers have been ordered to suspend the preferred customers' lists, so that there will be an equitable distribution of coal and supplies intended for parties with fair stocks on hand are being diverted to other points where fuel is needed.

"Milwaukee has coal enough to last until Spring," said a leading shipper, "but in case of prolonged period of idleness at the mines, the Government may requisition some of the coal on the docks for the benefit of interior points." The Milwaukee road has taken off a number of trains in order to conserve the supply of fuel. Prices continue unchanged. Receipts by lake are slow, and the wind-up of the season promises to be weak in this respect. The total receipts by lake thus far aggregate 832,490 tons of anthracite and 2,-836,325 tons of soft coal, a gain over last year of 168,642 tons of anthracite and a loss of 495,019 tons of soft coal.

ST. LOUIS

Coal supply exhausted. Consumers falling back on coke supply. Conditions growing serious.

The local condition is beginning to give considerable worry. The coal stocks are nearly depleted there being practically no storage coal in the city, aside from that held for steam purposes by the gas company and one or two large manufacturing plants.

Office buildings and factories that were unable to obtain coal are now using coke breeze and other sizes of gashouse coke. In a few instances by-product coke is being consumed.

On Nov. 22 there were about 60,000 tons of byproduct coke stored in St. Louis. This, however, is being loaded out at the rate of 3000 or 4000 tons a day. About 30,000 tons of gas coke were also held in storage. Five per cent. of this entire tonnage is made up of coke breeze.

COAL AGE

Volume 16 New York, December 11 and 18, 1919 Number 22

What in the World Can You Expect

By Rufus T. Strohm

You raise your voice in a doleful wail,
You clench your fists and you beat your breast,
Because expenses absorb your kale
And knock your bank-roll galley-west.
You curse the way that the prices rise,
With every ounce of your intellect,
And damn the Government to the skies—
Say, what in the world can you expect?

When all the millions of Union men
Reduce the length of the working day,
And boost their wages by half again,
Yet toil along in the slow old way;
When men lose faith in their brotherhood,
And each one feels that he must collect
The most he can while the getting's good—
Well, what in the world can you expect?

When herds of foreigners sprag the wheels
That fill the shelves of the Nation's store,
But keep on eating their three square meals
Without a thought of producing more;
When Labor's pledges are paper scraps,
And Trust and Confidence both lie wrecked,
And Honor shares in the grand collapse—
Well, what in the world can you expect?

When Ease and Pleasure become the gods,
And Thrift is sent as a sacrifice;
When men keep saying, "Oh, what's the odds?
I've got to have it—so hang the price!"
When love of luxury rules the land
And gross extravagance goes unchecked,
And simple laziness stays the hand—
Well, what in the world can you expect?

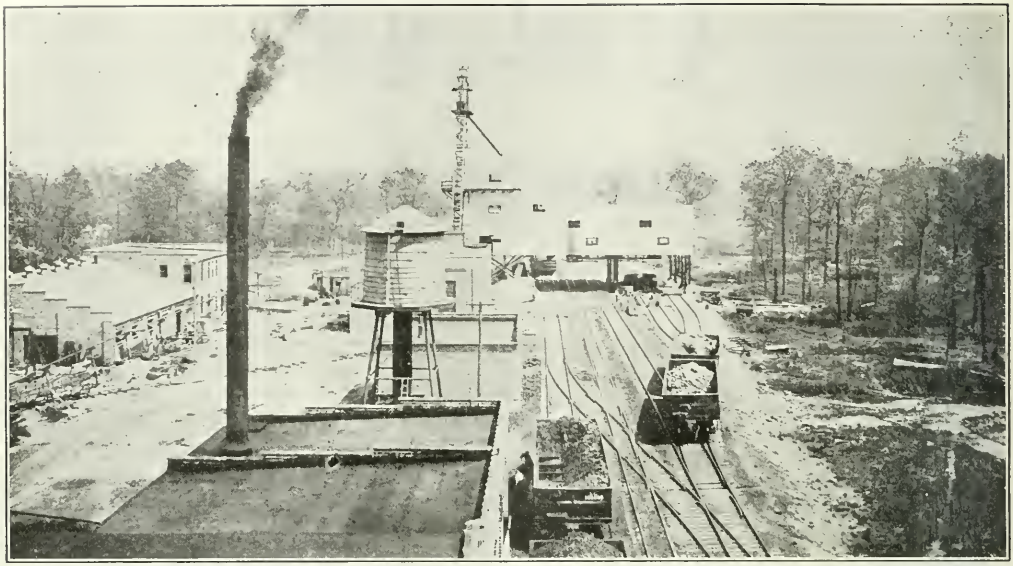


FIG 4. VIEW FROM AIR SHAFT AT THE KATHLEEN MINE

Engineering Features of Modern Large Coal Mines in Illinois and Indiana*—II.

By C. A. Herbert† and C. M. Young‡
Vincennes, Ind. Urbana, Ill.

Although many new mines have been developed in Southern Illinois and many improvements made in the recent past, six large new operations have been selected as showing the trend of modern coal-mine and engineering practice. The details of these developments are here compared.

THE construction of the tipples of the six mines considered in this paper shows only one striking novelty—the concrete air-shaft tipple of the Katheleen mine. The use of concrete for the construction of tipples is not in itself a novelty, as it has been employed in some other districts. In this case concrete was adopted, not because a concrete structure was desired, but because at the time of designing it was doubtful whether steel could be obtained. In spite of the fact that a portion of the concrete was poured when the thermometer registered about 20 deg. below zero, the work is sound and the structure is peculiarly attractive. Moreover, it is perfectly rigid, no vibration whatever being felt when the hoist is running. The cost of the concrete tipple, as built, was about $6000 higher than that of the steel tipple originally intended. A considerable part of this excess was due to the expense of heating the materials and of pouring the concrete during severely cold weather. At this mine and at the Valier, cars hoisted at the air shaft will be dumped in Wood single-car rotary dumps.

Attention may also be drawn to the fact that of the mines mentioned, four have tipples of the three-leg type introduced by Allen & Garcia. Two of these have bar screens, and the others shaking screens. The tipple at the Bell & Zoller No. 2 was designed and built by the Wisconsin Bridge and Iron Co. The tipple at the Standard No. 2 mine was designed by R. W. Hunt & Co. The equipment for preparation at the six mines considered is designed to satisfy the needs of the different producers and may be enumerated as follows:

Standard No. 2.—At the Standard No. 2 mine all coal is to be crushed to from 1¼ to 1½ in. and the only screening equipment needed is that preceeding the crusher for bypassing the small coal. The coal will go from the skips to a receiving bin from which it will pass over two parallel conveying and crushing equipments, each designed to handle 500 tons per hour. The coal passes from the receiving bin to two 54-in. feeder conveyors, from which it goes over sloping bar screens, the oversize going to crushers from which it drops to conveyors, being joined there by the undersize of the screens. Two 60-in. apron conveyors elevate the coal to the middle of the line of loading bins, which are built in two lines over the two loading tracks and extend for a linear distance of 360 ft. Their capacity is 3500 tons. Each apron conveyor discharges onto a 72-in. flat-top

*Part of a paper presented before the Chicago meeting of the American Institute of Mining Engineers, September, 1919.
†Mining engineer, U. S. Bureau of Mines.
‡Professor of Mining Engineering, University of Kansas.

conveyor, one running from the middle to each end of the line of bins. Adjustable scrapers are used to distribute the crushed coal into the bins, from which it will be discharged into cars.

Superior No. 5.—In point of simplicity of preparation equipment, the Superior No. 4 comes next. The preparation depends on the kind of coal demanded. When fuel is being stored, all coal over 2 in. or over 6 in. goes to storage. The material under 6 in. may be shipped as mine run. The material under 2 in. goes to the washer. When coal is not being stored, it may be crushed to pass a 6-in. screen. The screening equipment is designed to meet this simple demand and consists only of gravity bar screens. Material to be crushed is carried by a reciprocating feeder to the crusher.

Valier.—At the Valier mine shaker screens with pendulum suspension are used. These are so arranged as to make four sizes of coal: lump, egg, 2½-in. screenings and a fine coal approximately corresponding to No. 5. The two larger sizes are run over picking tables and may either be loaded into cars or fed to a crusher and reduced to pass through a 2½-in. screen. The plant is thus equipped to furnish coal for either hand-fired locomotives or those equipped with mechanical stokers.

American No. 2.—As the coal from this mine will be sold almost entirely to steam trade, the screening equipment is similar to that of the Superior No. 4. The coal will be run over bar screens so arranged as to make either 1¼-in. screenings and standard lump, 1¼-in. screenings and railroad lump, mine run, or the entire output may be run through crushers and made into 1¼-in. screenings. Picking tables are being installed for both the mine run and lump coal.

Kathleen.—At this mine the demand will be variable, as part of the coal will go to the St. Louis and Milwaukee plants of the North American Co., which consume 500,000 tons of screenings per year. The remainder is to be marketed and the tipple is equipped for making lump, 3 x 6-in. egg, 2 x 3-in. nut and 2-in. screenings. There are picking tables for the nut, egg and lump coal, with loading booms for lowering the coal into the cars. Provision has also been made for the installation of crushers so that either the lump or the egg coal may be crushed to screenings if the market conditions make this desirable. Shaker screens are used with pendulum suspension. At this mine and at Valier, the crushers are so placed that the coal may be discharged into them by elevating the loading boom.

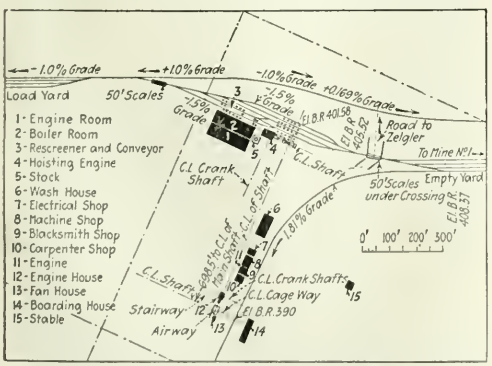


FIG. 5. SURFACE LAYOUT, BELL & ZOLLER NO. 2 MINE

Bell & Zoller No. 2.—The preparation equipment at this mine is more elaborate than that at any of the others. The main screen will produce three sizes of coal; lump, 6-in. egg and 3-in. screenings. The egg and lump sizes from the main screen will be passed over picking tables and discharged over loading booms. Provision is also made for the installation of crushers to reduce either the lump or egg sizes. Means are also provided for loading lump coal into box cars on a separate track, in case these should be available when coal cars are not. The screenings will be elevated by a belt conveyor to a screening plant equipped with two sets of screens in parallel, supported on ash boards, which will produce coal of the five standard Illinois sizes: Nos. 1, 2, 3, 4 and 5. The screens are of such length as to permit hand picking if this should be necessary. The rescreening plant is set over the loading tracks and the coal will be discharged from the screens to the bins, from which it will be loaded. The chutes

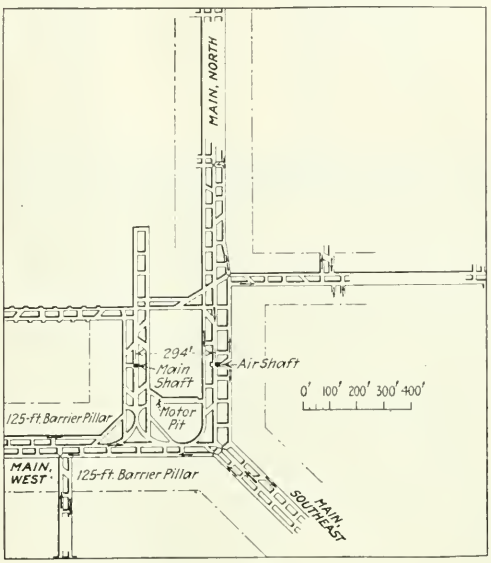


FIG. 6. PLAN OF SHAFT BOTTOM AT AMERICAN NO. 3 MINE

from these bins are equipped with lip screens for removing the fines produced by handling.

U. S. Fuel Co.—The U. S. Fuel Co., a subsidiary of the United States Steel Corporation, is developing a coal property lying to the northeast of Benton, Franklin County, Illinois. All the coal produced is to be washed, so a large concrete washer has been erected and equipped with jigs, tables and settling tanks. This is by far the largest washer in the central coal field and its equipment has been planned with great care. The company is not yet ready for a discussion of its operation.

The system of handling cars on the surface by gravity, common in this district, has been followed at most of the mines. This system sometimes requires extensive grading in a level country and the moving of cars is difficult in winter. The surface layout for the Bell & Zoller No. 2 mine is shown in Fig. 5.

At the Kathleen mine, the nature of the surface is such that the construction of a gravity yard would have required an unusual amount of grading, as the surface at the mine is practically on a level with the main line of the Illinois Central from which the cars will be taken. This difficulty has been avoided by the use of a flat yard, the only grade being that extending from the air shaft on the west, past the main shaft and railroad scales on the east, where there is sufficient grade for the movement of the cars being loaded. Over the remainder of the yard, cars will be moved by a pusher locomotive, running on a 36-in. track between the two main tracks. The pusher locomotive will have arms that can be extended to either side and engage the ends of the cars. A 15-ton locomotive is now being used for this purpose. A 25-ton locomotive will be provided later to move the loaded cars while the 15-ton machine will be employed for the empty cars. Each locomotive will be able to handle about ten cars.

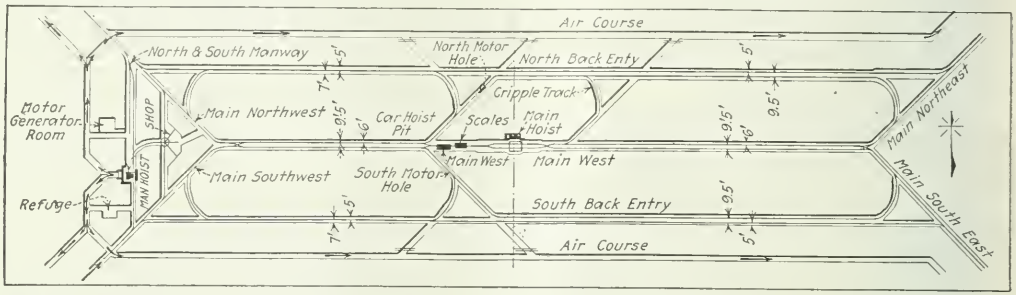


FIG. 7. BOTTOM LAYOUT, STANDARD OIL CO. SHAFT

At the Standard Mine No. 2, the problem is entirely different as far as the loading of cars is concerned. At all mines in the district having the ordinary preparation equipment, only one car is loaded at a time on each track. At the Standard No. 2, all the coal is to be crushed and placed in hoppers from which it will be drawn directly into the railroad cars. Only one size of coal will be shipped and only two loading tracks will be employed. The hoppers will extend for the length of about eight railroad cars, over the two loading tracks, and cars will be loaded in groups of eight. Car pulls will be used to allow the spotting of cars of variable lengths under the loading chutes. Under these circumstances the simplest arrangement is to employ a switching engine. The track layout differs from that of the ordinary mine in that there is no provision for the collection of loaded cars beyond the tipple. The empty cars will be brought in from the west to the loading hoppers and after being loaded will be taken back toward the west to be made up into trains.

At three of the mines, Superior No. 4, Standard No. 2 and Bell & Zoller No. 2, power plants have been erected. The Superior No. 4 will be equipped with five vertical water-tube boilers of 513 hp., which will supply steam at 150 lb. pressure and 150 deg. of superheat. There are two turbo-generators, one having a capacity of 938 kv.-a. and one of 375 kv.-a., both generating current at 2300 volts. All steam piping from the boilers to the engine is in duplicate, so that any interruption of service in the steam lines is guarded against.

At the Standard No. 2, a central power plant is being erected at which four 750-hp. Vogt boilers have been installed. These are expected to produce from 1000-1200 hp. each, and it is probable that two more boilers will be added in the future. The power plant contains two 2500-kw. turbo-generators, and one 1250-kw. generator, all supplying current at 2200 volts. The surplus power will be transmitted to other plants. One of the precautions against interrupted transmission from this plant to the mine is the construction of a double transmission line from the power plant to the main shaft.

The three other mines are supplied by power purchased from public-service corporations. The American No. 2 can, in case of protracted failure of the power supply, be furnished by the power plant of the No. 1 mine, which can be enlarged sufficiently to supply both mines.

In the case of the Kathleen mine, it would be possible within 90 days to build a power line from one of the generating stations of the Union Electric Light and Power Co., at St. Louis.

During the past 25 years, the method of mining in the central field has been changed from the old room-and-pillar system with long room entries, which in many instances were used as main haulage roads, to what is known as the panel system. In this latter system, no rooms are turned from the haulage and main air-course entries, but these are protected on either side by large barrier pillars. The room entries turned off from these main entries are comparatively short, averaging from 1000 to 1500 ft. in length. In the typical panel system of mining, each panel, consisting of two room entries with their respective rooms, is a unit in itself connected with the other workings only where the two-room entries pierce the barrier pillar.

This method of mining has come into general use in the central field, principally, because of the prevalence of mine fires and the great difficulty of sealing them off under the old system of mining, it then being necessary to seal off a large part of the mine in order to control the fire. It is now possible to isolate a fire in any one panel by seals at the points where the room entries pierce the barrier pillar, without the loss of much territory. At the same time, because the area is small, the fire is usually smothered completely within three or four weeks. This system of mining is being followed at all the new mines in this field with such variations as to the length and width of the rooms, thickness of pillars and number of rooms in each panel, as are made necessary by local conditions.

At the Valier mine an attempt will be made later to make a complete recovery of the pillar coal in the panels. With this one exception the room pillars will vary in thickness with the depth of the seam and will be only thick enough to allow rooms to be driven to

full length without squeezing. The barrier pillars are of sufficient thickness to protect the main entry from any subsequent squeezing. The dimensions of rooms and relative dimensions of rooms and pillars are, however, subject to change and it is not improbable that steps will ultimately be taken for the recovery of pillar coal at some of the mines, if not at all.

At the Valier mine it is planned that the rooms shall be 25 ft. wide on 85-ft. centers, leaving 60-ft. room pillars, which will be later recovered. By driving the cross-cuts between the rooms 20 ft. in width, 40 per cent. of the coal will be taken out in the advance. This is nearly as much as the total extraction at the other mines in this field. The room pillars will be left in blocks 60 ft. square, which may be recovered later without the squeezing that would be certain to take place should an attempt be made to recover the narrow room pillars employed at the other mines. The ultimate extraction is expected to be about 70 per cent.

The sinking of these new mines with large daily capacities and intended to work out larger areas than ever were contemplated in the past, has led to the necessity for driving a greater number of main airways. Until recently two entries in the mines in this field had been thought sufficient.

At the Bell & Zoller No. 2 it is proposed to use the four-entry system throughout the mine for all of the main haulage and airways, with double entries in the panels. At the Valier and at the Superior No. 4, four main entries will be driven, the cross-entries, or secondary mains, from which the room entries are turned, will be on the three-entry system, with two entries in the panels. At the Kathleen mine, the three-entry system will be used for the mains, with the two-entry system for the secondary mains and panel entries. At the American mine No. 2, the three-entry system will be used for both the main and secondary main entries with two entries in the panels.

The four-entry system has the advantage of making it possible to put the required amount of air into the mine at a much lower pressure and velocity than where fewer entries are used, accompanied with a marked saving in power required to operate the fan. Also where the entries are driven in pairs with no cross-cut between the two central entries, except at points where cross or room entries are turned off, the necessity of expensive brick or concrete stoppings is eliminated, as the air in both entries of each pair travels in the same direction. Moreover, in case of an explosion the recovery work can be carried on much more rapidly and economically, as there will be no delay nor expense in rebuilding stoppings to restore ventilation.

The shortwall mining machine has practically superseded the breast machine at all these new developments. Alternating-current undercutters will be used at four of the six new larger developments in this field. In every case, it is proposed to take 2300-volt, three-phase alternating current into the mine in armored cables to motor-generator sets located at advantageous points in the workings, there to be transformed to 250-volt direct current for haulage locomotives.

At the American mine No. 1, where 240-volt alternating current mining machines have been in use for several years, the mining machine transformers are supplied with 240-volt and 275-volt secondary taps, so that when the room entries have advanced sufficiently to make a drop in voltage noticeable at the machines the machine lines are connected to the 275-volt taps. This same system will be used in the No. 2 mine.

With the advent of the 5-ton mine car, it has been found that the 6-ton gathering locomotive, which had been almost a standard in this field, is too light and the gathering locomotives at these mines will weigh from 7.5 to 8 tons. At the Valier mine and at the Standard No. 2, combined storage-battery and trolley gathering locomotives will be used, while at the other mines the trolley-and-reel type of gathering locomotives will be employed.

The use of heavier cars and locomotives has also made it necessary to use heavier track with curves of longer radius. In fact, the underground mine tracks in these new mines will closely approximate, as far

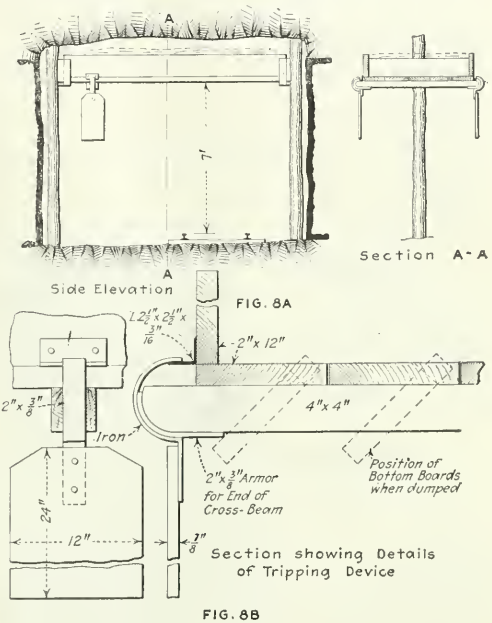


FIG. 8. DETAILS OF THE JONES DUST BARRIER

as the class of construction is concerned, the standards of the modern steam or electric railway.

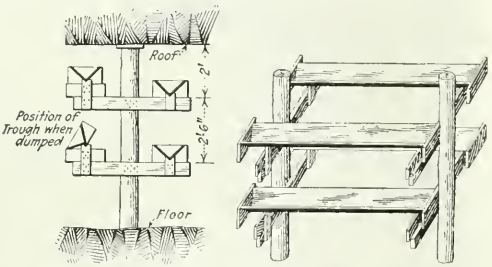
The bottom layout at the American No. 2, shown in Fig. 6., Bell & Zoller No. 2 and Superior No. 4 are all much alike. At each of these mines self-dumping cages are used. At each what is known as the A-type of bottom has been adopted, in which the coal is brought in from either side of the mine to a double-track shaft-bottom entry, at right angles to the main entry.

The mine car, after being automatically fed onto the cage, hoisted, and dumped is returned to the bottom, where it is pushed off the cage by the oncoming loaded car. After leaving the cage, the cars pass by gravity to a kickback switch and are shunted off to either side into entries forming the sides of the A, where they are made up into empty trips to be taken back inside. Where the natural conditions make it necessary, a car haul is put in between the cage and the kickback switch in order to give sufficient grade to run the cars back into the empty-car storage entries.

There are usually a number of cut-throughs between the main bottom and the entries on either side to enable the locomotive coming in with the loaded trip to uncouple at a convenient point and run through to the waiting trip of empty cars.

The bottom layout at both the Kathleen and Valier mines is quite similar to that just described except that the cars are run in over a single track to be weighed and dumped and that provision has been made to handle the empty cars in trips instead of singly, as will be done where cages are employed. At the Valier mine, the cars will be handled in trips of ten. After leaving the dump, these trips will run a short distance to the foot of a rather steep incline up which they will be hoisted by a single-drum electric hoist. From the top of this incline, the trips will be shunted off to the entries on either side of the main shaft bottom. This method of handling empty cars was made necessary by the natural grades that were encountered. At the Kathleen mine the empties will leave the dump in trips of 20 cars and run by gravity to empty storage entries.

The bottom layout at the Standard No. 2 is rather more elaborate than at any of the others. The mine is divided into four districts, and the coal will be brought to the shaft bottom over four main haulage roads. The bottom is so laid out that the cars from



TROUGH DUST BARRIER

these four roads will be brought to a long double-track bottom entry. An automatic car haul will be used to feed the cars over the automatic scales and into the rotary dump. The movement and dumping of the cars will be controlled by one man. At this mine, contrary to the general custom, the cars will be turned end for end at each trip to the bottom; a new and ingenious coupling has been provided for each end.

At the Valier mine, entry-driving machines have been introduced to accomplish rapid development work, promote safety through elimination of explosives and prevent the shattering action of explosives on the ribs and roof of the entry. Two B-34 machines, made by the Jeffrey Manufacturing Co., have been used. The cutting in this mine is unusually hard, but under ordinary conditions an advance of as much as 150 ft. per week was made with each machine, by working three shifts. On single shifts these machines are now making a general average of 300 ft. per month. With regard to the economy of the use of these machines, it is the opinion of Carl Scholz, general manager of the company, that the cost of installation and operation will be repaid many times by the saving in timbering because the coal is not affected by the use of explosives when these machines are employed. The roof will stand much better than it does when so shattered and timbering will be unnecessary in most parts of the entries. These machines are being used on the main west entries where a possible distance of 3½ miles can be driven. After an experience of about one year in entry driving in this mine, a difference between the standing qualities of these entries and those driven with explosives can be observed.

The Old Ben Coal Corporation has undertaken a more elaborate program for accident prevention than is being followed by any other coal company in this district. This program follows three lines. In the first place it was decided that only electric safety lamps should be allowed in the future in the No. 11 mine in which an explosion had occurred, and that no one should be allowed to smoke in the mine or even carry matches. At first this ruling met with some opposition but at the present time this has entirely disappeared and the mine is being satisfactorily operated with electric lamps.

In the second place, a safety engineer was employed, whose work is a general inspection of the mines of the company with special regard to the prevention of accidents, and the recommendation of changes to be made and policies to be followed. In the pursuit of this work, the safety engineer, J. E. Jones, formerly state mine inspector, is making a close study of all accidents and their causes, giving attention not only to the immediate physical causes of these accidents but to the classes of labor in which they are most common. Records are also kept covering the accident rate under different headings at the different mines of the company. In addition to this, careful study will be made of all the fatal accidents in the Franklin County field.

The third line followed is the introduction of dust barriers. The general plan promulgated by the U. S. Bureau of Mines was pursued, but the details were worked out by the company staff. These barriers are of two types; a concentrated barrier for the haulage entries and a trough barrier for the airways. The concentrater barrier is commonly known as the Jones barrier, but represents the combined efforts of the company staff.

The Jones barrier consists essentially of a box about 2 ft. deep and extending across the entry, the dimensions being varied somewhat to suit its capacity to the width of this passageway. The bottom of the box consists of a number of planks running crosswise of the entry, 10 to 12 in. wide, and notched out at the ends so that only a few inches of one edge of the planks rests on the framework of the box proper. When unsupported from underneath, the planks drop down at an angle of about 45 deg., allowing the dust to pour out in a number of thin streams. In their normal position, when loaded with dust, these bottom planks are held in position by cross-pieces, which extend beyond the box on either side and are held in place by supporting irons. The ends of the cross-piece are cut to a half circle and fit into a semi-circular curve in the iron supports. They are so adjusted that a slight outward pull on the supporting irons releases the cross-pieces and allows the bottom planks to tilt downward, discharging the rock dust.

To the bottom end of each supporting iron is attached a vane about 12 in. wide and 24 in. long. These vanes will be caught by the advancing wave of an explosion, moving the supporting irons sufficiently to allow the cross-pieces to fall. It is planned also that other vanes shall be placed at some distance from the

barrier along the entry and connected with the supporting irons, thus providing for a somewhat earlier operation of the barrier.

As the Jones barrier is up close to the roof of the entry and offers no obstruction either before or after being discharged, it is thought to be a marked improvement over the Rice barrier, which when discharged drops into the entry sufficiently to offer a dangerous obstruction to locomotives or cars, in case of accidental discharge.

The trough barrier, Fig. 9, consists of V-shaped troughs loaded with shale dust, supported on arms attached to posts set in the entry. Each pair of posts carries four troughs set at different elevations. The supporting posts are so arranged that the sets of troughs are staggered along the entry, thus providing a winding path for men to travel but protecting the entire cross-area of the entry. The troughs are made of 8-in. boards nailed together at right angles and are supported in notches 1 in. deep. With this arrangement they will be easily overturned by any strong blast of air; moreover, the shale dust is heaped up in the troughs so that a considerable amount will be blown off, even by a blast of air too feeble to overturn the troughs.

The company has installed a crusher in which shale from the mines is reduced in size so that 75 per cent. will pass a 250-mesh screen, 92 per cent. a 200-mesh screen and 95 per cent. a 150-mesh screen. The dust is removed from the crusher by a current of air and only that fine enough to be thus raised is used; 94 per cent. of this dust is ash and the remainder mostly moisture.

The proper housing of mine labor has always been a serious problem, and one that has been much neglected until recent years. This field is fortunate in that most mines are situated near established towns in which men can find homes.

There has been only one development in mine housing of sufficient importance to warrant inclusion in a discussion such as this. This is the provision of residences in connection with the work of the Standard Oil Co. of Indiana. Though the No. 2 mine is about 8 miles from Carlinville, it was decided that no town should be built at the mine, but that houses should be erected in an addition to the town of Carlinville, thus giving the miners the benefit of city schools, lights, water and sewer systems.

The houses were erected by Sears, Roebuck & Co., of Chicago. One hundred and fifty-six houses were erected in Carlinville, and twelve more at the mine for the accommodation of those employees who must necessarily be constantly at the mine. The plans and materials for these houses were taken from the regular stock of the company, illustrated in its catalog. In order to diversify the dwellings as far as possible, 14 different floor plans were used and these were modified by different arrangements of porches and roofs so that there are 45 or 50 different appearances. The difference of design is farther accentuated by painting in different colors. The cost of these houses was nearly one-half million dollars, not including grading, sidewalks and plumbing. This addition to the town is provided with sewers, the lots are graded, the sidewalks are in place and trees have been planted to the value of about $50 per lot. This new addition to Carlinville is so different from the ordinary mine town that any connection between the mines and the dwellings would not be suspected.

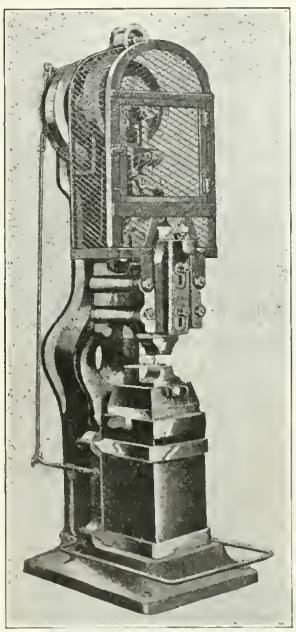
The company expects to operate the mine constantly and desires to attract labor of steady habit and a desire to work, in short, such class of labor as will desire to live in the kind of houses erected and become a permanent part of the population. It is not the intention that these houses shall be rented. The whole undertaking simply represents a desire on the part of the operating company to so house its labor as to promote contentment rather than unrest and attract a class of steady industrious labor.

Safety Guard for Power Hammers

Today the slogan "safety first" appears at numerous points in and around mines—at places where a careless movement might cost an employee more or less serious injury, or even his life.

The accompanying illustration of a safety guard installed on a Fairbanks power hammer shows a device which requires no sign to caution men working about this piece of machinery. An operator can give his whole attention to the work in hand, as this guard completely covers the working parts.

The device complies with the safety laws as enacted by the various states. While effectively protecting the operator the guard leaves the working parts accessible, both for oiling and for change of adjustment, through the door provided for that purpose. The guard is easily attached to such Fairbanks hammers as are already in operation, so that present users of these machines may readily secure protection for their employees.



THE GUARD IN POSITION

It is of interest to know that these power hammers are now made in sizes up to and including 500-lb. weight of ram for the heavier classes of work, such as is found in locomotive and car shops. Heretofore Fairbanks power hammers have been built up to 300-lb. weight of ram.

Coke Prices Fixed and Railroads to Make Diversions in its Transit

On Dec. 6, 1919, the Fuel Administration issued an order, effective Dec. 8, which related to the fixing or regulating prices of beehive coke and by-products coke, and also referred to margins or commission of middlemen, wholesalers or retailers of those products. In the latter part of the order authority was given to the Railroad Administration to make such diversions of coke in transit as may be necessary in the present emergency.

Curious Coal Deposits in Missouri

By Walter M. Brodie
New York, N. Y.

SYNOPSIS—The largest coal fields in Missouri lie in the western portion of the state. Many broken or irregular deposits or pockets are found in the central counties. Not a few of these contain both cannel and bituminous coal as well as small quantities of zinc blend in the same deposit. Although these deposits have in the past been worked with much irregularity, it would appear that their thickness and quality as well as the small amount of overburden covering them would make their operation particularly attractive as a stripping proposition.

THE chief coal field of the State of Missouri lies in the western counties, but coal is also found in the middle of the state and here and there in the eastern counties. Not all of these deposits are workable, however. To make coal mining profitable a number of circumstances must exist simultaneously, but as conditions are always changing and local demands constantly increase, many coal beds that now idle are likely to be worked in the future.

There will always be a fair demand for Missouri coal as there are great stretches of country west of the Mississippi River that do not produce merchantable fuel. This demand will be more insistent later, as the mines of Kansas, Arkansas, Oklahoma and Texas may in course of time be hard pressed to fill their own home markets.

Further, the State of Missouri is developing rapidly industrially. The soil is fertile, the number of farms is increasing everywhere, cities are getting larger, the country is accessible. The local demand is growing all the time and will in many cases permit a profitable production by small operators who could not undertake to develop a large field for a distant market. Under such conditions a considerable amount of mining may be done with local labor in favorable places with less friction than would be possible in regular mining districts where the workmen are not interested in the neighborhood, in the soil, or in helping to build up a permanent business.

The coals of central Missouri are of various kinds. Both bituminous and cannel coal have been found in various places, sometimes together, sometimes separately. Some of these deposits, even if not extensive, are of unusual thickness.

The bituminous coals of Missouri, like those of other states, vary in quality. Some are better than others for steaming purposes, or for blacksmithing, or for domestic use. Each kind, however, will find its particular use if it is produced clean and in quantity. The coals of central Missouri as a rule compare favorably with those of other fields. Though cannel coal is not found anywhere in extensive areas or in the same quantity as bituminous coal, it occurs in a number of places in remarkable deposits or pockets. It has a higher volatile content than bituminous coal and is thought to be derived from the spores and pollen and waxy material of marsh plants, and perhaps to some extent from animal remains bituminous coals having been formed from the fibrous or woody parts of the plants in the original marshes. Decomposition, pressure and heat produced the characteristic change. Morgan County, Kentucky, is probably the principal producer of cannel coal in the Middle West, but Morgan County, Missouri, also has a number of deposits.

Cannel coal withstands the action of the weather remarkably well. It is tough and massive, does not soil, has a conchoidal fracture, ignites easily, does not cake in burning produces a friable coke, contains a higher percentage of volatile matter than of fixed carbon and gives a gas of more candlepower than the ordinary bituminous coal. It yields more oil when distilled, about two barrels instead of one to the ton of coal. The cannel coal of the United States has been described by George H. Ashley in Bulletin 659 of the Geological Survey (1918).

D. W. Eaton, who was surveyor of Morgan County, Missouri, for a number of years, in one of his communications points out that this county is separated into two characteristic drainage sheds by a dividing ridge running irregularly east and west. On the divide stands Versailles, the county seat. To the north and east the waters flow into the basin of the Missouri River, to south and west they flow into the Osage. North of this main divide the country is comparatively level, but near the larger creeks it is rough and broken, and here a number of outcrops of coal, lead ore and zinc ore have been found.

The original formations lie comparatively level, with local deflections and faults. The altitude of Versailles, Mo., is 1,001 ft. On the main divide, about nine miles west southwest from Versailles, the elevation above sea level is over 1,150 ft., while at the mouth of the Gravois where it falls into the Osage River, the altitude is a little less than 550 ft.; and this difference of elevation of 600 ft. reveals a great vertical section of the different strata.

Most of the rocks in Morgan County belong to the Upper Silurian period. On the top of these in places rest the rocks of the Carboniferous age. In the latter are found the coal deposits. The Devonian period, which should come between, is wanting. The Magnesian limestones of the Silurian period contain the deposits of lead and zinc ores, but some zinc blende has been found in the coal formation, sometimes interstratified with the coal.

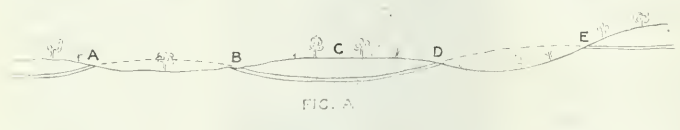


FIG. A.

FIG. 1, A. A ROLLING ERODED COUNTRY

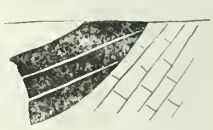


FIG. 1, B. CROSS SECTION OF THE SIMPSON BANK

The accompanying sketch shows how in an eroded region like that of Morgan County, Missouri, coal or any other stratified deposit may occur in the form of basins or pockets.

Suppose that coal shows on the surface at A, B and E. The owners of the ground from A to B may have a good showing of coal at distant points on their land and still have no quantity whatever, while nearby the owners from B to D may have good coal land with no showing whatever on the surface. When the ground is covered with much wash it often is difficult to determine without exploration just how the strata dip and where the coal may be found. The fact that

it comes to the surface proves that in one direction it does not continue.

Bituminous coal beds, formed in marshes from fibrous plants, are generally supposed to lie in the place where they were formed. Cannel coal and clay beds formed from lighter and easily floatable material may have been carried by water some distance into depressions and channels before they definitely settled and finally were covered and solidified. It is therefore to be supposed that these deposits are eminently pockety and irregular and that a great vertical thickness of bed in one place in no way denotes any considerable horizontal extension.

The geological reports of the State of Missouri all lay stress on this fact and warn against imprudent deductions. In his report on cannel coal in the United States, 1918, George H. Ashley draws particular attention to this consideration. Before taking for granted the continuity of a cannel coal deposit, a prospective buyer must carefully follow the local custom of Missouri and insist "on being sighted" beforehand in a safe and reliable manner. The existence of coal between two points should never be assumed unless it is proved to be there by drill holes placed close together.

Stover Coal Bank in Morgan County, Missouri

The Stover Coal Bank is mentioned in the report on the "Coal Deposits of Missouri," by Arthur Winslow, state geologist, published by the Geologic Survey, Jefferson City, Mo., November, 1891, on page 169. It is one of a group of deposits situated some ten miles southeast of Versailles. This report says: "The coal is here creditably reported to be 70 ft. thick as proved by a shaft. It occurs on the side of a hill of Magnesian limestone, where it has been stripped and drifted into. A face fully 20 ft. thick was exposed here at the time of inspection. Similar deposits are worked in the immediate vicinity of Versailles and also occur west and north of that place."

The Stover Coal Bank lies in what is called the hill country. According to the "Versailles Statesman" of June 28, 1900, it was discovered many years ago by parties hunting for lead. But little was thought of the discovery until blacksmiths began to come for the coal, and it was hauled away little by little in wagons. In the latter part of the 80's a company got an option on the land, went back where the hill flattened out and sank a shaft. After going through some 32 ft. of dirt

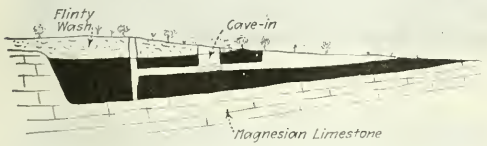


FIG. 2 CROSS SECTION OF THE STOVER COAL BANK

they hit the coal, and then for more than 70 ft. they found hard bituminous coal, making the bottom of the coal 104 ft. below the surface.

More excitement was created over this discovery than anything that had occurred in Morgan County before. Different parties rushed in and tried to secure this property or any other property adjoining, getting options and making contracts. They finally ended by bonding the whole thing and getting into litigation that lasted for ten years. This litigation concerning over 5,000 acres of the most promising coal lands, together with the troublesome conditions of the country during the closing years of the past century, virtually put a stop to everything.

About this time various people were becoming interested in the other Morgan County coal fields and mineral lands, and teams, scrapers and men came to build a railroad from Versailles to the Stover Bank, but this movement came to nothing. About 1898 the litigants became tired, all interests were brought into court in such a manner that the property was

FIG 3. DRIFT ENTRANCE, STOVER BANK

sold and bought by Mrs. Halderman, a rich woman from Kansas City. After a certain time a company was formed by a promoting firm in Chicago, stock was sold, but only one payment was made to the owner. Again the property got into litigation and another ten years passed before the seller got back her ground. Then the owner died. Finally the property was bought from the estate by one of the heirs. He holds it now, but it lies idle and has not had the economically necessary attention.

At one time a considerable amount of drilling was done. An old map shows a number of drill holes, but the records

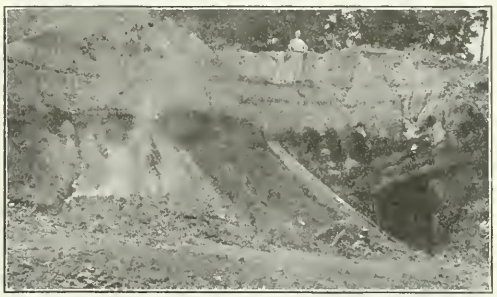


FIG. 4. ANOTHER VIEW OF STOVER BANK

in the course of disputes have been carelessly (or perhaps carefully) lost and no one knows how much coal this particular deposit or the property contains.

For a while the coal deposits or coal pockets of Morgan County had a reputation. At present the owners are afraid of having the old fame dimmed by new explorations. Those who have coal lands for sale do not wish any preparatory drilling done for fear that the actual results may not come up to the expectations of former days.

FIG. 5. SHOWING THE THICK COAL OF THE STOVER BANK

FIG. 6. COAL DEPOSIT EAST OF STOVER PIT

FIG. 7. VIEW OF THE STOVER CAVE-IN

Up to last autumn the entrance or driveway into the workings of the Stover Coal Bank was open. A team of horses and a wagon used to drive in and bring out the coal. We are told how loads of coal were taken out by turning the team around in the workings, breaking the coal from the roof into the wagon and driving off with it without even using a shovel. There are a few hundred feet of workings all in coal, connecting with a shaft at some 50 ft. vertical distance from the surface. A couple of chambers are some 30 ft. in diameter, with clean coal all around. In the shaft, which was the farthest accessible development and was covered over inside the workings, some 30 ft. of coal could be seen last fall.

one place, in this direction, 200 yd. away, an old pit is said to have gone through 10 ft. of coal. Toward the west the coal gives out suddenly and little exploration seems to have been done in that direction, probably because no coal was found there. Toward the north, however, for a distance of some 3½ miles, a number of pits have shown coal in various places. There are no authentic records, it seems, of these pits, though they are marked on a blueprint.

South of the Stover Bank coal has been found as shown on this map. Figs. 3, 4, and 5 show the entrance to the mine, from which it seems no more than about 2,000 tons at most have been removed. From where the man shown in

FIGS. 8 AND 9 SHOWING NATURE OF CAVE-IN AT STOVER MINE

During the past winter, some 50 ft. from the entrance of the adit, the roof of the main driveway, which was all coal, fell in after standing for 30 years and more. The cave-in extended to the surface, which here consists of loose dirt and soil over of coal of nearly 20 ft. above the old workings, or say nearly 30 ft. in all. In the shaft the coal is reported to reach 40 ft. farther down, but this is now under water.

The great vertical thickness cannot be explained by the strata standing on end. As shown in the accompanying sketch, toward the east the coal comes to the surface. At each of the pictures stands, downward, everything in coal, and it will be noted that the general dip of the stratification is not much inclined. Over the coal shown in the pictures there is only surface wash and soil, no rock, and the picture gives a fair idea of what would have to be removed to expose the coal. The coal roof in the workings inside the mine is solid, and though here and there cleavage planes are found, only in one place, that above mentioned, has the roof dropped in for want of care and attention. The floor of the yard in front of the entrance is coal.

FIG. 10. YARD OF THE STOVER COAL BANK

Fig. 6, taken east of the Stover mine yard, shows the coal at the surface of the ground. There is hardly any soil over the deposit here. The man in the picture stands on coal.

The workings inside the mine are about 10 ft. high. The coal forming the roof over these workings is shown in Figs. 7, 8 and 9, taken in the hole where the roof caved in. In Fig. 7 the man holding the stick stands on the end of a 10-ft. post in the workings, and everything up to the handkerchief is coal. Fig. 8 on the north side of the cave-in shows again the man standing on coal and gives an idea of the small amount of overburden. Fig. 9 shows the coal reaching almost up to the surface.

On an old blueprint, marked J. M. T., and dated Feb. 23, 1893, the following data are marked:

½ mile S.S.E. of the Stover Bank in S.W. ¼ Sect. T 5-41—R 16—a shaft, 25 ft. of coal.
1 mile S. of the Stover Bank in N. ½ Sect. T 7-41—R 16—two shafts, 77 ft. of coal.
⅛ mile N. of the Stover Bank in N.E. ¼ Sect. T 6-41—R 16—104 ft. deep, 70 ft. of coal.
½ mile N. of the Stover Bank in S.E. ¼ Sect. T 31-42—R 16—Bishop shaft, 4 ft. of coal.
¾ mile N.W. of the Stover Bank in S.W. ¼ Sect. T 31-42—R 16—Barkhart shaft, 24 ft. deep, 4 ft. of coal.
¾ mile N. of the Stover Bank in S.E. ¼ Sect. T 31-42—R 16—Brogler shaft, 35 ft. deep, 17 ft. of coal.
1¼ mile N. of the Stover Bank in N. E. ¼ Sect. T 31-42—R 16—Burkhart shaft, 35 ft. deep, 25 ft. of coal.
1½ mile N. of the Stover Bank in S.E. ¼ Sect. T 30-42—R 16—Burkham shaft, 20 ft. deep, 16 ft. of coal.
1¾ mile N.N.W. of the Stover Bank in S.W. ¼ Sect. T 30-42—R 16—Bradshaw shaft, 30 ft. deep.
2⅛ mile N. of the Stover Bank in N.W. ¼ Sect. T 29-42—R 16—Porter shaft, 45 ft. deep, 18 ft. of coal.
2¼ mile N. of the Stover Bank in N.E. ¼ Sect. T 30-42—R 16—Crane shaft, coal.
2¾ mile N. of the Stover Bank in S.E. ¼ Sect. T 19-42—R 16—San Lamb shaft, 35 ft. of coal.
3¼ mile N. of the Stover Bank in N.W. ¼ Sect. T 19-42—R 16—shaft, 80 ft. deep, 70 ft. of coal.
3¾ mile N. of the Stover Bank in S.E. ¼ Sect. T 19-42—R 16—Ruyan shaft, 24 ft. deep, 14 ft. of coal.

Now it is not possible to judge offhand the reliability of these data, but a trip over the surface verifies the existence of most of these old workings; and although the pits are now caved in or are full of water, there are plain signs on the dumps that coal was found in a number of places.

The coal therefore in the neighborhood of the Stover Bank does not fill a single pocket or pothole, but probably formed part of a bed or run that has been washed away partly or mostly by erosion, but still may have left here and there sufficient quantity to make, under favorable circumstances, extraction profitable for a number of years. In this kind of country, however, it is absolutely necessary to test the ground systematically with drill holes placed close together in order not to be deceived by imaginary quantities, especially so since in an east and west direction no extent of field has been shown, and further since the coal-bearing rocks do not extend far in any direction.

It is curious that on the Stover Coal Bank, which now has been known to exist for nearly half a century and which probably is one of the thickest known deposits, no machinery of any kind has ever been used thus far. There is a home-made hand windlass over the Arnold shaft which communicates with the workings, but it is a crude affair, probably put up provisionally by a farmer to take out water occasionally when purity is not required.

Fig. 10, taken in the yard of the Stover Coal Bank, both the man in the picture and the observer taking the photograph are standing on the coal of the deposit.

How far the coal body of the Stover Bank extends probably was tested fairly well in years past. There are signs and rumors that a number of holes were drilled, but the records are not available. Still, whether there be coal in quantity or but little more than what actually can be seen in the workings, the Stover Coal Bank is an interesting place to visit and seemingly worth more attention than it has received for a number of years. Its present main disadvantage is that it lies a considerable distance from the railroad in what is now a rather isolated neighborhood. If it had railroad communication the mine would be well located and exploration round about might show other pockets worth development.

FIGS. 11 AND 12. VIEWS AT THE BISHOP COAL PIT

An analysis of the Stover coal was made by N. Lehnen, Ph.D., analytical and technical chemist, of St. Paul, Minn., and is dated Jan. 5, 1900. Dr. Lehnen states that he made a report on these lands some four or five years earlier, calls

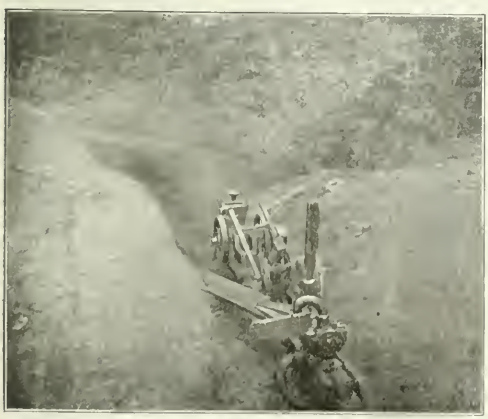


FIG. 13. THE PUMP AT THE BISHOP PIT

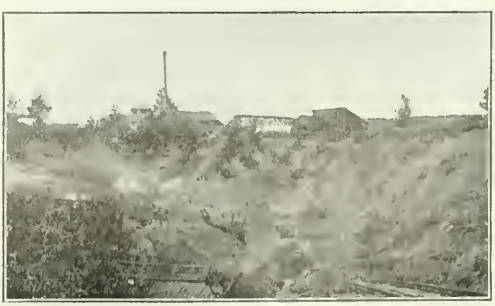


FIG. 14. VIEW OF SIMPSON COAL BANK

the coal a very fine quality of bituminous, equal to Pennsylvania coal, and gives the following analysis:

No. 1 Specific gravity.....1.19 per cent	
Fixed carbon	45.80 per cent
Volatile matter	42.90 per cent
Moisture	2.10 per cent
Ash	9.20 per cent
Total	100.00 per cent
ANALYSIS OF COKE	
Fixed carbon	82.38 per cent
Ash	17.62 per cent
Total	100.00 per cent
ANALYSIS OF VOLATILE MATTER	
Coal tar .....15 per cent	33.333 per cent
Carbonated hydrogen .....30 per cent	66.666 per cent
Total .....45 per cent	100.000 per cent
No. 2 Specific gravity.....1.12 per cent	
Fixed carbon	57.20 per cent
Volatile matter	36.60 per cent
Moisture	3.40 per cent
Ash	2.80 per cent
Total	100.00 per cent
Yield of coke.....60 per cent	
ANALYSIS OF COKE	
Fixed carbon	95.07 per cent
Ash	4.93 per cent
Total	100.00 per cent
ANALYSIS OF VOLATILE MATTER	
Coal tar	31.395 per cent
Carbonated hydrogen	68.605 per cent
Total	100.000 per cent
Or One Ton of the Above Yields	
Coke 60 per cent or .....1200 lb.	
Coal tar ..... 251 lb.	
Gas ..... 549 lb. or 14666 cu. ft.	

At the time the Stover Coal Bank was being promoted a graded roadbed was partly constructed from a point between Marven and Barnett on the Chicago, Rock Island & Pacific R. R. to the mine. This road was to be some 4 miles long. It was graded for some 2½ miles but was then abandoned.

The grade and right-of-way is said to belong in fee to the railroad. Though the grade does not reach nearly to the Stover Bank, it is probable that there is some coal within a short distance from it now, as some of the exploration pits

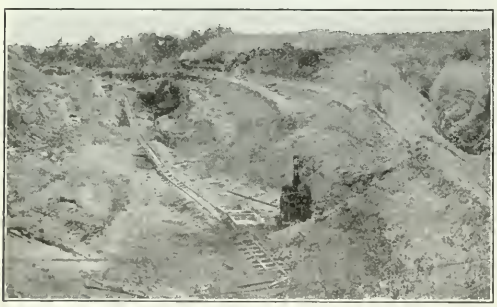


FIG. 15. THE SIMPSON STRIPPING

north of the Stover Bank are situated not far to the west of the grade. The fact that the grade was not finished leads to the supposition that the railroad at the time had little faith in the enterprise.

About ½ mile north of the Stover Coal Bank some coal was being mined this summer at the Bishop shaft on ground of the same owner. The coal here also comes to the surface, and a pit sunk into it somewhat over 20 ft. deep is in coal all the way down. How much thicker the coal is is not known.

Fig. 11 shows this working and gives an idea of the light overburden. To the left in the picture is seen a small gasoline-driven pump. It stands on coal.

Fig. 12, looking towards the west, was taken across this same coal pit. The man shown in the picture stands on solid coal, which lies almost horizontal, and here was covered with a small amount of wash and soil. The coal breaks out in a little gully on the eastern side of the working.

Fig. 13 looks toward the east. The pump stands on coal. The overburden here is very light. There are many croppings of coal in the same neighborhood.

The Simpson Coal Bank of the Monarch Coal and Mining Co. in Manitou County, Missouri.

The deposit of coal known as the Simpson Bank is another interesting occurrence. It is situated in Manitou County, about 10 miles east of Versailles, on the road to California, Mo. Arthur Winslow describes it as follows in "Coal Deposits of Missouri," page 169: "The deposit is located in the foothills of the valley of Barro Fork and has been exposed by the erosion of the valley. The contact with the limestone country rock is only seen on the north side. The coal is of the cannel variety. Pyrite occurs in sheets along the joint planes and also in thin films in the finer crevices where it is more difficult to remove. Zinc blende occurs in a similar manner.

"Over the cannel coal lies about 5 ft. of bituminous coal of rather poor grade. The occurrence is illustrated in B, Fig. 1. The coal here was found to reach 90 ft. in depth at the end of the open cut. A working driven 140 ft.

FIG. 16. ANOTHER VIEW OF THE SIMPSON STRIPPING

south from the foot of the shaft is said to be all in cannel. In the open cut the coal dips some 45 deg. but farther to the south it lies flat."

George H. Ashley, in "Cannel Coal in the United States," gives the extent of the deposit as 400 ft. long by 150 ft. wide and states the thickness of the cannel to be 45 ft. where it lies level. He states that the total contents of the deposit does not appear to be over 75,000 tons. What new developments have been made recently I cannot state. At the present moment the overburden is being stripped off with a large steam shovel, which fills cars drawn by a small locomotive. In the quarry a smaller steam shovel loads the coal into cars which are drawn up an incline by a stationary engine.

Figs. 14, 15, and 16 show the coal quarry. Fig. 14 is taken looking north. The deepest workings are in line with the incline, to the left, where the smoke rises. Fig. 15 shows the coal-handling steam shovel in the foreground and in the middle distance the large steam shovel stripping off the overburden, which here is from 20 to 25 ft. thick. On the right is the old coal pit, where, it is reported, 94 ft. of coal were passed through. Fig. 16 shows the inclined car track going down into the coal quarry, with coal all around. The company has 9 miles of railway to connect its mine with the Rock Island R. R. The coal is shipped mostly to Kansas City.

Coal Bank of the Ouacheta Coal and Clay Products Co. in Morgan County, Missouri.

The Ouacheta Coal and Clay Products Co. is operating some 5 miles northwest of Versailles. It lately has made a railroad connection about 4 miles long and is stripping a body or pocket of coal by means of scrapers. The property has

changed hands a number of times and it is reported that the company has made lately some valuable new discoveries.

Some years ago this property consisted of 378 acres, and drill tests and prospect shafts had been put down on about 120 acres. The drift at one point showed, it is stated, 51 ft. of coal. This is a cannel coal of good grade. Fig. 17 shows the scraper used to remove the soil and dirt from off the coal. Fig. 18 shows this scraper at work. In the left foreground the coal pit, at the time the picture was taken, is shown full of water. Fig. 19 shows the coal quarry, which while the railroad connection was being made was allowed to fill up. A train of cars drawn by a locomotive is an adjunct to the scraper.

Coal Near the Town of Versailles, Morgan County, Missouri

In the immediate neighborhood and east of the town of Versailles coal has been taken out in small quantities in various places. George H. Ashley mentions these localities as pockets of cannel that have been worked out—the Martin mine, 1½ miles east of the town; the McClure or Huffman working, ½ mile further north, and the Price Bank, north of the McClure. But it seems that it was not always the coal deposit that was worked out. The thickness of the coal here is said to be from 30 to 40 feet.

These different places and a few more were worked in a small way some 30 years ago before the Rock Island railroad was constructed. At the time there was only a small local demand for coal, and as roads were in poor condition most of the year and the load had to be hauled uphill by teams, the work was not carried on in an energetic manner.

The Huffman Coal Bank

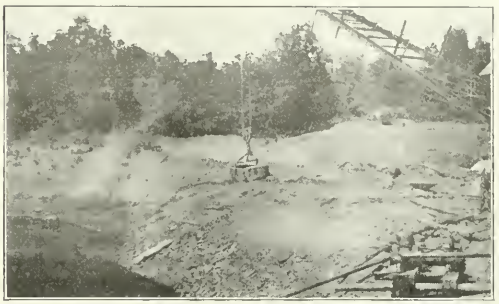
One of the old quarries, has for a long time been known as the Huffman Coal Bank. Like the others it is situated in one of the valleys or gulches near town, where the coal happened to show on the surface. The history of this particular place is characteristic and I therefore give some particulars taken from the "Versailles Statesman" of June 28, 1900.

"The Versailles Coal and Mining Co. is composed of several members who live principally in Johnson County, Missouri. After visiting Morgan County and seeing for themselves, they formed alliance with a certain non-resident gentleman who said he could buy the lands chosen by the company cheaper than anybody else could. He was employed to buy the land with the understanding that he was to become a member of the company. He bought the coal land at very reasonable rates, but it is said that he represented to the company that it cost several thousand dollars more than it did. The company seemed satisfied at the time and put men and teams to work at the coal bank, which was already open on the lands about 1½ miles east of Versailles. They shipped several carloads of this coal last summer and immediately after they bought the lands. The coal being of good quality met with a ready sale. Everybody thought that this company, which had just incorporated with a capital stock of $100,000, would prove to be the best mining company in the country. Everything was moving along nicely and everybody was satisfied till one day one of the members discovered that the company had paid several thousand dollars more for the land than the non-resident agent had to pay for it. The mine was closed at once and the members went to quarreling among themselves and the quarrel still is on."

This was in 1900. It is said that from this property several carloads were sold in Sedalia and that there was a good demand for more. Also that drilling was done on the land for several months and that coal was found in some of the drill holes. Old workmen tell that some of the pillars were robbed, that a part fell in and that since then no work has been done. They say that the coal did not give out. The company did.

The Lucy Martin Mine

About half a mile south of the Huffman mine and east of Versailles lies the Lucy Martin mine. Here the coal shows again on the surface in the valley and was quarried, off and on, for several years, about 30 years ago. The owner was an old man, who went blind and could not attend to the business in which, according to his daughter, he placed great faith. After his death the property was sold but never was opened up again.



FIGS. 17 AND 18. VIEWS IN THE ONACHETA STRIP PIT

The indications of coal near the town of Versailles seem to extend for some distance. Several people in the town, with property south of the divide on which the town is built, have told me that they went through coal in their drilled wells,

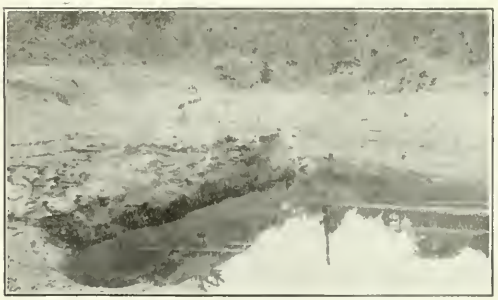


FIG. 19. ONACHETA PIT FILLED WITH WATER

and several wells on the farms round about to the north are said to have shown coal in the drillings.

Few reliable or exact data are to be had, but from a little valley in the town itself coal was mined before the Civil war for local use. This working was on the Cardell property, corner of Stephens and Hudson Sts., in the northwest portion of Section 6.

Labor and Its Responsibilities*

By Charles Piez
Chicago, Ill.

On Nov. 9, fully conscious that the bituminous coal miners had declined to submit to the arbitration offered by the President, a series of demands which were so extravagant that they would have imposed on the consuming public a burden of, at least, a billion dollars a year, the Executive Council of the American Federation of Labor, after a four-hour session, pledged to the United Mine Workers the full moral and financial support of its four million members in the bituminous coal strike which the Government, through Judge Anderson in the Federal Court at Indianapolis, had declared unlawful.

In commenting on this action, one of the labor executives said that same evening:

"This means that the strike order will not be rescinded. *The time has come when the people of the United States should find out once and for all if its government has the power to make men work against their will.*" If this were the outburst of some splenetic business agent it would not deserve mention, but when it represents the views of conservative labor leaders it is apparent that the error in the conception of the real situation is epidemic, rather than sporadic.

It is difficult to believe that such experienced and astute leaders as Mr. Gompers and his colleagues should really feel that the action of the Government in Indianapolis meant a return to involuntary servitude for the workers. If they do, then labor is under a most peculiar and unwholesome delusion as to its rights and privileges, and the organization which has recorded itself against oppression of every kind has itself become a most inconsiderate and merciless oppressor of the general public.

At this time organized labor is stronger in membership and atronger in solidarity than ever before in its history. It is no longer a suppliant for popular sympathy in its struggle for recognition. It works short hours, receives high pay, and has unlimited opportunity for employment. It has attained these exceptional advantages so quickly and so easily, through the extraordinary conditions attendant upon the war, that it has armed itself with a bludgeon and is preparing to beat its way to the full and exclusive possession of the fleshpots of established industry.

ALL CAUTION IS GONE

There is evident in its methods and its aims none of the care and consideration that should attend the exercise of great power. It has thrown caution to the winds, and is prepared to wreck the atate itself in its blind intent to follow the course laid by radicalism. Neither want nor economic necessity can be urged as the cause of the epidemic of strikes from which we are at present suffering. They result, without doubt, from carefully laid plans to create discontent and to develop suspicion and class hatred. So skillfully and methodically have these plans been laid, so adroitly have revolutionary leaders worked from the inside of the American Federation of Labor, that even its conservative executives are today, in their desire to compromise with radicalism and maintain the integrity of the Federation, giving countenance to methods and doctrines which, if tolerated, will subvert the very foundations of our economic and social structure.

I came in frequent contact with Mr. Gompers and his associates during my connection with the Emergency Fleet Corporation, and I found nowhere more patriotic and earnest cooperation to keep the industries going without interruption during the national crisis. I feel free to say, therefore, that I believe Mr. Gompers and his associates are unaware of the menace and dangers of the course that has been laid for them. Radicalism decided on its policy to bore from within the American Federation of Labor some years ago and no effective steps were taken by the leaders of the Federation to prevent this honeycombing. Constant compromise may build up a large association, but it takes courage and unswerving fidelity to principle to build up a strong and effective organization.

The executives of the American Federation of Labor have yielded too much to the desire for numbers, and they have, therefore, before them a large job of housecleaning to re-establish themselves in the public confidence. They have missed several opportunities within the last twelve months to show that, in their growing strength and increasing power, they were still mindful of their obligations to the public.

When the Metal Trades Council of the Puget Sound District called a strike last January in defiance of an existing and unexpired agreement entered into between the Federation and the Government, its members should have been ordered back to work by the international presidents of the crafts involved, and failure to comply with this order should have resulted in a withdrawal of the charters. But the officers of the Federation contented themselves with being sympathetic with the Government's efforts to enforce a labor contract and lost a golden opportunity to put themselves sternly and uncompromisingly on record against a breach of agreement, and against the radical element in its membership that was guilty of so violent a disregard of common business honesty.

Again, the Federation should have appreciated the difference in obligation between a policeman sworn to protect the life and property of the public and a workman engaged in manufacturing. It should have set itself squarely against a strike of policemen, under any and all circumstances, and should have advocated other ways to redress wrongs, if wrongs existed.

SUPPORT WRONGLY PLACED

And in the steel strike, the American Federation of Labor gave its countenance and support to Foster, an avowed syndicalist and revolutionist, a man who had disseminated among our alien workmen, principles wholly at variance with American institutions. Why should the American Federation of Labor lend its encouragement and aid to an organizer who has publicly announced that "the wages system is the most brazen and gigantic robbery ever perpetrated since the world began"; that "the syndicalist allows no consideration of loyalty, religion, patriotism, honor or duty to stand in the way of his adoption of effective tactics?"

Does not the American Federation of Labor surrender its vaunted position of conservatism and loyalty to American institutions when it employs exponents of such doctrines in its campaign for new members?

Can there be any question that even the conservatives among our labor leaders are tolerating the specious arguments and false promises of the extremists in the labor group and that in facing the situation today, and in looking for a remedy, we must appreciate that the radicals in the Federation, though I believe in the minority, have temporarily raised the red flag above the red, white and blue?

Conservative, sane leaders of the Federation must either declare themselves in favor of radical doctrines and action or they must have courage to assert themselves, to re-establish for the organization the groundwork of American principles

*An address made before the annual meeting of the American Mining Congress, St. Louis, Mo., Nov. 21, 1919.

and ideals, even if that re-establishment should split the Federation. The public is going to insist that it be no longer victimized by men who intend to control industry and society through a framework of soviets, and it is not going to submit to constant interruption of the vital industrial processes when revolutionary propaganda, and not economic necessity or want, is the cause of the interruption. The public is insufficiently organized for promptly and effectively meeting a situation like the present, but it can insist in no uncertain way that its legislators and its representatives bear in mind that obligations, as well as privileges, go with American citizenship, that this is a government by majorities, and that no organized minority will for any length of time be permitted to prey without hindrance on the majority. France has, in the national elections just held, declared herself overwhelmingly against radicalism, and America will declare herself similarly when the opportunity comes. For our people are just beginning to understand and appreciate the reason for the existing unrest and the sinister purpose of the leaders who are fomenting it. They are growing more critical of the aliens who have sought our shores; they insist on knowing whether these aliens have come here to seek a livelihood in the American way under American institutions, or whether they propose to enforce upon us a new form of Government born of immature and visionary minds amid the stress and discouragement of foreign oppression.

THE SITUATION WILL BE MET

Congress will, without question, meet this present invasion of irrationalism and revolutionary propaganda by suitable laws that will enable the Department of Justice to deport aliens who are unwilling to accept the American principles of government, or who are guilty of slanderous misrepresentation of our institutions. We want men of foreign birth, men who will adopt our principles of government and assist in improving them, but we want no unassimilated foreign element to become a cancer spot to our institutions in the future. We are going to handpick our immigrants hereafter and we are going to return some troublesome examples that have sought our shores. That will be the first step in our return to sanity.

The second step should consist in impressing on the sane leaders of labor the necessity of getting a proper conception of what wages are and who pays them. Among the many economic delusions of the day is the one that capital pays wages and that high wages can be paid out of profits and surplus, or out of capital itself without increasing output or advancing prices. Not only workmen, but many of our legislators, forget that capital, as applied to the industries, represents investment in property, in machinery and equipment, and in material in process of manufacture, and that the cash to meet wages, the cost of materials, of power, and all the other expenses involved in manufacture must be secured out of the selling price of the product, out of the money derived from the user or consumer.

If wages increase and production falls, an almost universal industrial occurence at this time, prices must go up, not only to meet the increased wage, but also in proportion to the decreased output. Wage earners are apt to forget that they are themselves the largest consumers of manufactured commodities and that they must, therefore, pay by far the largest share of any increase in the cost of production. If any group or class, like the bituminous coal miners, for instance, attempts, under some wrong economic theory, to improve the opportunity for labor by reducing output and at the same time insists on an increase in wages, the burden falls most heavily on other groups of wage-earners, who must retaliate in some equivalent form to restore the economic balance.

So much has been said of the necessity of increasing production and reducing consumption to bring down the cost of living that further repetition seems unnecessary. But this economic axiom is not yet admitted by labor leaders to indicate the right policy and constant reiteration is, therefore, essential to insure its wider acceptance.

It is well to remember that the disinclination of labor leaders to accept this basic truth is by no means due to lack of intelligence on their part, but is due rather to the fact that for years organized labor, both here and abroad, has endeavored to improve its condition by keeping demand in excess of the normal supply. Labor adopted, in other words, the principles of monopoly and such measures as the limitation of the number of apprentices, the consistent opposition to any scheme of wage payment that would tend to stimulate output, and the restriction of the output of the individual to the capacity of the least skilled, naturally resulted. Without questioning the wisdom of this labor policy in the past, it is proper to indicate that under conditions as they obtain today and as they are likely to obtain during the next few years, a continuation of this policy is destructive of the best interests of labor itself. Restriction of output may appear wise during periods of reduced consumption, it is never wise during periods of unlimited demand. There is no possible hope that the vastly reduced productive processes of the world can meet the normal demand and make good the ravages of the war in years to come; and labor's present opportunity lies in securing high wages for large production so that earnings will increase faster than the cost of commodities and faster, therefore, than the cost of living.

THE FINAL STEP

The third and final step to meet the present situation is to insure that large unincorporated associations of either employers or employees be brought within the reach of civil process in every jurisdiction. These organizations, with their vast membership and their great defense funds, are in position to do infinite harm to the public without accepting any responsibility for the acts of either their individual members or their leaders. For the past twenty-five years labor organizations, particularly, have been exempted from every piece of legislation that has been enacted to safeguard the public against the aggression and extortion of combinations.

When associations grow as powerful as these labor organizations have grown in the past few years the only protection against irresponsible action lies in bringing them within the law. It has been suggested that this can be brought about by enacting a law which will provide that any voluntary association of seven or more members may sue or be sued in the name of the association. There seems to be no good reason why such an act should not exist in every jurisdiction.

A second piece of legislation that commends itself is that contained in the Cummins Bill which provides for compulsory arbitration in railroad labor disputes. Because continuous operation of the transportation systems is absolutely vital to the very life of the nation, no group of men whom chance has placed in the employ of these systems should have the right to conspire collectively against the public interest. It is not necessary to forbid a man to quit work if he so chooses, but it is fair and just that men engaged in an employment vital to the nation shall be prevented from using their great power in combination to practice extortion on the public. Proper tribunals for the determination of wages and the adjustment of disputes should be provided, but the workers on these systems should, in consideration of the establishment of such machinery to insure fair wages and just treatment, and in consideration of the paramount interest of the public, waive their right to strike.

A further piece of legislation which has been suggested as a possible preventive against premature, unfair and unnecessary strikes, but one which, it is thought, will not prevent strikes when they are necessary as a last resort to secure justice, provides that "It shall be unlawful for any person, association or corporation wilfully to induce ,aid or support any strike, lockout or other kind of industrial warfare;

(a) Of employees whose terms of employment are fixed by the state or any political subdivision thereof;

(b) In violation of an agreement, or for conditions of employment conflicting with any agreement between an employer and his employees, or an employer and any labor union;

(c) In violation of any arbitration award or for conditions of employment conflicting with the terms thereof;

(d) To enforce demands where the party against whom the demands are pending is willing to submit such demands to arbitration by any method agreed upon, or to any public agency, authorized by law to deal with such matters;

(e) Without first giving the parties involved a reasonable opportunity to consider and act upon the terms sought to be enforced thereby;

(f) Where there is no trade dispute involving issues of direct benefit to the parties involved; provided, however, that nothing in this section shall be construed to forbid the mere quitting of work or the discharge of employees.

The state or any political subdivision thereof, or any person, firm, association or corporation, when injured or threatened with injury by anything forbidden in this act, shall be entitled to all of the appropriate civil remedies in law and equity.

This bill is not framed with the intention of depriving men of the right to strike when that appears the only way to meet the economic pressure exerted by the employers, but it is framed with the purpose of instilling into the mind of organized labor a proper sense of responsibility for acts which will cause harm or damage to other parties involved in a labor controversy. The bill does not declare any acts criminal, nor does it impose on any department of justice the burden of enforcing the law. It simply affords the persons injured by such forbidden acts an opportunity to stay the injury by an injunction, or to recover damages in some court of justice. It will, if enacted, assist in building up, among the members of the unions, that sense of responsibility which is essential to the proper conduct of union affairs.

If industrial strife is ever to be brought down to sane limits it must be done by enforcing responsibility. No single class must be permitted to run wild beyond the reach of the law. If there must be collective action then let us so frame our laws that there will be collective responsibility.

Success and Failure

Two young men who were fortunate enough to graduate from their home-town mining school, each with a high mark, started in immediately to attain their ambitions. Since they were friends, they attended many meetings together, where prominent men in the mining industry occasionally lectured. At one meeting the topic discussed by one speaker was "Success and Failure."

In conclusion the speaker said: "There are two things before every man in life—success and failure. The way to success seems hard and long, but failure may come at any moment. Therefore it might be wise for the man who meets with either to be able to conscientiously feel that he is not ashamed to go back and work with his hands once more. He should be able to say, 'I was a man, in a man's position.'"

After the meeting was over, John, who seemed to think that there was some common sense in the speaker's words, asked his friend Will what he thought about the advice given. Will, who seemed to think the speaker wasted time and breath, said: "It might be all right, but whoever heard of a boss being ashamed to go back and work with his men? No matter what kind of a man he was in the position, he was there to advance the interests of the company and not those of the men." But with this view his friend did not agree.

Some years later these men met again at a gathering similar to the one mentioned above. John spoke to his friend concerning their respective ways of handling the job of mine foreman, to which both had risen.

It seemed as though everything was coming John's way and that his friend was having a difficult time of it. His men would strike occasionally, and he had to answer many questions from his superior. Finally their conversation drifted to the amount of supplies each used at his mine.

Will said: "We use very little supplies at our mine, especially timber. This I think is often used where it is not needed at all, and since our roof is very good, I never allow my assistant to order timber without my consent. Furthermore, I am going to watch this item more closely from this time on, and I am going to produce coal cheaper than what the company bought it for."

John, who was very considerate of his friend's feelings, replied: "Perhaps you had better be careful you don't bring on a squeeze."

With that his friend laughed, and they parted, only to meet some months later. And this time John's friend was looking for some advice. The first thing he asked him was, "How is it that you have such easy sailing in your work?"

To this John replied: "I will tell you candidly my honest opinion. It appears to me that you think you know it all. It is quite different with me. You see, when I started the job I considered that the man whose place I took must have been efficient in the position. Otherwise he would not have been promoted to superintendent. So before he left I learned from him his plans for the future development of the 'diggin's,' as he was more acquainted with them than I.

In your case, you started right in after the boys for more coal. And when I mentioned the possible chance of your methods drawing on a squeeze you laughed at me, and ignored the danger incurred. Now it has come, and your trouble has started. I have learned with regret but not surprise that you are to be discharged on the first day of next month. And if I may be permitted to do so, I would like to give you a little warning about mine squeezes.

"When you take the legs out from under a table, the top will fall, unless it is supported by some means or other.

If you ever get another job as foreman, my suggestion to you would be that you use your own judgment about producing coal cheaper than the company bought it.

And now, while we are on this subject, let me turn your attention back to the address that was delivered some years ago by Mr. ——— at the mining institute. You doubtless remember that he stated that there are two things before every mine foreman—"success and failure."

Fuel Administrator, Dr. Garfield, issued the following order giving the Railway Administration authority to issue regulations covering the delivery, use and consumption of coal, coke or other fuel or of power generated or produced by the use or consumption of coal, coke or other fuel.

Regulations were issued to make such restrictions uniform over the entire country to aid in the conservation of coal.

Electric railways and manufacturing plants, stores and offices were ordered to cooperate in arranging with the provisions of the order schedules, days and hours of work to permit the maximum utilization of transportation equipment during the coming winter season.

Two Deaths from Blackdamp

By Donald J. Baker
Pittsburgh, Penn.

SYNOPSIS: Three men entered an old slope without a flame lamp of any kind. Two were overcome by an atmosphere deficient in oxygen and died before they could be removed. The third man escaped uninjured. A rise of water had imprisoned the air in this slope. And the three men walked into a pocket of black damp. This accident emphasizes the importance of carrying a safety lamp when entering any old or abandoned workings.

A distressing accident that comes under the head of preventable, recently occurred at the No. 5 Manway of the Piney Run Mine, ¾ mi north of Blaine City, Clearfield County, Penn., when J. F. Stott of Philipsburg and R. M. Caldwell of Clearfield were overcome by air deficient in oxygen. The No. 5 Manway is on a 19 deg. slope, and the workings at the bottom have been abandoned for the past ten years. The accident has driven home to the miners of Clearfield County the conviction that it is nothing short of a big gamble for puny stakes to enter abandoned working places without taking precautionary means for the detection of gas or bad air.

An account of the accident as told by George Rainer of Philipsburg is as follows:

Mr. Stott, accompanied by his wife and niece, Mr. Caldwell and Mr. Rainer left Philipsburg by auto for Blain City, where it was Mr. Stott's desire to inspect some coal holdings owned by Mr. Caldwell with a possible view toward purchase. Upon arriving in the vicinity of the No. 5 Manway of the Piney Run Mine, the car was stopped and the three men of the party alighted and proceeded in the direction of the slope. Reaching the slope, Mr. Stott remarked that as he was the only practical miner in the group, he would lead the way to the bottom, using a pocket flashlight for illumination. Proceeding at intervals of 3 ft. with Mr. Rainer bringing up the rear, the descent was begun. About 40 ft. had been covered when Mr. Stott was noticed to fall against the timbers on the right side, while a second later Mr. Caldwell fell on the left. Mr. Rainer not suspecting the presence of gas, believed the men had stumbled, and tried to assist Mr. Caldwell to his feet, when he was himself partially overcome, but succeeded in raising himself before he fell and in moving backward toward the opening. Fortunately his head cleared the gas level. Reviving in the air, he struggled to the surface and summoned aid from a boiler house located nearly 2000 ft. from the slope. B. R. Bodle and Frank Linder were in the house at the time and promptly went to the assistance of the two men in the slope.

The account from here on is best related by Mr. Bodle.

Hurrying to the Manway, the forms of Mr. Stott and Mr. Caldwell could be plainly seen, as their progress down the slope had not reached a stage that necessitated the use of the flashlight. Several attempts at rescuing the men inside were made by Bodle and Linder before the latter finally succeeded in placing a rope about the body of Mr. Caldwell by means of which he was brought to the surface. The entire time consumed from the moment the party entered the slope until Mr. Caldwell's body had been recovered was not more than 20 min. By this time, a large number of men had arrived from Blain City. Repeated attempts to reach the body of Mr. Stott failed, the gas barrier being seemingly impenetrable. Nearly three hours afterward, the rescue of the lone body was effected by a miner entering with wet cloths fastened over his face. Both Mr. Caldwell and Mr. Stott failed to respond to artificial respiration.

GEORGE RAINER OF PHILIPSBURG

A Water Level at Time of Accident
B Normal Water Level
C Region of Gases
x Where Accident Occurred

PHYSICAL FEATURES OF NO. 5 MANWAY

Several days later, mine inspectors visited the slope, took samples of the gas, and sealed the opening. An analysis of the gas, if such it may be called, shows the following parts of gases per hundred parts of the sample:

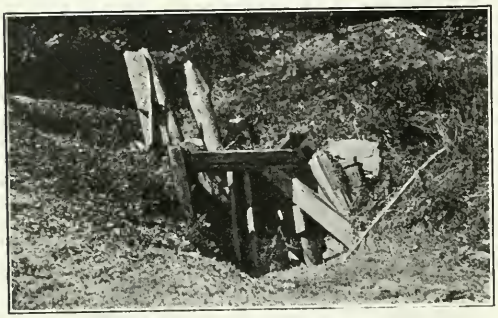
Carbon dioxide (blackdamp)	2.86
Oxygen	12.20
Nitrogen	84.94
Carbon monoxide (white damp)	Not present
Methane (firedamp)	Not present

Inasmuch as the sample was taken 9 ft. from the opening, 2 ft. from the roof, and without the aid of breathing apparatus, it may be assumed that the above quantities do not represent a true condition of the air that was encountered by the unfortunate men. In fact, a quality of air as represented by the above analysis would not cause death without giving the men warning in time to enable them to escape. However, certain conclusions can be reached as to the air mixtures that were responsible for the accident.

It is practically certain that the gas encountered, which was not diffused as may have been the sample, contained not more than from 6 to 8 parts of oxygen with a corresponding

increase in carbon dioxide. This would have given a heavier-than-air mixture which undoubtedly was present, otherwise the gas would have not collected at the bottom of the slope. The nitrogen value probably remained practically the same as that shown by the sample. It will be remembered that the sample was taken near the roof where the nitrogen value would have been highest, nitrogen being lighter than air.

Thus the substance that caused the accident cannot rightly be called a gas but rather an air deficient in oxygen. The effect of this air upon members of the rescuing party who were overcome at various times but revived substantiates the analysis report that white damp was not present. A black damp atmosphere, except in a highly concentrated state, would not have caused death as quickly as those reported. No after effects have been apparent on any of the men, although Mr. Rainer states that he occasionally experienced for some time a choking sensation. This no doubt arose from the severe mental and physical strain that he has been under, rather than any tangible physical discomfiture.



BARRICADED ENTRANCE TO THE SLOPE

A longitudinal cross-section of the slope as shown in the accompanying illustration will help to render more easily understood the conditions that were present at the time of the accident. The slope is approximately 80 ft. long, and at the bottom a raise is made that corresponds to the dip of the coal bed. A ditch leads away from the bottom and carries the collecting water to other sections of an adjoining mine whence it is pumped to the surface. During recent heavy rains, this ditch became clogged, with the result that the water not being allowed to escape, had risen nearly if not quite to the roof.

OLD WORKINGS ARE DANGEROUS

The air in the workings at the bottom not being subject to any system of ventilation had been undergoing a change for several years. It may be assumed that the coal left standing in pillars at or near the foot of the slope had absorbed considerable of the oxygen content from the air. The rise in the water then forced the air up the slope as shown in the diagram. The above mentioned condition is not a new one to mining men, as several accidents have occurred under similar conditions.

It would be unjust to criticize too severely the action of Mr. Stott and Mr. Caldwell in entering the slope without an open lamp for detecting the nature of the air. To them, particularly Mr. Caldwell, the condition of the opening was apparently known. This is the first time that water has ever been to the roof as far as records go. The whole catastrophe may be summed up as being another case of where the one chance out of a hundred prevailed.

The use of wet cloths in rescue work is neither to be commended or advised in air having a low oxygen content. The rescuer who used this method, himself admits that the cloths were utilized more for the purpose of excluding air than for forming any crude breathing apparatus. Water will absorb only its own volume of carbon dioxide, which places its value as a resistant at practically nothing. In white damp, wet cloths would be of no value, except for air exclusion.

Certain primary considerations should govern the investigation or entry of working places that have not been subject to ventilation for any considerable time. Of this the following —well known but often forgotten—will serve as a basis:

In entering an abandoned slope or shaft, an open lamp should be held in advance and at a level lower than the head. In entering an old working place, a mine safety lamp should comprise part of the equipment for the detection of any gas that may be present.

Legal Department

RIGHTS UNDER COAL LEASES—Suit, brought by a landowner to compel the lessee under a coal mining lease to make final account for royalties and to redeliver possession of the property to the plaintiff, was properly dismissed where it appeared that the lease expressly provided that it should run until the exhaustion of all merchantable coal, and where it was shown that the colliery remained in full operation, and that, in addition to the pillars left by the lessee, several small parcels of coal remained "in the solid" yet to be mined. A supplemental agreement, granting an underground right of way for the removal of coal from adjacent lands, did not expire with the lease of the land across which the right of way extends on removal of all coal under the latter land, where the right of way was reserved under an express grant as follows: Full and free right to use "any openings or gangways in any vein of coal now opened or to be opened upon the leased premises, for the transportation of "all coal and minerals that lessees may mine from any other lands leased, owned, or to be leased or owned by" lessee, together with the right to construct and lay tracks and freely to use the same for such transportation "through any openings or gangways now opened or to be opened thereon" by lessee. That an increase in royalties and a lump sum payment of $1000 has been made by the lessee, in consideration of such supplemental agreement, supports an inference of mutual intention that the right of way should not expire with removal of the coal under the land across which the right of way was granted. Where a right of way is granted, without express limitation, it will be presumed that it was intended to continue during the life of the estate or interest to which it has become appurtenant. Therefore, until removal of the coal under the adjacent properties, or cessation of the right of removal, the right of way may be enjoyed. (Pennsylvania Supreme Court, Lillibridge vs. Lackawanna Coal Co., 107 Atlantic Reporter, 688.)

SHOWER BATH ACCIDENTS—Defendant established a bathroom at its mine, as required by the Oklahoma statutes, for the benefit of its miners. While taking a shower bath in the place, plaintiff, a miner, slipped in the basin and broke his arm. He sued for damages. Held, that before defendant can be held liable in damages, on a theory of negligent construction of the basin, it must be shown, either that the basin was obviously dangerous for use, or that it was constructed so different from the usual method of construction as to be dangerous. If the place was so constructed as to be reasonably safe for a person exercising ordinary care for his own safety, the defendant discharged its full duty to its employees. (Oklahoma Supreme Court, Taylor vs. Rock Island Coal Mining Co., 182 Pacific Reporter, 81.)

MARITIME LIENS FOR COALING VESSELS—Where a fuel company furnished coal to a tug on orders from her engineer, who had previously obtained coal while operating the tug for her owner, and the company was not informed until after the coal had been furnished that the vessel was being operated under a charter which required the charterer to furnish the coal, the company was entitled to enforce a lien against the tug. But this lien right was waived by the act of the fuel company in attempting to secure payment of the bill from the charterer, the bill being charged to the latter at the suggestion of the engineer. (United States District Court, District of Mass.; The Eastern; 257 Federal Reporter, 874.)

Oxyacetylene Process in Collieries and Shops---I

By Charles C. Phelps
New York City

The general shops, where most of the maintenance work is done are located in the center of the company's field of operations at Lansford, Penn. Formerly, practically all the work from the various collieries requiring oxy-acetylene treatment was done at this center, but now welding and cutting stations are also installed at the local shops which are located near the various breakers.

Local conditions, such as the nature of the repair, its urgency, the amount of work awaiting attention, etc., determine the routing instructions on each piece of work. It is the general policy to handle each repair job, whenever expedient to do so, near its point of origin. This practice saves considerably in transportation and handling charges and in time consumed, inasmuch as some of the collieries are many miles away from the main repair shop.

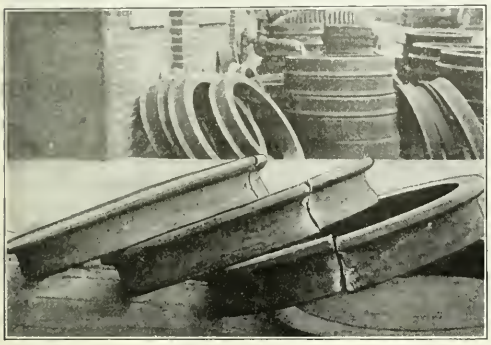


FIG. 1. REMOVAL OF TIRES FROM WHEELS

A large stationary Oxweld acetylene generator is installed at the Lansford shops and pipe lines radiate from it to the car-repair shop, the boiler shop and the general machine shop, the longest line being some two or three hundred feet in length. Six smaller stationary Oxweld generators are installed at the various breakers. In all, about 25 or 30 Oxweld welding and cutting stations are kept in operation at the various plants, most of them being located at the Lansford shops. Where possible, the work to be repaired is brought to a shop, which is provided with welding tables and preheating appliances. The job is taken to the apparatus and not the apparatus to the job.

This practice insures the execution of the repair under the most favorable conditions as to alignment of the work, preheating, etc. Of course, this is not practicable for some of the heavier equipment. The steam shovels and drills, for instance, which are employed in stripping operations are served by portable Oxweld acetylene generators, and cutting and welding equipment. Emergency crews, likewise, are fitted out with portable outfits consisting of a welding and cutting station, cylinders of dissolved acetylene and oxygen mounted on a two-wheeled hand truck.

Fewer Spare Parts Needed Where Welding is Employed.

With the exception of hammers and a few other forming tools, nearly all machine-shop tools are designed for the purpose of cutting or removing metal, hence the time-worn practical joke of calling upon the newest shop apprentice to produce the "putting-on tool." There is today, however, a true "putting-on tool," for in what better way could the welding blowpipe be described?

It rebuilds the worn places, it fills up cracks and blow holes and in a word it places within the hands of the artisan the power to form new shapes of infinite variety. Still more remarkable is the fact that the oxyacetylene "putting-on" process may be applied to practically any metal—wrought and cast steel and iron, copper, brass, bronze, aluminum, lead and many other pure and alloyed metals.

With the ability to build up metal at will to approximately any desired shape, the problem of maintaining a large supply of reserve parts is partly done away with. This is by no means the least of the advantages experienced by plants that make full use of the oxyacetylene process.

Frequently repairs are made at the end of the week at various plants of the Lehigh Coal and Navigation Co., and the repaired parts put back in place ready to function as usual upon starting up Monday morning, thus the repair does not delay production even for a moment.

Typical Mine and Colliery Repairs

Many repairs are of a truly urgent nature and it is not unusual for the welded part to start back to its destination before it has cooled. Sometimes even large parts are so hot that it is necessary to wrap them in asbestos and canvas for convenience in handling.

To record all the applications of the oxyacetylene process in shop and colliery would be like mapping the stars and anything approaching a complete statement of their extent could not be attempted in the limited space here available. From the very nature of the work, the operations vary from day to day and from month to month. Some idea of the scope of the work, however, may be gained by listing the jobs completed by a single operator during a typical month.

FIG. 2. FLAME AT THE FACE OF THE TREAD

The figures given in this list include the actual time consumed in preparing the work, setting up, chipping or grind-

ing, preheating when necessary, finishing, and other miscellaneous work connected with the above operations. Sometimes, for instance, it might require but two or three minutes to make a cut, whereas two or three hours might be charged up to the particular job.

Such an apparent discrepancy is explained by the fact that it might have been necessary to spend some time in removing and replacing guards, keys or bolts, or in moving the part from some distance or perhaps in going to the work and returning. In other words, the record gives the full time for completing each job and involves many factors.

The month's record, which is for the month of March, 1919, should therefore be considered in its entirety, as it would not be fair to single out individual items for purposes of comparison. Likewise, the descriptions of some of the jobs are

FIG. 3. CUTTING TIRE OF LOCOMOTIVE WHEEL

not complete, being based largely on the memory of the operator. Thus the time cannot be taken as exact.

A Month's Record for One Oxyacetylene Operator

DATE	REPAIR JOBS AT LANSFORD SHOP	TOTAL HOURS
Mar. 3.	Locomotive repairs (miscellaneous parts welded)	5
	Machinery repairs (miscellaneous parts welded)	3½
Mar. 4.	Brake rigging welded, logging tractor piping welded and worn brake band built up by welding	3
	Heavy lathe face plate (2 breaks welded)	3
	Locomotive main driving rod of forged steel, broken in half, welded	1
	Welding rope shackle	1
Mar. 5.	Locomotive frame (break about 3½x3½-in. welded)	8½
Mar. 6.	Cutting steel for repairing locomotive parts	2
	Steam shovel crosshead shoe (cast iron), broken in half, welded	4
	Cutting off ends of projecting keys on breaker shafts	2½
Mar. 7.	Locomotive throttle valve (broken body) welded	1
	Pump cylinder (cast iron) break welded	3½
	Welding pipe and cutting holes	3

FIG. 4. CUTTING A 10-IN. SHAFT

	Controller handle (cast iron) broken in half, welded	1
	Dog for shaper, broken in half, welded	2
Mar. 8.	Cutting 12-in. forged steel shaft (2 cuts)	3
	Steam shovel parts welded	2½
	Removing sand holes in large new piston head by welding	2½
Mar. 11.	Parts of road scraper welded	4
	Cast iron pinion, break welded	3½
	Building up several new teeth on gear for briquetting machine	3
Mar. 12.	Stripped threads on lathe tool post holder, built up by welding and retapped	1
	Cast iron pinion, break welded	3½
	Boring bar, broken in half, welded	1
	Pipe cutting	1
	Cutting off old stud heads and other locomotive parts	2
Mar. 13	Shaper chuck (cast iron) broken in half, welded	3

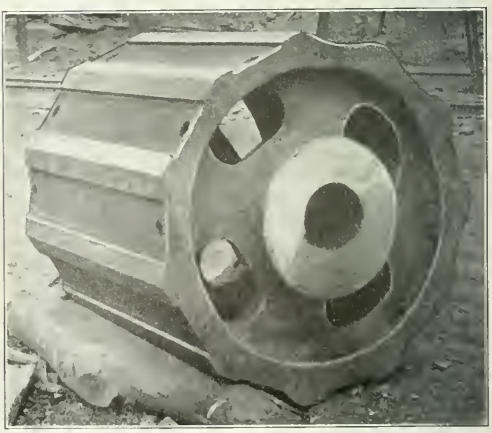


FIG. 5. VIEW OF MAIN CRUSHER ROLL

	Four locomotive wedges (which fit between frame and driving boxes) broken in half, welded	3½
	Rod for locomotive welded	3½
Mar. 18.	Hand oil pump part, welded	1
	Drill press rack broken in half welded	1

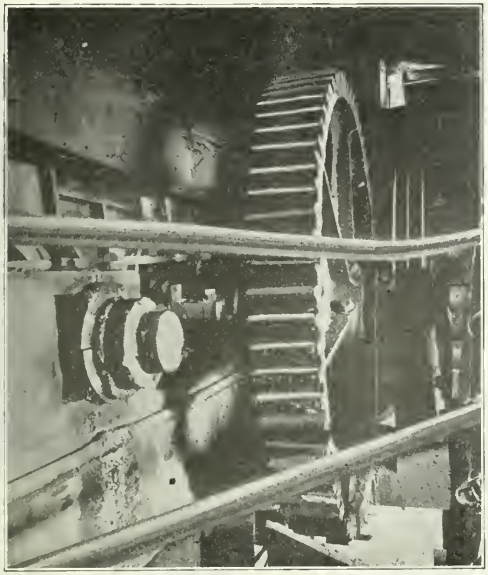


FIG. 6. DRIVING END OF CRUSHER

	Dodge auto parts welded	1
	Cadillac auto parts welded	½
	Pipes on locomotive welded	3
	Cast iron breaker clutch, broken, welded	2
Mar. 19.	Locomotive pipes, whistle, levers, etc., welded	3
	Steam cylinder, cracked longitudinally for 3 ft. from flange to flange, but flanges not cracked, welded	5½
Mar. 20.	Locomotive rod brass broken, new flange built up by welding	2
	Armature end shields (⅜-in. cast iron) cracked, welded	3
	Building up several new teeth on gears for boring mill	6
Mar. 21.	Locomotive fire door frame, 3 cracks welded and part of flange built up	4½
	Cast steel locomotive coupling, two breaks through bolt holes, welded	4
Mar. 25.	Locomotive boiler front frame and door cracked, (6 in. crack in ⅞ in. thick cast iron frame and 5 in. crack in ½ in. thick cast iron door) welded	4
	Thread nut for lathe, broken, welded	1
	Auto truck parts welded	3½
Mar. 26.	Boring mill gear casing (cast iron) 2 cracks 1½ ft. each, welded	3
	Clamp for key cutting machine, broken, welded	1
	Several repairs to ratchet jack by welding	3
	Brass valve plate from water end of pump, broken, welded	1½
Mar. 27	Packing nut on coal loader (end of nut, about 6 in. diameter broken off), welded	3
	Locomotive casting welded	3
	Locomotive journalbox welded	2½
Mar. 28.	Automobile door hinges welded	1
	Various locomotive welding repairs	5
	Heating with oxyacetylene blowpipe two ball bearing raceway rings, shrunk on armature shaft in order to remove rings about 8 and 14 in. diameter	2½
Mar. 30	Welding about 150 breaks in cast iron grids of large rheostat	5½

The above record covers only work passing through the Lansford machine shop. Outside of this building is a general metal storage yard and here the cutting blowpipe is frequently used for cutting up steel plates, shafts and various structural shapes.

Many steel and semi-steel mine cars are constantly undergoing repairs in the adjoining car shop. Car sides, braces, brackets, rivets, etc., require frequent replacement. It is extremely simple and economical to cut out the worn or corroded parts with the blowpipe and apply patches where necessary. Rivet holes are roughed out with the blowpipe and then reamed to the correct size. The work in this shop as well as in the boiler shop consists largely of cutting, and many Oxweld cutting blowpipes are kept in constant service there.

Following are a few of the typical welding and cutting operations described in detail:

Removing Steel Tires

The steel tires on locomotive wheels must be replaced after they have become worn. It is the practice with the Lehigh Coal and Navigation Co., to discard tires after the thickness of the thread has worn down to about 1½ in. and to replace the tire with one having a tread between 2 and 3 in. thick. Formerly, two different methods of performing this work were in use. One consisted in drilling a series of small holes in the tire and then fracturing it. This was often very difficult

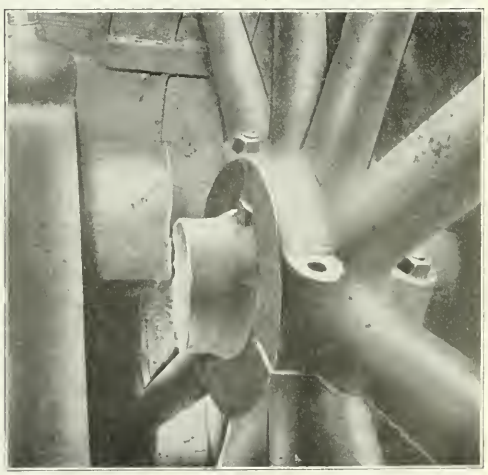


FIG. 7. VIEW OF CUT SHAFT

due to hard spots in the metal. The other method employed a special circular gasoline burner which was placed over the tire and by means of a series of small flames directed radially inward against the tire caused it to expand, whereupon it was slipped off the wheel. Both of these methods were expensive and slow, requiring from ¾ to 2 hr. per tire.

By the oxyacetylene method, which they now use exclusively for this work, each tire is removed in 2½ min. or less. Fig.

1 shows four tires 26 in. diameter, from "electric mules" (mine locomotives) which were cut in this way. The cut was started at the thinnest part of the metal, namely the crown of the flange (Fig. 2) and the flame directed horizontally parallel to the face of the tread. In this way the molten slag flowed out of the opposite side (Fig 3) and the tire was penetrated so quickly that no injury was done to the wheel, in fact the tire being still in tension as when first shrunk onto the wheel, generally snapped open before the cut had actually penetrated the full depth.

A somewhat similar application is the cutting of the hubs of two-segment steel gear and fly wheels. Many of these are cast in the company's foundry and in accordance with usual practice they are cast in one piece and broken afterwards, thus assuring perfect alignment of the two halves. Formerly the hubs were nicked with pneumatic chipping hammers and then broken by wedging. The operation is now greatly simplified and cheapened by merely cutting with the blowpipe, in fact the entire operation of splitting a large wheel is now completed in about a half hour whereas a full day was required for the work when it was done with pneumatic chisels and wedges, one man doing the work in both cases.

Cutting Shafts.

A question that is often asked is "What is the limit of thickness of steel or wrought iron that may be cut with the oxyacetylene blowpipe?" It is on record that metal as thick as 27 in. has been cut in this way, which goes to prove that the cutting blowpipe will accomplish any cut that in practice may be required of it, in the coal mining industry. Figure 4 shows a 10-in. shaft that was cut without any difficulty by the oxyacetylene process in just 6 min. It will readily be seen that there is no comparison between this speedy method and the slow usual machine-shop method of performing such work.

An interesting job of shaft cutting occurred at one of the Lehigh Coal and Navigation breakers. A piece of rock became wedged between two of the heavy main crusher rolls, badly twisting the driving shaft. Fig. 5 shows one of the rolls

FIG. 8. RIM AND HUB OF SHEAVE WHEEL

with the outer spiked segments removed. This is 3 ft. in diameter by 3 ft. in length and was mounted on a 6-in. shaft about 15 ft. in length. The keys that held the roll to the shaft were knocked out in an attempt to remove the shaft but it was found to be so badly twisted that the roll was gripped fast.

As it was inexpedient to dismantle the entire crusher at the time so it was allowed to continue running, without the keys, until the end of the week. The shaft was then cut off at both ends of the roll. Fig 6 shows the driving end of the crusher and gives an excellent idea of the very limited space available for conducting this operation. Fig. 7 shows a cut

FIG. 9. REPAIRING WIRE CABLE

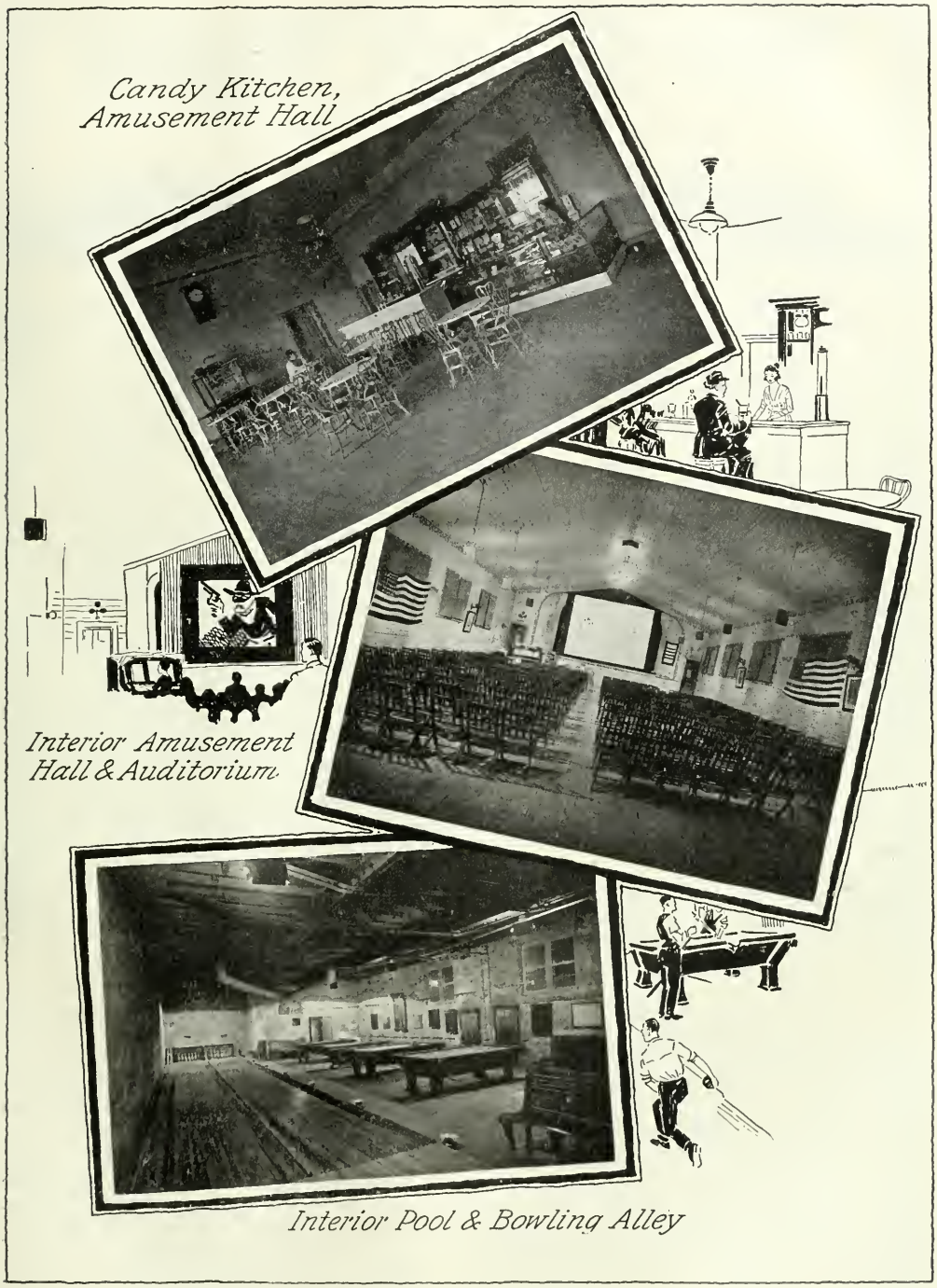
made under similar circumstances on another shaft. After the shaft was cut it was then an easy matter to lift the liberated roll out of its bearings with the aid of a chain block after which it was sent to the shop where the remaining section of the shaft was forced out of the roll with the aid of a hydraulic jack.

The actual blowpipe cutting operation required 18 min. on the driving side of the shaft and 13 min. on the other side. The work was started at 12:30 p. m. Saturday and at 6 p. m. the same afternoon the work of removing the roll had been completed, a gang of 8 men and foreman being employed on the job in addition to the oxyacetylene operator, whose services occupied the short period of time noted above.

Broken sheave wheel flanges are easily repaired by welding. Sometimes these repairs are made without removing the wheel, and when this is done it makes the operation of repairing extremely simple and economical. After sheaves have become worn or damaged to such an extent that salvaging by oxyacetylene methods is not profitable, it is customary to reclaim the spokes which are composed of good grade wrought iron and add them to the stock of bar iron. Fig. 8 shows the rim and hub of such a sheave wheel from which the spokes have been cut by the oxyacetylene process. The 36 spokes, 1⅜ in. in diameter, on such a 12-ft. diameter sheave are cut in this manner in about 30 or 40 minutes. It is necessary to cut only the outer ends of the spokes, the inner ends being merely nicked and then broken with the aid of a sledge.

Wire hoisting cables soon become weakened through wear, and the wisdom of resocketing or reclamping rope at regular periods is well recognized. There is no simpler and easier means of cutting such ropes than by means of the oxyacetylene cutting blowpipe (Fig. 9). The fact that the cutting flame must penetrate so many separate strands makes little difference in performing the operation. In timing this application of the process one operator required about 2 min. to cut through a new cable 2 in. in diameter.

(To Be Continued.)



MODEL RECREATION CENTERS

Scenes of the Amusement Hall of the Union Pacific Coal Co., Hanna, Wyoming

Morrow Explains 1917 Profits

In a letter addressed to Hon. Carter Glass, secretary of the Treasury, J. D. A. Morrow, vice president of the National Coal Association stated that Mr. Glass was misinformed as to the profits of the coal operators in 1917. He desired to be fair in his representation of facts and so did not use his own figures but quotes the reports of the United States Geological Survey.

Following is the letter as was received by Mr. Glass and made public Dec. 1, 1919.

Reluctantly I find myself obliged to take issue with an informal statement furnished you by some of your experts and published Nov. 27, regarding the profits of bituminous coal mine operators. That statment has given the public an impression so incorrect and misleading that I must call your attention to its obvious inconsistencies.

I feel sure that you did not personally weigh and test the statements contained therein, for I am confident that you wish to be fair and impartial, and a moment's consideration must have revealed to you the obviously erroneous impression certain to be created by the publication of the memorandum.

The memorandum was apparently based on a casual inspection of the returns of certain individual coal companies. From these individual instances the impression is clearly given that the industry in 1917 made "fabulous profits", with average returns on invested capital of "from 100 per cent to 150 per cent. It is true that the foregoing statement refers only to the operators east of the Mississippi, but they produce nearly 90 per cent of the total bituminous output.

Certain individual concerns may have made such profits, but not the industry as a whole, and, as the Fuel Administration has pointed out, fairness demands consideration of the industry as a whole.

For the entire bituminous industry in 1917 to make profits of "from 100 per cent to 150 per cent. on invested capital, would require a total profit of upwards of $1,500,000,000. According to the United States Geological Survey Report, entitled "Coal in 1917," page 923, the total gross receipts of the operators for all the bituminous coal produced in 1917 was only $1,249,272,837. Hence the total gross receipts, before deducting operation expenses, were less than the total profits which would have to be made out of those receipts to justify the statement of your experts. This indicates the ridiculous nature of their casual generalizations.

The statement respecting the profits in 1918 is even worse. The memorandum says that in 1918 profits were generally "reduced 25 per cent to 30 per cent. less than for the preceding year". In other words, they must have averaged from 75 per cent to 120 per cent. This would mean total profits for the industry in the neighborhood of $750,000,000 to $1,200,000,000. Fortunately, on Nov. 19, the Fuel Administration issued exact information on this subject. It stated that for the year 1918 the average gross margin realized by the bituminous producers was 46c per ton, out of which "interest charges, selling expense, Federal taxes, both normal and excess profit, as well as certain other items not allowed in computing costs, were paid" before any profit remained. According to the United States Geological Survey the total production of bituminous coal in 1918 was just under 580,000,000 tons. A gross margin of 46c on this tonnage amounts to $266,800,000, most of which was not profit. This statement of the Fuel Administration was given to the newspapers, had been made public and attracted wide notice more than a week before your experts handed you their memorandum, indicating that the profits in 1918 were from three to five times the total gross margin actually realized by the operators during the time that the United States Fuel Administration was exercising a careful and exact control of prices.

The Fuel Administration has emphasized the fact that general conclusions affecting bituminous coal selling prices can safely be drawn only from averages covering the entire industry. I know that you wish to be fair to this industry, as well as to all others. Therefore, as a correction to the memorandum of Nov. 27, I respectfully request that you publish the average percent. of profit on capital invested, both before and after paying Federal taxes, for the bituminous industry as a whole.

The Fuel Administration has also pointed out that a comparison of earnings of employees in this industry with earning of workers in other industries, is necessary to a fair consideration of wage problems. Likewise a comparison of profits in this industry with those in all other industries is necessary if you mean to set forth fairly the aspect of the bituminous coal mining industry. I must therefore further respectfully request that at the same time you also publish for the other industries their average percentage of profits both before and after Federal taxes have been paid.

In conclusion, let me add that this is asked not because it has any direct bearing upon the present wage controversy. For whether the coal producers can now absorb out of their profits large wage increases is to be determined, not with regard to conditions of two or three years ago, but with reference to present conditions. It is well known that in 1919 prices have been lower, costs higher and margins much smaller than in 1918, in many cases profits having entirely disappeared. Therefore, in asking for the publication of the averages suggested, this industry is asking merely for a simple act of justice to correct finally and effectively the erroneous public impression created by ill considered statements from those whose word carries the weight of authority.

Since I feel that this entire discussion should be open to the public, I am taking the liberty of handing this letter to the press.

1—The payment for diverted coal should, in all cases, be made to the shipper. For the purpose of such settlement the shipper shall be regarded as the party issuing shipping instructions, whether the producer, jobber or middleman.

("Where coal is consigned on the order of a jobber to a producer to be shipped to a customer of the jobber, the jobber is the shipper" and "the consignor of the coal is the shipper, unless the coal is consigned by the producer to a customer of the jobber on shipping instructions of the jobber.")

2—All coal shipped before Oct. 30, 1919, is to be paid for at the f. o. b. mine price at which it was sold by the shipper. Coal shipped before Oct. 30, 1919, which is claimed to have been sold for export, shall be paid for at the f. o. b. mine price, at which it was sold to the exporter. Between Oct. 30 and Nov. 12, inclusive, it is not to be in excess of the maximum Government f. o. b. mine price.

(The sum of $1.35 permitted under the United States Fuel Administrator's order of Feb. 25, 1918, fixing prices for export and bunker coal may not be added to the f. o. b. mine price, either under a valid and enforcible contract, before Oct. 30, and after Nov. 12, inclusive, or to the maximum Government price between the two dates mentioned. The Fuel Administrator rules that coal cannot be classified as export coal, except when actually loaded into foreign vessels, and only after the coal has been so loaded.)

3—All coal shipped on and after Oct. 30 and until and including Nov. 12, 1919, shall be paid for at not exceeding the maximum Government price at the mines, unless such coal is, at the time of diversion, moving to a purchaser from a jobber, in which case a jobber's margin of 15c per net ton may be added.

4—All coal shipped on and after Nov. 13, 1919, under a valid and enforcible contract, made prior to Oct. 30, 1919, shall be paid for at the price provided by the contract. All coal shipped on and after Nov. 13, 1919, not covered by a valid and enforcible contract, shall be paid for in accordance with Rule No. 3.

5—The order of Oct. 31, 1919, restores the order of Jan. 14, 1918, as amended by order of Nov. 20th, 1918, which cancelled the 15c rebilling charge. Therefore, the 15c rebilling charge is not a proper item of settlement on coal diverted on or after Oct. 30, 1919.

6—Proof of the contract price between the shipper and the original consignee should be established by requiring a certified copy of the shipper's invoice, and if claim is made that coal was not shipped on contract, and the Government price is demanded, a certificate or affidavit should be required from the shipper to that effect.

7—Date of shipment is the date on which coal has been delivered into possession of the railroad as common carrier, and price is determined as of that date.

Coal Financing Plan

The American Wholesale Coal Association through George Cushing, its managing director, has been laboring with the Railroad Administration in an effort to arrive at some agreement whereby the operators may be paid for their coal in order that the money which is due them may be used to pay the wages of miners who are at work in the mines. Mr. Cushing announced lately that the Railroad Administration has agreed to pay part of one bill of $34,000, leaving unpaid bills for nearly $50,000,000.

The Central Coal Committee later made the statement that, if any wholesalers or operators who had not been able to collect from regional committees for coal taken, would present their bills for such coal to the chairman of the finance committee of the Central Coal Committee at Washington, they would secure prompt payment.

Following this cheering statement, advice was received from Washington that the Railroad Administration refused to carry out arrangements made with the Coal Committee. The question of payment for these coal shipments still

loomed large until a new plan for prompt settlement of claims against the railroads was adopted by the Railroad Administration and Federal Reserve Board.

Under this plan, upon the delivery of coal to the railroads for shipment, the coal company will issue a special draft which will be eligible for rediscounting at the Federal Reserve Banks, thereby preventing the accumulation of claims against the carriers of payment of coal diverted in transit from the original consignee.

Bureau of Mines Appropriation for 1920 Provided For

Appropriations totaling $2,592,920 and $1,655,880 are provided in the annual estimates for the Geological Survey and the Bureau of Mines, respectively. The money is to be expended during the fiscal year ending June 30, 1921. While a considerable portion of the work of the Geological Survey has a bearing on the coal industry, the items of more direct interest are as follows. Special statistical compilations on the production and distribution and consumption of essential minerals, including coal, $200,000; survey of power production and distribution in the Boston-Washington industrial region, $250,000.

Most of the Bureau of Mines' work applies directly to coal. Some of the items asked by the Secretary of the Interior for the Bureau of Mines are as follows: Investigating mine accidents, $454,000; testing of fuel, $175,000; scientific and technologic investigations with the view to increasing safety, efficiency and economic development in mines, $250,000; operation of mine rescue cars, $180,250; purchase of new mine rescue cars, $40,000; inspecting mines in Alaska, $7,000. In addition, the Bureau of Mines has jurisdiction over the Government fuel yard which is conducted with a revolving fund of $1,000,000.

Investigation of the condition and methods of use of scales and mine cars used for the weighing and measuring of coal dug by miners, and for the purpose of determining wages due, and of conditions effecting the accuracy of the measuring or weighing of coal at the mines, by the Bureau of Standards during the next fiscal year, will call for an appropriation of $25,000, the Director of that Bureau reports. This is an increase of $10,000 over the appropriation for this work during the current fiscal year. The work is under the immediate direction of an inspector of weights and measures at a salary of $3,300. Others employed in this work are: an associate engineer at $2,100, an assistant inspector of weights and measures $1,920, two assistant engineer-inspectors at $1,800, an assistant physicist, $1,680, an assistant inspector of weights and measures at 1,500.

Coal Shortage May Reduce Canadian Consumption

In view of a threatened coal shortage in this country this winter, Canadian importers have speculated on the possibility of getting their supply from the Nova Scotia bituminous coal centers. There is a strong feeling, however, in Canadian manufacturing centers opposed to the quality of the maritime provinces coal, and it has been reported through official channels that it is doubtful whether such a change will be made.

In addition to the superior quality of bituminous coal from certain American districts over the Nova Scotia bituminous coal, freight charges from Nova Scotia are reported to be unusually high, and manufacturers in Quebec have found it more profitable to use American coal. The quality of bituminous coal from Nova Scotia, according to a report, would not relieve the domestic heating problem in Ontario.

Despite the warnings that have been sent by the transportation department of the Canadian Manufacturers Association to all users of bituminous coal to secure their supplies as soon as possible, it would appear from the comparative figures on the importations of bituminous coal in Ontario that the users of this coal were well supplied.

The importations of bituminous coal between April 1 and August 31, 1916, according to customs returns, were in round figures 3,500,000 tons. In the same period in 1919, the importations amounted to 3,300,000 tons in 1917, 4,850,000 tons; and in 1918, 5,350,000 tons.

The large importations of 1918, with the sudden ending of the war and the closing up of many industrial plants, would lead to the conclusion that large quantities were on hand this year.

New Adjustment for Railroad Rates Sought

In their efforts to stablize conditions in the coal mining industry the representatives of the operators and the miners are more determined than ever to work for an adjustment of railroad rates which will make possible a greater price inducement to the consumer for the purchase of coal during the spring and early summer. The operators express themselves as being willing to go further than ever before in the matter of price concessions so as to make it possible to operate mines more nearly on a year around basis. It is believed that from the present conference will come concrete recommendations which, if put into effect, will do much to permit of operation during the season of lightest demand. Assurances of coöperation to this end have been received from the Railroad Administration. While the Railroad Administration soon will be a thing of the past, it is believed that a plan can be worked out with the individual companies, all of whom are interested in flattening the peak load which they are called upon to carry in the early winter. It also is believed by spreading coal transportation over the entire year that important savings can be effected in the purchase of open top equipment.

Another matter which is being given very careful consideration in connection with the adjustment of the labor troubles is the matter of coal storage. Since it is manifestly of little advantage to store coal at the mines, the problem resolves itself into making it to the advantage of consumers to provide storage facilities. No concrete plan has been worked out as yet, but it is expected that this matter is to be brought forward in a way which is likely to have important results.

Ventilation Problems to be Investigated

Complying with numerous appeals from engineers throughout the country, the Bureau of Mines has asked Congress for $100,000 to investigate ventilation problems in connection with the construction of vehicular tunnels. The work that the Bureau has done in connection with ventilation and the study of poisonous gases in coal mines qualifies it particularly for this work. It is believed that the study in this connection which is to be made in coöperation with Yale University will lead to results of value to the coal mining industries. At present, vehicular tunnels are under consideration at New York, Chicago, Pittsburgh, Boston, San Francisco and New Orleans. It is feared that the carbon monoxide developed by the many automobiles which will use these tunnels may be sufficient to menace life.

COAL AGE

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Last Combined Number

IT IS A CAUSE of much congratulation that we publish herewith the last combined number of *Coal Age*. Our next issue that of Dec. 25, which will appear Dec. 29, will be a regular number, so we shall start the New Year as New Years should be started—with new resolutions.

Our readers, have borne nobly with our delays and with the measures we have taken to remedy an unfortunate, but unavoidable, situation. Their kindly letters of interest have sustained us at times the most trying that can come to any publishing house.

We are endeavoring to overcome the difficulties that still confront us. If, for a while, we do not maintain all our past efficiency, and the paper does not have all its former excellencies, kindly credit us with a knowledge of that fact and a desire to attain and surpass what we have done in the past. None of the "letting down" will be observable when the pressure of the strike has entirely come to an end.

Every publishing house fits its printing capacity to the number of periodicals it is publishing. When there is an enforced delay in publication, on resumption either more copies must be published each month or else combined issues are made necessary. The McGraw-Hill Co., has used both expedients—a slight acceleration in issue and combined numbers. It is clear that both these handicaps no well-adjusted shops can meet satisfactorily.

In short it is not possible to set all the material for all the papers in our own establishment or to print the material when it is set. For this reason the papers are as yet, not all gathered under the family roof tree. Some day soon *Coal Age* will be home again and printed by our own employees and under the eye of our entire editorial staff. Then every editor will, with his accustomed zeal, guard the printing of what he has prepared. Till then we plead for patience and for a further exhibit of that good will which our readers have so generously exhibited toward us.

Low Prices and Idleness

DR. GARFIELD ASSURES us that his 14 per cent increase with prices unchanged will put out of business mines producing 100,000,000 tons of coal a year. This suspension of industry will, be severe on capital, it is true, but he is probably as unmoved by that fact as most people are by the losses incurred by capitalists, small or large.

However, he has nothing to say about the effect of his order on the workingmen who have been engaged in those mines the operations of which may, or must, now be suspended. The laying off of 100,000 men is no small matter. Many of them will move themselves, their families and their household property. If they have houses they must abandon them. Their dwellings cannot be sold, for the community in which they are living will be completely ruined by the fuel order.

But many men will not move. Some are too old to take up life in a new town, some are too closely wedded to the old community, some are parasites, or partly parasites, of the parental home and some rather than move will continue to try and eke out a poor living—far poorer than mining affords—by working on the farms, on the roads, at clayworks and like industries. Some will work part of the year elsewhere and return home for a few months every so often.

The outcome will be hard for them. The past irregular work in the mines looked at from the experience of the future will be a happy memory rather than a bitter one.

Fortunately it is likely that Dr. Garfield's order will not be as harmful to workingmen as his statement would indicate. The operator is a persevering and optimistic person. Like Mr. Micawber he persists in "looking for something to turn up". Some will see ahead to the end of the war and to the consequent removal of the restraints of the Lever Act. When that time comes they will be able occasionally to charge what they find necessary or even a bigger price, if the demands for coal continues as it undoubtedly will. They want to keep their men together till that time.

Besides the operator is apt to remind himself that if he closes his mines he will be idle at a loss and that is worse than working under a like condition. There will be maintenance charges to be met in any event. He will urge on himself that it is better to lose a little money working than to lose as much or more lying idle. The practice of working at a loss which the Federal Trade Commission under E. N. Hurley condemned will be resumed. Some of the mines will work irregularly and unprofitably, and the mine worker's exeperience will be unusually bitter.

Raw Material and Products of College Life

NO ONE CAN CONCEIVE what kind of iron and steel we would produce if the iron masters did not specify what tolerance limits they would demand in the coke, iron ore and limestone shipped to their furnaces. And who shall say what would happen if the manufacturing public and the railroads would receive without protest any and all iron and steel offered by the steel companies regardless of quality?

Foolish indeed is the suggestion just made. No business man would abolish specification and inspection. Yet college professors build large institutions on this basis. There are specifications for the building, the fixtures and the faculty, but for the raw material to be smelted in the furnace of the educational establishment no specifications are written. The faculty welcomes all comers, those mentally unfitted for the work for which they are to be trained and those without a proper brain equipment for any professional or executive position whatever.

The college professor is bidden to seize avidly all the students he can induce to attend his college. He has no standards except perhaps as to the moral character of his charges, and the degree of preliminary training they have received. He does not examine the inwardness of the student. It is as if the purchaser of coke saw that the coke was really devolatilized coal and knew that it had passed through one of several types of ovens, but did not query whether the material was low in sulphur and phosphorus.

Until colleges sort out the offering material and take only the best, they will fail as ignominiously in satisfying the public as the operator would fail if he kept every man

offering and raised his position and emoluments year by year as he advanced in seniority. Too often there are basal defects in the material.

Fortunately for the Carnegie Institute of Technology it is seeking to have the mining public select the men for its academic treatment. It is not running all kinds of human ore through the mill but only that which seems likely from previous expert inquiry to be capable to serve the purposes sought.

Perhaps the public prefers the wasteful way of the colleges and is willing to see them take all offering material, pay ore and other, and treat all natures alike—but it may be necessary to stand at the feeder and select what is good material beneficiated and reject all material that was not from the first good enough for beneficiation.

Tit for Tat

EARLY IN 1919 the public declared that prices of coal should come down about 60 per cent and that the mine workers' wages were higher than they should be. For this reason the mines were idle. There was in short a buyer's strike, from which the mine workers and the country suffered.

Near the close of 1919 the mine workers, made angry by the lengthy idleness in the early part of the year declared they must have a 60 per cent increase to make up for their irregular employment.

Coal Age in the spring of this year said that the mine workers were in a mood that would make a strike and a big demand for a wage increase and shorter time almost inevitable, and the public by not buying was preparing itself for an uncomfortable disillusionment later.

The disillusionment came. The strike was declared, and only the determination of the public to prevent an excessive wage increase prevented the mine workers from having their way. Now everyone is trying to claim that the fault for the idleness did not lie with them.

The Fuel Administration, the Geological Survey, the National Coal Association, the operators and mine workers can prove that they were not to be blamed for not having forewarned the public of the possibility of a coal shortage. The same cannot be said of the United States Railroad Administration, of some members of Congress such as Representative or of the public generally.

They declared the attempts to awaken the public to a sense of its duty and danger was a malicious conspiracy to brisken the market needlessly. As a result the campaign of the National Coal Association costing, it is said, $80,000 failed to produce the whole effect desired. However, much good work was done. Had it not been for the Association's activity in informing the public of the situation the Bolshevism would have been more general, the demands might have been even more unreasonable and the outcome to a nation, entirely without coal stocks, more severe.

A New Departure

IN THESE DAYS there is plenty of publicity, but it is all of the wrong kind, for like is talking to like and no progress is gained when that is the case. The workingman takes his daily paper which usually caters to his unrest, while the employer reads his business papers, which are too often largely devoted to playing up the employer's point of view. The employer, however, is unusually fortunate in that he reads the daily press, which in normal periods is apt to favor the employed rather than the employer, the bulk of the readers of newspapers coming under the former description. As a result, though his feelings are occasionally outraged, he really does learn the point of view of the employed and is broadened thereby.

But the employee reads nothing but newspapers and his union organs, and they carefully foster his unrest. They like to blazon forth headlines which arouse his interest as a red rag draws a bull. It is needful that the workingman be led to see the other side as, he in part, did during the war, when the four-minute men, Government officials and Government propaganda filled the land.

Coal Age knows that its readers are not in any way infested with the germ of the Bolshevik fever, and that as a journal it cannot meet the needs of the Red situation. It can, by editorials, correct in large degree the unrest which spreads in most unlikely places, finding a congenial home in Washington and in the hearts of men of some authority and intelligence elsewhere, but it cannot reach the Bolshevik—the man who would end all in a vain attempt to get his visions made realities.

These must be reached by posted notices on buildings where the persons to be addressed continually pass or stop. *Coal Age* expects to run, in the lower right hand corner of its second editorial page, anti-Bolshevik and similar propaganda. These posters it expects to set up in somewhat larger type (so large in fact that they will be page size or larger) and to distribute them to its readers free, or at cost price, according to number, to those who write for copies. *Coal Age* will also be glad to have them printed in the form and size in which they appear on the page. Furthermore, if it appears that there is a fair demand for any given editorial, it will be glad to have reprints made for distribution at cost. Some of the editorials may need the rewriting of a few words to make them more suitable for general distribution, and that change will be made.

The Reds Promised Well, But This is What They Did

A British officer writes to his wife:

"I hope to send you copies of sixty-four official photos taken by British officers at Odessa when the town was retaken. . . . They show men who have been crucified with the torture of the human glove. The victim gets crucified, nails through his elbows. The hands are treated with a solution which shrivels the skin. The skin is cut out with a razor round the wrist, and peeled off, till it hangs by the finger nails—the 'human glove.'

"Most of the photos are of women, women with their breasts cut off to the bone, women with their bodies cut open."

The Socialists promise great things and demand much, but if they win they will rule; and what then? We shall not care then what they preach but what they do. Are they good men in their family and in the community? Will they be good then or will they be like the Russian Reds?

DISCUSSION *by* READERS

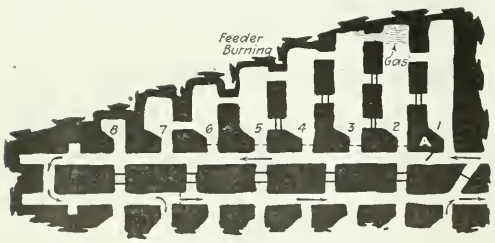
EDITED BY JAMES T. BEARD

Finding a Mine Door Set Open

Letter No. 11—Much credit is due Richard Bowen for the question he has raised in regard to the manner of proceeding if a fireboss finds a door set open when beginning his examination of a mine. Mr. Bowen should receive the thanks of all good firebosses, many of whom will be benefited by this discussion.

My experience tells me that any short-circuiting of the air, such as is here suggested, will be at once detected by observing the water gage, a thing that every fireboss should do before starting to make his examination. Any decrease in the reading of the gage will indicate that either the fan is not running at its regular speed, or the air is not traveling in its customary course through the mine. It may happen, however, that the standing open of a door controlling but a small section of the workings, as illustrated in the figure presented, will cause such a slight decrease in pressure, as to be unnoticed and the fireboss will discover the open door only when he has reached the place.

In that instance, a man with practical judgment will know what to do at once. He will let the door stand open and, following the air, will examine each place and make sure that everything is safe, before closing the door. Should



he find anything wrong, he will then decide the best course to pursue. Assuming, however, that a man of less practical experience finds a door standing open when he is about to begin his examination, the chances are that he will close the door at once and wait until the circulation has been restored, which as Mr. Bowen has said would probably bring disaster.

In the discussion of this question, some will claim very rightly, that such a condition as is here presented will only be found in a poorly managed mine. It is true that, in mines where shots are fired at quitting time, a firerunner should follow the course of the air after allowing a short interval of time for the smoke to clear. It is the duty of the firerunner to see that no fire has been started, in any place, by the shooting. In mines where no firerunner is employed, it will frequently happen that a fire started by a shot is discovered too late, after it has gained much headway and a whole section of the mine may be endangered. Many disastrous explosions can be traced to such a course.

It should be remarked here, that the arrangement shown in the figure presented by Mr. Bowen is not adapted to the ventilation of a gassy mine, since the air circulating through the rooms on the right must pass through the rooms on the left, before reaching the return. A safe method to adopt in the arrangement of a mine that is generating much gas, is to provide a triple-entry system and conduct the air from each set of rooms at once into the main return.

In respect to starting the examination of a gaseous mine, my practice is to follow the air current, beginning at the intake end, which I believe is the only way to locate a possible short-circuit of the air quickly and safely.

The suggestion that should a fire be burning in the section it will be reached in time whether the start is made at the intake or the return end of the section is not very clear to me. My opinion is that when one starts at the return end of a section in which the air is short-circuited and a fire burning at some point, there is danger that the examiner will be overcome by the smoke or gas before reaching the mine. This, of course, is more applicable to a larger section than that illustrated in the figure.

Peru, Ill. GASTON F. LIBIEZ.

Letter No. 12—An experience of ten years firebossing, in very gaseous seams in the Wyoming Valley, leads me to say that the condition suggested in this discussion is one that a fireboss does not want to meet with very often. In many of the Anthracite mines, the finding of an open door suggests a bad condition and causes the fireboss to proceed with the greatest caution, particularly if there is a possibility that the air has been short-circuited eight or ten hours, which fact he has no means of telling.

Speaking practically, I have always proceeded by way of the intake, following the course of the air, not because technical books say so, but for other reasons. For instance, on entering the section by the intake, a fireboss will quickly observe the quantity of air passing and know whether or not the circulation is deficient in volume. If the usual quantity is not going, the fireboss is at once on his guard and observes closely every door and brattice. Being familiar with every inch of the ground, he goes directly to those points where he thinks the air may be short-circuited. Not finding any trouble at these points, he will naturally assume that the slack air is due to a fall on the return.

Where the three main-door system is employed, there is always a certain pressure on the door and the fireboss, by observing carefully and listening, can readily detect if that pressure is diminished, in which case he will again be on his guard from the time he enters the intake of his section. Again, when entering a section by the intake, the fireboss, on observing the first indication of gas in a place, will generally be able to form a better conclusion in respect to those points where danger may exist, than if he detected gas when approaching the place from the return end of the section. Observing the brattice in good condition, he examines carefully for any feeder in the coal, or slip in the roof from which the gas may come. It may arise however, from an abrupt change in the pitch of the seam or other cause, but its presence makes him doubly cautious.

Proceeding thus with the air and observing a gradual increase in the size of the flame cap on his lamp, the fireboss

is warned of his approach to a dangerous atmosphere; but his chances to retreat to safety are more satisfying than if he was traveling against the current, which would be the case if he had entered at the return end of the section. Approaching a dangerous atmosphere from the return end, a fireboss must promptly extinguish his lamp and withdraw in the dark; but when approaching on the intake side he needs only to lower his flame and withdraw to safety.

Referring to the geological conditions being such as to favor starting the examination at the return end of a section, Richard Bowen advances that as a reason for such procedure, "Coal Age", Sept. 11, p. 462. I have known some men to hold the same view though they were practical mining men. Hundreds of times men have made examinations beginning at the return end and found nothing wrong, while at other times they have been compelled to withdraw after going but a few hundred feet. Finding themselves much weakened, they realized that something was wrong and retreated, reaching safety, panting and excited.

I recall one fireboss who was accustomed to jump into the return and hustle along. On one occasion, however, he was halted by the smell of burning canvass and compelled to withdraw and enter by the intake, before he could approach the scene of the trouble.

THE TEXT BOOK VERSION

Technical mining books always say that it is safer to approach a body of gas on the intake side rather than on the return side, claiming that the liability of explosion is lessened. The main point, however, is that if a man falls in a weakened condition on the return side of trouble he is likely to stay there until rescued; but if he falls on the intake side, the chances of his being revived with fresh air are fairly good, since the fresh air almost invariably travels along the floor. On reviving, the man is able to crawl back to safety.

Now, assuming the conditions illustrated in the figure presented by Mr. Bowen, it appears that an open door has short-circuited the air and gas has accumulated at the face of Chamber 2, while a gas feeder is burning in Chamber 5. Common sense tells us that to close the door would soon result in an explosion. Instead, therefore, the fireboss must proceed with caution and seek to find how much gas has accumulated, making frequent tests as he moves up Chamber 1.

Having gained some idea of the volume of gas present, he withdraws to the entry and proceeds to examine the remaining chambers to ascertain their condition. Only after extinguishing the burning feeder and assuring himself that there is no fire in the remaining portion of the section, can he safely close the door and restore the circulation

One thing every fireboss must remember is that it will frequently happen, in making an examination and finding a large body of gas lodged at the face of a pitch, the closing of a door will retard the circulation for a time. At this juncture, one must not get excited, but wait patiently for the air to mix with the gas and for the ventilating pressure to force it out.

At times, the entire current may be checked and recourse must then be had to other means before the gas can be removed. It may be necessary to increase the quantity of air delivered to that section. Even after the gas has been removed, the entire section must be examined again, in order to make sure that the working places are safe for men to enter. This is one of the requirements of the Anthracite Mine Law.

Edwardsville, Tenn. LEWIS R. THOMAS.

Promotion of Eager Workers

Letter No. 3—In reading the interesting letter of Richard Bowen, "Coal Age" Oct. 9, p. 628, I notice that he takes some exception to the ideas I expressed in a previous letter, regarding length of service as being a factor in deciding promotion. Mr. Bowen has seemingly misjudged my position in this matter.

It was far from my intention to convey the meaning that seniority, or length of service, should alone determine the question of the promotion of an employee. I much regret that my letter conveyed this impression. The illustration I gave was calculated to show the disappointment felt by an old employee who had qualified himself for promotion, passed the examination, and secured a first-class mine foreman's certificate.

Let me say, here, that length of service should only be considered in connection with the fitness of a man to fill the place in question. An old employee who can pass the examination and is qualified for the position should however, in my opinion, always be given the preference over a new man who may have equal qualifications.

It is true, as Mr. Bowen has pointed out, that there are always men who labor with their hands and do not use their brains, but depend on their length of service to win for them the desired promotion. I regard such men as being the least fitted for advancement. They are anxious to fill positions of trust, because of the honor and respect due the higher position.

Coal mining, let me say, is not a game for amusement and cannot be learned in a few short months; it takes years of continued effort, both by study and labor. The man who puts aside his books and papers when he has secured his certificate will never make a good foreman. He must continue to study and read in order to keep himself abreast of the times and be able to handle successfully the various problems that arise each day in the mine.

It is my desire to emphasize the injustice done old employees who are equally qualified with the new men who so frequently are given desirable positions through favoritism. Such action on the part of a management discounts all the loyalty, all the effort of old employees who have rendered years of faithful service. Disappointed and discouraged, their ardor dampened, they are unable to show the same enthusiasm in their later service.

It is this condition that leads good miners to quit the mine for work in other industries. Many a miner has lost his ambition for the work he has followed all his life, and is anxious that his boys shall find other work than that of mining coal.

My thought is well expressed in a verse by R. T. Strohm, which appeared in "Coal Age" Vol. 10, p. 869, and reads as follows:

Nothing kills his high ambition
Quite so thoroughly as when
He observes advanced positions
Go to new and unknown men.
So you really cannot blame him
If his spirit's dull and dead
When you don't intend to name him
For the better job ahead.

Let us hope that managers, superintendents, and foremen will, in the future, lay more emphasis on the seniority rule when considering the fitness and qualifications of men for advanced positions of trust and responsibility. It will go a long way in retaining the services of competent mining men.

Altoona, Ala. JOHN W. JONES.

Letter No. 4—This subject will surely stimulate an active interest among all ambitious workers, especially those who allege that the proper recognition has not yet been accorded them for their fidelity and faithfulness in service. Mention has been made by previous writers of partiality being shown by the management toward their personal friends, and the ambitious worker is said to be lost to sight in the shuffle. It is even urged that the length of service of faithful workers is not properly recognized

In this connection, let me suggest that the first point to be considered is whether the worker is really ambitious; or is he merely a faithful, steady worker like so many of the rest of us, who are compelled by necessity to labor. It may chance that the mental energies of many so-called ambitious workers are mostly idle dreams of future leisure.

Again, let me ask: Is the worker's ambition founded on substantial principles that stand for success, or is his work limited automatically by the clock? We must remember that it is faithful and intelligently directed work that wins recognition and promotion. The boss is watching the workers, either for the purpose of learning who are best fitted for advancement to positions where their services will be of more value to the company, or to find an excuse for laying off those who are not profitable workers.

There are, of course, hundreds of workers who are performing valuable service, and yet are not ambitious. However, we are at present concerned in the ambitious worker and striving to find the real source of his ambition, in order to determine what merit he possesses that makes him a fit subject for promotion.

HOW ABOUT TOOTING YOUR OWN HORN

A truly ambitious worker must keep in mind the necessity of aligning his ambitions with the interest of his employer. The ambitious worker may have the proper capabilities for filling a higher position, but he must be able to show his capacity in that direction and so deliver the goods that his employer will see his fitness for higher service. The worker may be faithful, loyal and have a certain amount of ambition; but, through lack of contact with him, his employer may remain wholly ignorant of the man's qualifications. In that case, no one is to blame but the man himself when the promotion goes to another, because the superintendent or foreman was not aware of his ambitions, as remarked in a previous letter. One of the great secrets is to make one's ambition known.

Loyalty goes hand in hand with true ambition. I have seen road and ditch cleaners give their attention to an insecure piece of rock, in time to prevent a serious accident or delay, by a fall of roof blocking the road. I have seen them give their attention to leaky stoppings, open doors and other hindrances to good ventilation. By such acts they have shown their loyalty and ambition to perform faithful service.

There are other steady workers, but who never step aside from the line of work in which they are engaged at the time. Their ambition, if they have any, is to be at the shaft bottom when the whistle blows. One can readily judge of their value to the company, as compared with the tracklayer or shifthand, who puts in a little overtime in order to finish his job, that night, in order that there may be no delay the next morning. Unconsciously, it may be, such a worker makes known his ambition by his loyalty to the work.

Many a worker believes that he has real ambition and should be crowned with success, but they are often merely calamity howlers and knockers. Should it happen that someone of their fellow workers is shoved ahead, they do not fail to proclaim the injustice done them so loudly that a few of their fellows are led to believe their claim and sympathize with them. Men of this class are quite versatile in telling their fellows how a thing ought to have been done and explain how, in their opinion, the mine could be made one of the best producers in the country, but none of their ideas are offered to the foreman, who has learned their worth and has a correct estimate of their ambition. A competent foreman knows there are many ways in which the truly ambitious worker can show his ambition and it is up to the worker to do this.

Thomas, W. Va. MINE WORKER.

Letter No. 5—This question of promoting an ambitious worker is one of considerable importance to the organization of a coal-mining company, or any other industrial company for that matter. It brings to my mind, an incident that took place more than a quarter of a century ago, when I was a young man of about 30 and engaged as an assistant foreman at the colliery of a large mining company.

The number of openings at this colliery were increasing continually, and it was apparent to me that the work would shortly be divided and another foreman appointed to take charge over a portion of the rapid development. While I was right in this conclusion, a disappointment was in store for me as the appointment of another foreman went to an outsider who was a personal friend of the general superintendent

In this case, it must be admitted that the new man was exceptionally capable and well fitted to fill the position. The fact of the matter was, as I willingly acknowledged a few years later, my direct association with this man was of the greatest help to me in learning many things with which I was not familiar. I realize now, that the appointment of an outsider, in that particular instance, was a blessing to me, as I gained more than I lost.

QUALIFICATIONS SHOULD BE KNOWN

It is stated by Fairplay, in his letter, "Coal Age," Aug. 28, p. 375, that the superintendent, in the instance he cites, did not know that the man (who was disappointed by not receiving an appointment as foreman) was an applicant for the position. Certainly, there was something wrong there, either with the man or his superintendent. In my view of the matter, a superintendent should be in such close touch with his men that he would be fully acquainted with their ambitions and aspirations. It is true that this man may have been uncommunicative and was himself to blame that the superintendent did not know of his desire for promotion.

It frequently happens that, in large organizations, many misfits get into good positions through friendship, relationship or some religious or political influence. I recall an incident that occurred a few years ago, at one of the largest mines in this valley. Owing to a change in management, an order was issued that no foreman would be permitted to have a relation of his employed directly under him.

It so happened that a foreman of this company who was in charge of a large and important colliery, in an isolated locality, was directed by the superintendent to lay off his only son and direct him to report to another colliery some four miles distant, which would necessitate the young man's leaving home. The lad was an exceptionally bright and capable young fellow and had been employed as a locomotive engineer on the main haulage road, a place on which the success or failure of the colliery much depended.

As foreman of the colliery, the father explained to the suprintendent, in a modest way, how hard it would be to find a suitable man for that place, besides urging that the change would mean the breaking up of his home. The only consolation he got was: The big boss has given the order it must be obeyed.

As a result, the young man sought and obtained a good position with another company. Five or six other persons

were successively appointed to fill the vacancy, but none of them gave satisfaction and the output of the mine was gradually decreasing. Some of the miners left, because their earnings were reduced when their coal was not hauled. For falling off of the tonnage the foreman was called to account. His daily morning mail contained letters asking for explanations of the delay that had occurred the previous day.

Not long after this, the superintendent became convinced that he had acted hastily and sent a request for the young man to return to his former job. The request, however, was refused as the lad was well satisfied in his new position. I cite this instance to how that there are rare cases where foremen's relations are not a detriment, but an actual gain to the organization.

In the same letter, Fairplay refers to the system of promotion adopted by one of the great railroad systems, of the country. I cannot say whether the same plan would work if put in operation in our mine, under the large turnover of labor with which we have to contend. This, however, may not prove a serious objection to the plan. A few of the large companies of the anthracite field have, within the last decade, made many changes in their semiofficial forces. These changes are feared by some of the older miners who think that the company will shortly pay the penalty through a decrease in the efficiency of operation.

QUALIFICATIONS EVENTUALLY ARE KNOWN

I heartily agree with Richard Bowen, in the idea he expresses in his letter, Oct. 9, p. 628, that a truly ambitious worker cannot fail, sooner or later, to have his ability and fitness known to his superiors. His work should be of a nature to reveal this; but if he fears that such is not the case, he should at once take steps to ascertain from his employer wherein he fails. That would give him the opportunity to remedy his faults, improve his service and make himself more valuable to the company.

Mr. Bowen remarks: How many of our mine foremen and firebosses who hold certificates could pass a satisfactory examination given by the general superintendent or manager of their company? Much as I regret to do so, I must admit that many of the men holding such certificates could not pass the examination, annually. However, if this was required by law, these men would study and prepare for such examinations.

In Pennsylvania, today, it is not necessary for mine officials to pass any examination, provided they are equally competent with men who have passed the examination and hold certificates of competency. Let me ask, here, Who is the judge or who will decide that the men are equally competent? It is assumed, of course, that the superintendent decides this question; and the mining laws of the state have thus become a joke among the mining men of the civilized world.

It may be that I have diverged, far and wide, from the subject; but let me say, in conclusion, that a corporation has a perfect right to go outside in search of competent men, although it must be willing to bear the consequences, which may come, in various ways, along the line of disloyalty and dishonesty on the part of some old and faithful employees.

Kingston, Penn. AJAX.

Coal Mines in Scotland

Letter No. 2—I was deeply interested, a short time since, in reading the letter entitled Coal Mining in France and Scotland, "Coal Age," Sept. 4, p. 395, and would have taken up the matter, on behalf of my brother Scots, long ere this had not the printers' strike interfered. For nearly two months, now, we have not been privileged to receive our regular issues of "Coal Age," which we have all missed.

Speaking of strikes, I am certain that my fellow readers will agree with me in expressing the hope that the day of strikes will soon come to an end, and that some permanent form of arbitration will take their place, in the settlement of disputes between employer and employed. It will be the dawning of a new day when we are able to join with Robbie Burns and say, "A man's for a' that."

In one of the last regular issues of "Coal Age," Oct. 2, p. 586, I was delighted to read the letter of my fellow countryman, John A. Douglas, written in defense of the coal mines of Scotland. But, I am going to ask our readers to bear with me a little further and permit me to take up the matter in behalf of the Scottish Branch of the Colliery Managers of Great Britain, as the article to which I have referred previously is knocking at my late associate members of that organization.

Having been one of the first members of the Scottish Branch, I want to say it was founded for the sole purpose of the furtherance of technical education and general safety in coal mining. The aim was to give to its members the benefit of each other's experience in the handling of difficult problems in mining. Only certificated colliery managers were eligible for membership in the Association.

Having had experience in the management of mines in Scotland, England, Canada and Pennsylvania, I am in a position to compare the practice of the management of the mines in these countries. Before proceeding, however, let me say that it would have been interesting if the writer of the article mentioned had informed us as to which of the Scotch coal fields he visited, Ayrshire, Fifeshire, Lanarkshire, or the Lothians.

SCOTTISH MINES ARE MODERN

My judgment is that the majority of mines in Scotland and their management will compare very favorably with the same in France or in this country. The qualifications required for a colliery manager make it no child's play for a candidate to pass the examination for a certificate, which lasts two days of seven hours each. The questions are set by an examining board appointed for each district. Every man on the board is an expert in mining and has a full knowledge of the mining laws, and no pull or graft will get a man his manager's certificate if he fails in the examinations. In respect to the mines, the general rule is, A place for everything and everything in its place. At each mine, there is a clean-up once a week, which is quite different from the slipshod method of management described in the article named.

In this country, it is well known that there are many mine managers (foremen) who have only a service certificate. In that connection, I have been trying to think of a single colliery manager in Scotland, who holds a service certificate. I believe there is not one now living and in active practice. Since the passing of the Mines Act in 1872, there has not been a certificate of service granted, and if a holder of such a certificate is now alive, he must be over 70 years of age. If such a one is still in active practice, we may surely take off our hats to him, after his 47 years of experience; but we must be shown the man.

The fact that the writer of the article speaks of the loss of much coal in the mines of Scotland proves to me conclusively that he is not familiar with Scottish coal fields, since these mines are worked on the longwall system, the seams varying from 16 in. to 12 ft. in thickness. The majority of the mines are worked on leases, and the coal extracted is paid for each six months. There is a fixed royalty per ton and a minimum rental. The operations are surveyed every three months by the landlords' engi-

neers, who measure the average thickness of the coal and the operator must pay for the tonnage computed on the basis of this thickness and the area shown by the survey to have been worked out.

Before closing, I want to refer to the rescue and first-aid work in Scotland, and ask: Can anyone show better equipment for that purpose? The rescue apparatus is not kept as an ornament at Scottish mines, but is in constant use for training, which insures its being in good condition whenever it may be required. This cannot be said of all the rescue appliances in the good old Keystone state of Pennsylvania.

McKeesport, Penn. ANDREW ORR BAIN.

Co-operation Among Mine Officials

Letter No. 1—After reading with interest the article by A. T. Dickson, "Coal Age", Sept. 25, p. 528, it has occurred to me that the coöperation he advocates between mine officials, which undoubtedly is the essence of efficiency in the numerous coal-mining problems of the present day, is needed to an even greater extent among the under officials and their men than among the officials themselves.

When one considers that we are all, from the superintendent to trapper boy, simply cogs in the great wheel of the organization, it is not surprising to discover that the failure of certain cogs, here and there, to mesh together; or in other words, the lack of coöperation between the under officials and their men interferes seriously with the steady routine of the work, and decreases the efficiency of the organization.

In our travels here and there, how often do we find an under official, even one who has just been promoted from the ranks and should know better, became so autocratic as to be almost unapproachable by the men who work under him. He is self-sufficient, overbearing and faultfinding, with scarcely ever giving a word of constructve advice. Finding a workman doing a certain work in a wrong manner, instead of assisting him by a few simple instructions, he gives him what the men term a bawling out.

Some time ago, while on a short vacation in company with two friends, I visited a modern mine that was well worth seeing. Guided by the underground overman (foreman) we went below and, in course of time, came to a place where a couple of tracklayers were engaged laying a switch for an incline driven at right angles to the level. The men had already laid the frog and latches, and it was plain to be seen that the cars could not go into the incline. until five or six sets of timbers had been changed

The overman, observing the fact, at once began to curse and swear. He raved and tore around until he was almost breathless, while the tracklayers stood by looking very sheepish, as though they had had the same dose before and were used to it. The overman finally decided that it would cost less to change the timber sets than to tear up and relay the switch, and, glad to get away, we passed on into the mine.

When out of hearing of the men one of my friends asked the overman why he swore so at his men, and received the reply accompanied by a few expletives that would not appear well in print, the never-to-be-forgiven sons of a Barney-car would not understand me if I spoke to them in any other manner. He may have thought himself witty, but the overman's humor was entirely lost on his visitors

When sending these men to lay the switch how much better would it have been for the overman to have said to them: I want you to lay a switch for the new incline in the third 8 entry. Use a No. 5 frog, and put the point of frog exactly where you will find I have marked the rail on the level. Had the overman previously calculated the size of frog required and marked its location in this manner, he would not have had to bawl out his men in the manner described, besides saving the company much expense.

A fault-finding foreman does little more than irritate his men. If a man does a piece of work wrong, take him and show him the same work done right; or explain to him a better way of doing the job. The results of friendly constructive advice secure better coöperation on the part of the men, and the benefit to the company is obvious. How seldom one hears a word of appreciation spoken by an official to a workman who has done a good job. Yet, even a good horse will receive a friendly pat after pulling a heavy load, and he answers with a snort or an appreciative wag of his head.

Let us imagine, for a moment, that we are going about a mine on two separate occasions accompanied by two different officials. In the first instance we come to some men engaged in retimbering an old airway. Looking about a moment, the official exclaims: Well, men, your work looks good, but we are in a hurry to get this airway finished. Now if two of you will go ahead and take out the old timbers and set temporary posts for safety, the other two men will come along behind and put up the permanent sets, and the work will proceed much quicker.

AN EXAMPLE IS CITED

A little further on we come to two men who are pulling out the tracks from an old abandoned roadway. It is observed that they have left a number of ties in and the official says: Men, we want to save as much of this material as possible and I see you are leaving some of the ties. One of the men explaines: The ties we have left are rotten and not worth pulling out. Taking up a pick, the foreman tests one or two of the ties and finds that the men are right. He then cautions them to save all the track spikes and rail splices and as many of the ties as possible.

In contrast with this treatment of workmen, let us turn now to observe the second official. Coming to the men working on the airway, this man begins somewhat as follows: This job is costing me too much, and if you fellows can't get a move on you and make more headway I'll start a new gang in here and put you men where your work will count. Reaching the place where the men are tearing up the track and seeing the ties that they have left as being unfit for use again, he begins to rave and shouts: My God, you fellows drive me crazy. What in thunder and lightening are you leaving these ties in here for? Told that the ties are of no further use, he raves again and exclaims: By the sulphur and brimstone, I want them all taken out and if there is any more of this fooling there will be two men looking for a new job by night. The men have no recourse but to take out the rotten ties, and the company pays for useless labor because the foreman was too proud to satisfy himself that the ties were not worth removing.

These illustrations show two methods of dealing with men, the one by manifesting an appreciation of work done and securing in return the hearty coöperation of the men; and the other revealing a fault-finding method that not only fails to secure the coöperation of the men, but is an expense to the company. I have read that Theodore Roosevelt when president of the United States never failed to shake the hands of the engineer and fireman who drove his train, thereby showing his appreciation of their work. It is such appreciation on the part of the superintendents and foremen that will ever secure the heartiest coöperation of the men in their employ.

In conclusion, I want to emphasize the following essentials: Appreciation of work well done; the giving of constructive advice to workmen; speaking words of encouragement, instead of finding fault when the work is not satisfactory; receiving the suggestions of workmen kindly in the spirit in which they are given; and showing no autocratic bearing. These, I believe, cannot fail to win the heartiest coöperation on the part of all mine workers who take an interest in their work.

Cassidy, B. C., Canada. JAMES TOUHEY.

Roller Bearings for Mine Cars

Letter No. 8—Some weeks ago I read an article in "Coal Age" (Sept. 25, p. 545), drawing attention to the advantage derived from the use of roller bearings in mine-car wheels. I want to endorse all that the writer of that letter has said and add a few comments suggested by my own experience.

No piece of equipment, in use about the mine, is subjected to the same hard service and receives less attention than the average mine car. When one considers the need of the highest efficiency in mine haulage it is not surprising that the choice of a proper car bearing has attracted the attention of coal operators everywhere.

Regarding the old style of plain bearing with which mine cars have been equipped for so many years, the progressive operator readily realizes that this style of bearing is not up-to-date or efficient. He recognizes that, in order to reduce the frictional resistance in haulage and the unit cost of production, he must adopt a type of bearing that will best overcome the frictional resistance of the cars, and reduce the drawbar pull on the locomotive by enabling the cars to move more easily.

Not only this, but the study of the question shows that the cost of lubricating the old plain-bearing wheels greatly exceeds that required in the use of wheels of the roller-bearing type. In addition to these items, it is plainly seen that the locomotive will be able to haul longer trips, which will increase the output of the mine and reduce the cost of its operation.

Following up the line of these thoughts, the operator is led to make further inquiry, and finds that through the proper application of roller bearings, either in the journal box or installed in the wheel hub, all that he has anticipated in the reduction of the drawbar pull and the various items affecting the cost of operation will be realized.

The progressive operator finds, on investigating that the roller-bearing wheel will give the very best results if lubricated three or four times each year, with the proper lubricant. His experience, on the other hand, tells him that the plain-bearing wheel must be oiled each day if any results are to be obtained. He reflects that, this being the case, the labor cost of lubrication will be reduced from $4 to $6 a day, and he is reminded moreover, that expense for repairs will be less by reason of a more lasting application of the lubricant, and wrecks and delays will be less frequent.

In deciding on the adoption of roller bearings, however, the operator is confronted with the choice between flexible and solid rollers. Investigation shows that the flexible type of roller has many advantageous over the solid roller. Being installed in an absolutely fixed inclosure consisting of a strong cage and being spirally wound and alternately assembled, the flexible type promises a longer life of the bearing. It is more easily removed from a broken wheel and installed in another with less loss of time, besides insuring a full contact throughout the bearing and absorbing a goodly portion of the hard shocks that a mine wheel encounters, in striking tipple horns, bad rail joints and other obstructions, to say nothing of the dropping of a heavy load into the car body.

Flexible bearings are used on a heat-treated axle, thereby reducing the chance of many bent and broken axles. Observation shows that almost all large mine-car manufacturers are today using this type of bearing and, considering the long life of the equipment, the saving in power and lubrication, the flexible roller bearing is proving a good investment for the mine operator.

E. J. G.

Huntington, W. Va.

Bolshevism in America

Letter No. 9—I quite agree with the sentiments expressed by Joseph R. Thomas, in his letter, "Coal Age", Oct. 2, p. 588, that it is the lack of intelligence that inclines so many workers to follow the Bolshevik doctrine and practice its principles. If those men could only foresee the misfortune that their actions are bound to bring upon themselves and others there is no question in my mind but that they would turn a deaf ear to its entreaties.

While it is quite evident that there are a large number of men among the strikers, in our mining districts, it is not my intention to class all strikers as being unintelligent. Many of them are not to blame for the action they are forced to take in absenting themselves from their work in the mines. Far better would it be, however, if the mass of our mine workers would study out for themselves the underlying causes of the matters that lead them to strike. All will agree that it is better to think twice before one speaks. A careful study of the situation will often convince men that a strike is not the best way to remedy a trouble.

Consider for a moment the demand for higher wages, based on the high cost of living. A little reflection should serve to demonstrate the fact that the granting of higher wages, by employers to their employees, will surely increase the cost of production. Increase in the amount paid for labor must naturally increase the price of the product; and the cost of living is made greater than it was before. The producer who has to pay his workmen higher prices for their work must increase the price of his goods, or discontinue his business.

A little study along this line shows that the only rational method of lowering the cost of living is to increase production, and thereby overstock the market. That could not fail to have the immediate effect of lowering prices and decreasing the cost of living. Labor and lots of it is necessary to increase production and lower prices; but strikes and lockouts always have the opposite effect, as does also the unreasoning demand for higher wages.

One thing is certain and that is the principles advocated by Bolshevism, claiming to bring relief by destructive violence and the overthrow of governments, can never succeed, because all such measures are contrary to the laws of nature. We have an example of this in the situation in Russia today, where Bolshevism emanated and grew, only to bring misery and distress to the people who embraced its doctrines.

In closing, let me urge that we remember that every man is here on earth to work. Since the time of Adam, man must earn his bread by the sweat of his brow. Labor brings happiness, while idleness leaves sorrow and misery in its trail. Let every true American, therefore, strive loyally for the good of his country, respecting those who govern the state and, by all means, doing what lies in his power to destroy the fruit of Bolshevism, both in the country and in his own mind

Rawdon, Quebec, Canada. C. McMANIMAN.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Anthracite Foremans' Examination Carbondale, Penn., May 6, 7, 1919

(Selected Questions)

Ques.—What produces whitedamp and blackdamp in mines and what are their injurious effects on the workmen employed therein?

Ans.—Whitedamp or carbon monoxide (CO) is the product of slow combustion of carbonaceous matter taking place in a limited supply of air, where the combustion is incomplete; for example, the slow combustion of fine coal and slack in the waste or abandoned places in a mine. Considerable carbon monoxide is also found in the return air coming from a mine fire, and the same gas is produced to a limited extent in the explosion of powder, in blasting. Only a small percentage of this gas, say one-half of 1 per cent., in the air breathed for a considerable length of time, may prove fatal. The effect is cumulative and the gas is not easily eradicated from the system, being absorbed by the red corpuscles of the blood.

Blackdamp consists mostly of carbon dioxide and nitrogen mixed in various proportions. It is the result of the complete combustion of carbonaceous matter in a plentiful supply of air. The oxygen of the air is consumed and unites with the carbon to form carbon dioxide (CO_2). The nitrogen of the air remains unchanged, while the oxygen content is depleted. Blackdamp has an injurious effect on the system. When breathed for any length of time it produces headache, pains in the back and limbs, followed by nausea, suffocation and death if rescue is not at hand. The presence of 18 per cent. of carbon dioxide, in an otherwise normal atmosphere, reduces the oxygen content to 17.14 per cent., forming a fatal atmosphere.

Ques.—State how the several mine gases may be detected; in what proportion in the air they are fatal to life and in what proportion will they extinguish a light.

Ans.—Methane, marsh gas or light carbureted hydrogen (CH_4) is the principal one of the hydrocarbon gases found in mines. Olefiant gas or ethylene (C_2H_4) and ethane (C_2H_6), otherwise known as heavy hydrocarbon gases, are rarely found in the mine, except in extremely small quantities associated with methane. These gases are detected by their effect on the flame of a safety lamp. When methane is present in the air, a flamecap is formed in the lamp, the height of the cap increasing with the percentage of gas present, till the lamp flames, which occurs at about 3 or 4 per cent. Methane is not a poisonous gas and its presence in the air is only fatal to life when the oxygen content of the air has been depleted to about 10 per cent., which requires 52 per cent. of methane being present. An oil-fed lamp flame is commonly extinguished when the percentage of methane in otherwise pure air reaches 29.5 per cent. and the oxygen content is thereby reduced to 14.7 per cent.

Carbon monoxide (CO) is detected by observing the effect of the gas on mice or birds confined in a cage. These small animals are prostrated when a much smaller percentage of the gas is present than is fatal to man. The percentage of this gas that is fatal depends on the depletion of the oxygen in the air, the length of time the air is breathed, the physical condition of the person and the amount of his exertion at the time. Ordinarily, one half of 1 per cent. when breathed a short time will prove fatal to life. The gas is highly inflammable and not extinctive of flame, though, having no available oxygen, and not being a supporter of combustion.

Carbon dioxide (CO_2) is detected by its effect to dim and extinguish a lamp. If 18 per cent. of this gas is present in otherwise normal air the result is fatal to life; and 14 per cent. will extinguish an oil-fed flame.

Hydrogen sulphide (H_2S) is commonly detected in mines by its smell. It is fatal to life when 1 per cent. of the gas is present in air breathed for any length of time. This gas, also, is inflammable though not a supporter of combustion and 50 per cent. or more would be required to extinguish a lamp flame.

Ques.—What duty does the mine law impose on the mine foreman when he employs any person to blast coal or rock?

Ans.—The Anthracite Mine Law requires the foreman to ascertain that the person is qualified by experience and judgment to perform such work, before permitting him to blast coal or rock in a mine.

Ques.—Where, in a mine, should safety holes be provided and where should safety blocks be placed?

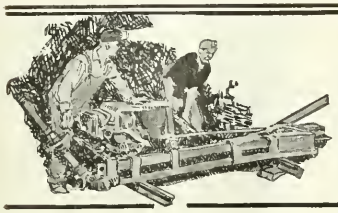
Ans.—Safety holes are required to be placed at the bottom of all slopes and planes and on all haulage roads where men are compelled to travel, unless a sufficient clearance space is available at the side of the road sufficient to enable men to pass the cars with safety. The law requires that these holes shall be of suitable dimensions, not more than 50 yds. apart and kept free of all obstructions.

Safety blocks must be placed at or near the head of every shaft, slope or plane. Safety also requires that these blocks or a good prop laid across the track shall be used in all chambers driven to the rise, to prevent a car from running down to the mouth of the room, after it has been taken to the face for loading.

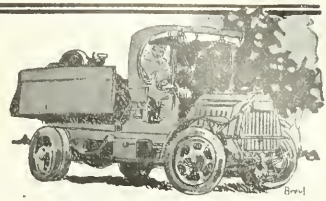
Ques.—Are there any conditions under which the flame will pass through the gauze of a safety lamp? Explain fully.

Ans.—Yes. Flame will pass through the gauze when the wire has become heated; or when the gauze chimney is dirty or the lamp is exposed to a strong air current or a heavy concussion of the air produced by a shot. Flame will also pass through an imperfect gauze.

When the wire of the gauze is heated to a low redness visible in the dark, it loses its cooling effect on the gas burning within the lamp, and flame will then pass through the mesh of the gauze. Dust or dirt accumulated on the gauze may be ignited by the heat of the burning gas and flame be thus transmitted to the outside atmosphere. The pressure of a strong air current or blast of air will force the flame of the burning gas through the mesh of the gauze. If a gauze has been injured and its wires are separated or broken or are burned out, the resulting opening is so large that the wires fail to cool the burning gases in their passage through the opening. Such a lamp is unsafe.



COAL AND COKE NEWS



Charleston, W. Va.

New River field produces coal in spite of difficulties. Production about 75 per cent. This notwithstanding pressure of union officials. On the other hand, operations in Kanawha region almost at a standstill. Miners evidently acting under orders of district officials. Operators generally apprehensive over financial outlook. Coal not being paid for.

Lack of production in this section of the West Virginia coal fields featured the first week of December, although that condition did not prevail throughout the territory reached by the Chesapeake & Ohio. The organized smokeless field of the New River had quite a substantial production considering the difficulties with which the operators in that field had to contend, and, while there was some diminution in production there, it was nothing like conditions which prevailed in the neighboring Kanawha district constituting the southern part of District 17), where operations were almost at a standstill, owing to the continued strike of about 12,000 miners.

The miners in the Kanawha territory were avidently acting under orders. Many of them admitted it. Consequently the production of high volatile coal in this immediate region was not over 17,000 or 18,000 tons for the entire week, the number of mines in operation being few in number.

The 14 per cent. wage increase offered the miners failed to improve conditions, although it was in effect in all organized fields of the state; but it was considered noteworthy as well as significant that the Kanawha field was the only orgsnized field, in which the 14 per cent. had not been agreed to, even under protest. There was no prospect that the proposed grand jury investigation, as well as the restraining order issued by Judge Keller, would alter the situation where miners were still on strike, during the second week of the month.

While operators claimed that the same effort was being made to stop production in the smokeless field in this part of the state, through the activity of union officials, yet their efforts were not so successful as was the case in the lower part of District No. 17. There was a difference, therefore, of only about three hundred cars in the New River field, even though the "check-off" had been discontinued there; the 14 per cent. increase, which became effective on the first of December, apparently appealing to the miners in the smokeless region along the C. & O.

Even where coal was being produced in this section of West Virginia, there was no certainty as to just when it would be paid for, and operators had begun by Dec. 1 to become apprehensive over the financial outlook, since a large proportion of the coal produced in this part of the state during November has not been paid for; io many cases the shipper has not been informed as to the ultimate consignee, nor has he any way of ascertaining just who received his coal and used it. For that reason many producers are experiencing a good deal of difficulty in meeting their pay-rolls and proposed remedies are only temporary.

Neither a 14 per cent increase nor the fact that fellow miners in another part of District No. 17—in northern West Virginia—suffiied to induce the striking Kanawha miners to return to work in rny considerable number during the first week of the month, despite the utmost endeavor of the operators to persuade them to do so. In fact it was certain the Kanawha miners were acting under orders not to return to work. Operators found this difficult to understand, since President Keeney of District No. 17 attended the conventions of sub-district No. 3 and Subdistrict No. 4 (in northern West Virginia), where, on Friday night, Nov. 5, and Tuesday night, Dec. 2, respectively, representatives of locals voted to return to work. Keeney's statement was that he was neutral as to advising the miners either to return to work or to remain in idleness; at the beginning of the second week of the month, Kanawha miners were still loafing, except at about 25 mines, where comparatively small forces were at work. As a result of such idleness, only about one-seventh of the usual tonnage was produced in the Kanawha region; the actual number of cars loaded being 346 for the Kanawa field proper, and 345 cars for the Coal River field, tbe Kanawha field usually having about 2250 loads a week and the Coal River field in proportion.

Pressure was brought to bear on miners of tbe New River field, by officers of District No. 29 during the first week of December, to cease work, and, while in some instances, union leaders succeeded in inducing men to cease work, production was maintained at about 75 per cent. during tbe greater part of the week, sveraging around 15,000 tons a day. The increase in wages, amounting in some instances to more than 14 per cent., is thought to have been one influence in keeping men at work with Christmas approaching. However, at some mines it was "Off sgain, on again, gone again, Finnegan," some mines being down one day and running agsin the next, with conditions just the reverse at other mines. All New River coal, generally speaking, was still embargoed as to eastern shipments, the West getting the smokeless fuel from the field in question.

Huntington, W. Va.

Guyan Valley reaches peak of production for year in first week of December. No sign of labor trouble. High water stops transpertation to Logan field on Dec. 8. Financial stringency serious matter with Logan operators. Coal not paid for. Sharp decrease in coal handled by C. & O. system in first week of December, compared with previous week.

The peak of production for the present year was reached in the Guyan Valley during the first week of December, when the output of coal was 249,840 tons or almost 86 per cent of capacity, showing a gain over the previous week of sbout 3,000 tons, something more than 4,900 cars of coal being shipped to various western points. A total of 4826 hours was put in mining the tonnage mentioned. A loss of only 270 houra or 13,985 tons was eustained through an insufficient car supply, that amounting to about four per ceot. of full time capacity as compared with a six per cent. loss during the last week of November.

The loss from a labor shortage was almost insignificant. Indeed, miners were showing extremely commendable perseverence in getting out a large tonnage, and there was no sign of sny labor trouble whatsoever in the district, despite the contention of certsin mine organizers in the Kanawha field; miners were apparently well satisfied with conditions, taking results as a criterion.

However, physical conditions on the Guyan branch of the Chesapeake & Ohio Ry. were such at the beginning of the second week of December, that a smaller production was anticipated. Egress and ingress to and from the Logan field was cut off on Dec. 8, when a bridge at Martha was washed out; the mines in the Logan field and alsa the C. & O. having had to contend against two floods within a month. While there was much high water throughout the coal field, it inflicted little damage on any of the mines in the field.

The most serious situation which Logan mines faced was not the strike but financial stringency. Little coal shipped from the Guyan region during December had been paid for by Dec. 10, most of the November shipments having been diverted, shippers in many instances having no knowledge of the ultimate consignee. Consequently the companies in the Logan field were managing with difficulty to meet their semi-monthly pay-rolls. One company in the field, in fact, was unable to meet its obligations owing to its inability to collect for diverted shipments. That was the Aldredge Coal Co., which was forced into a receivership for the time being.

Restricted production in certain fields, penetrated by the C. & O., during the first week of December, was reflected in a sharp decrease in the tonnage of coal handled on the entire system as compared with the loadings during the final week of November. During the latter period 12,664 cars or an approximate total of 633,200 tons were handled; by the end of the following week the amount of coal transported had dwindled to 10,487 cars, a decrease of 2177 cars or about 108,850 tons; the decreases in the Kanawha and Coal River sections being sufficient to offset gains in the Guyan, Kentucky and other fields.

Easthound shipments of coal over the C. & O. Railroad passing through Clifton Forge were 257 cars less in numher during the first week of Decemher than during the last week of November, only 4814 csr loads being handled through the division point mentioned during the week ending the seventh.

Bluefield, W. Va.

Smokeless coal fields produce fuel though facing uncertainty of early payment for shipments. Mines speed production. Poor railroad weighing of coal causes great confusion. Some 3700 cars of coal lost. If continued, means bankruptcy for operators. Shipping receipts issued by railroads impracticable. Nevertheless most smokeless fields boost production.

Notwithstanding the fact that the operators of the Tug River, Pocahontas, Winding Gulf and Williamson fields, as well as of all other fields, were in a position where the more coal they produced the more serious was their position financially, yet there hae been no relaxation in the effort being put forth in southern West Virginia to keep the country supplied with as much coal as possible. The first week of December found production not only maintained at the same high level reached early in the strike, but in several fields the previous week's production was exceeded, although there was no certsinty that much of the coal so produced and shipped would be paid for in the very near future.

Mines in the Tug River field succeeded in speeding production up to 93,550 tons during the week ended the sixth, an increase of 8800 tons over Thanksgiving week. A large proportion of the Tug River coal was still being moved westward and was being regularly weighed; much of the coal going through Portsmouth, being confiscated by the Railroad Administration for redistribution.

In sharp contrast to the satisfactory handling of westbound coal, on the Clinch Valley division of the Norfolk & Western, extremely poor weighing facilities were making for much confusion. Such coal as was being diverted from the N. & W. to the Chesapeake & Ohio, at St. Paul, Va., and from the N. & W. to the Louisville & Nashville, at Norton, Va., or rather a large proportion of such coal as was being confiscated, was leaving the originating road without first having been weighed, and with the connecting road also neglecting to weigh this coal, so that the coal so shipped has reached its final destination without ever having been weighed.

Just how serious such a situation is mey ha judged from the fact that, since the di-

version of coal began, a total of 3700 car loads of coal have been lost for the time being, and so far every effort to secure weights on the 3700 loads has failed. The 3700 cars represent about 185,000 tons, worth approximately $500,000. This is only one instance of the confusion which exists as to the diversion of coal, and if long continued it means bankruptcy for a number of companies.

The issuance of shipping receipts, a method evolved by the Railroad Administration, is described by operators as impracticable, and is not being utilized by operators in the Tug River fields at least. It was the idea of the operators of the Tug River and other smokeless fields, that the best method of handling the whole matter was to have settlement made at the same time the freight charge was handled, but the Railroad Administration did not appear to take kindly to such a method. Banks are affording relief, but this is proving to be quite a heavy drain.

Just as gains in the output of the Tug River field were scored, during the first week of December, so also Pocahontas mines succeeded in boosting production over that for Thanksgiving week; the increase amounting to nearly 20,000 tons, although the working time in the mines was only increased about three hundred hours. There was a splendid car supply throughout the week, the car shortage loss being reduced, amounting to only 3400 tons. The labor shortage loss was doubled, however, reaching a total of 18,000 tons. About twice as much Pocahontas coal was being shipped to the West as to the East.

As in previous weeks there was little change in conditions in the Winding Gulf field, where about 130,000 tons was being produced. High water on the Virginia Ry. retarded shipments of coal somewhat early in the second week of the month, but not seriously. Miners on the Winding Gulf began the second week of the month with a substantial wage advance in effect.

While not quite so large a tonnage of coal was produced in the Williamson field, during the first weekly working period of December, as was the case during Thanksgiving week, nevertheless the output was above 150,000 tons. Much concern was manifested by operators about their future finances, it being impossible to make ends meet with so little diverted coal being paid for; shipping certificates having no face value and simply putting additional financial burdens on operators when they went to borrow money, since there was no assurance that coal so diverted would be paid for by the unknown consignees.

Fairmont, W. Va.

Interesting labor situation in northern West Virginia first week of December. Miners in conventions vote to return. By Dec. 8 shipments almost normal. Coal goes West. Operators find it hard to meet pay-rolls.

As a large number of miners in the northern part of the state showed a disposition to return to work, a convention was called and was held on Dec. 2; this convention voting in favor of returning to work, although registering a protest against the 14 per cent. increase as being entirely too meagre. As a result of the action of the convention, quite a large percentage of the miners were back at work by Thursday.

Miners in the Flemington field and several other sections, embraced in sub-district No. 3, declined to go to work unless such a move was sanctioned by a convention. On Friday, Dec. 5, such a convention was held at Grafton, action similar to that taken on the night of the second being taken also at the Grafton convention. Consequently by Dec. 8, practically all mines had full forces of men at work and a considerable impetus was given production throughout the entire northern part of the state.

Despite the fact that a great many miners were not at work during the first week of December, 5,204 cars of coal were shipped from the Fairmont region alone, amounting to about 258,000 tons, shipments being 927 cars less than during the previous week. However, by Monday, Dec. 6, shipments from the region amounted to 1039, almost normal. During the week ended the sixth, eastern and western shipments were about equally divided. A very large tonnage of coal, however was being shipped to Michigan as well as to Chicago for distribution. In common with producers in other fields, northern West Virginia found it hard to meet pay-rolls, owing to the impossibility in so many cases, of collecting for coal diverted. The situation has become just as serious in northern West Virginia fields as elsewhere.

Harrisburg, Penn.

Broadest tax revision plan in 50 years to be undertaken by Auditor General Snyder. To add $10,000,000,000 to corporation assessments. Anthracite and bituminous coal lands included. Has backing of Governor. State to raise big revenue from coal, but no increase in price involved.

Auditor General Charles A. Snyder recently started out on what is said to be the broadest and most comprehensive system of tax revision undertaken by the state in 50 years. Experts say the movement will result in adding more than $10,000,000,000 to the corporation assessments of the state, and will so add to the state revenues that sweeping appropriation on a largely increased scale can be made for the maintenance of hospitals and increased facilities for public schools.

The plan is properly to assess the vast mineral resources of Pennsylvania, the greatest in the United States, but which have been practically neglected as a source of revenue, assessments having been indifferently made on figures furnished by corporation attorneys. Now the assessments are being revised by experts, and millions of dollars will be added to the total. Bituminous and anthracite coal lands, as well as the iron ore lands, are included in the revision.

As a prelude to the investigation, it was found that state assessments of corporation property, in many instances, are only a trifle on the assessments made by counties on the same properties.

Auditor General Snyder, ever since occupying his office, has been an advocate of assessing the mineral wealth of the State for the benefit of the people, and now he has the backing of Governor Sproul and State Treasurer Kephart in the undertaking. Requisition is being made on corporations for all their private papers, extending back for many years, so that the investigators will have all possible information at hand. The tax to be levied will take the place of the coal tax which the Legislature sought to levy in an unconstitutional way, and which proved abortive when tested in court. It is declared the corporation assessment will be increased half a billion dollars in Schuylkill County alone. Officials point out that while the state will receive a big revenue from this source, it will involve no increase in the price of coal—at least not in this state.

PENNSYLVANIA

Anthracite

Pottsville.—A large number of collieries were in operation in this region on Thanksgiving Day to help relieve the national shortage of coal. At some collieries, where the breakers were not in operation, the miners were on hand mining coal which would be available when the plants worked on the following days. In the St. Clair district the mines were idle due to a big patriotic celebration.

Bituminous

Pittsburgh.—The Pennsylvania Bituminous Mine Inspectors' Advisory Association held its annual meeting recently in the Seventh Avenue Hotel, President Thomas K. Adams, of Mercer, presiding. Important questions pertaining to the mining laws of the state and the reduction of accidents in the mines were discussed by Frank Hall, of Harrisburg, assistant chief of the State Department of Mines; President Adams, Secretary-Treasurer Thomas S. Lowther and others also took part in the discussion. The following officers were elected for the ensuing two years: Thomas K. Adams, Mercer, president; Joseph Williams, Altoona, vice president; Thomas S. Lowther, Indiana, secretary-treasurer. These officers and the following will constitute the executive board: Nicholas Evans, Johnstown; P. J. Callahan, Bridgeville; John I. Pratt, Pittsburgh; W. H. Haworth, Brownsville; Richard Maize, Uniontown.

Pittsburgh.—Referee in Bankruptcy, Wm. R. Blair, recently confirmed, provisionally, the sale of the assets of Josiah V. Thompson of Uniontown, bankrupt. In one order he authorized the sale of "certain specific properties of J. V. Thompson" to William M. Hudson and others. In a second order he authorized the sale of the remainder of the real and personal property of Thompson to the Piedmont Coal Co. for $5,500,000. In this sum is included $2,500,000 personal property, $2,000,000 in real estate and coal lands in Pennsylvania, and $1,000,000 in real estate and coal lands in West Virginia.

Referee Blair's confirmation is held in abeyance for ten days and if, within that time, no exceptions are filed, the sale will be confirmed absolutely by the United States District Court. If exceptions are filed the whole matter will have to be threshed out again in court.

WEST VIRGINIA

Beckley.—Operators of the Winding Gulf region of West Virginia, members of the Winding Gulf Operators' Association, in addition to granting an increase in wages to the miners employed in their district, selected officers for the coming year. The roster of officials of this association newly elected is as follows: E. E. White, of the E. E. White Coal Co., Glen White, W. Va., president; C. H. Meade, of the Meade-Tolliver Co., Beckley, vice-president; George Wolfe, general manager of the Winding Gulf Colliery Co., Winding Gulf, W. Va., secretary; W. Gaston Caperton, treasurer. On the executive committee are the above officers and W. B. Beale, P. M. Snyder and J. C. Sullivan. The Winding Gulf field, embracing the counties of Raleigh and Wyoming, principally, has an annual tonnage of 6,000,000. This, it is expected, will be increased during the coming year, owing to the large amount of development work in progress, one company alone now being engaged in preliminary work on a plant to cost $3,000,000, which will have a total capacity of 6,000 tons a day.

Charleston.—Steps are being taken by the Government at Washington to relieve the financial distress, in which many West Virginia operators, big and little, find themselves, as the result of confiscation of coal by the railroads or diversion to new consignees. The great trouble is that in many instances, where coal was diverted, no record was kept or preserved of such diversion; furthermore, producers and shippers have no way of showing who eventually received the coal they shipped. Association secretaries have been asked to secure from members information as to coal taken by railroads and not paid for, and also coal which has been diverted without information as to final consignee. While shipping certificates are being issued, yet many producers and shippers are not only suffering serious financial embarrassment, but some are also on the verge of bankruptcy, because only a small percentage of the tonnage shipped from West Virginia in November has been paid for.

Charleston—Considerable damage was done to the branch lines of the Chesapeake & Ohio R. R. serving coal-producing sections, by the high water on Sunday, Dec. 7; such damage affected production in the West Virginia during the early part of the second week of December. This was true particularly on Cabin Creek, Coal River, the Piney branch (in the New River field) as well as on the Guyan branch. As a result a number of mines were closed down at the beginning of the week.

Wheeling—This city occupies a rather unique position during the coal strike, in view of the fact that there are ten coal mines in operation within the city limits of Wheeling; such limits were recently enlarged and one or two of the mines are large operations. It is believed that no other city of its size in the bituminous fields of the United States is in quite the same position, nor in as advantageous a position to be supplied with coal for industrial and domestic purposes.

Gypsy.—Fire which broke out in the interior of the big Gypsy mine of the Consolidation Coal Co., is reported under control and confined to sections where it should be readily extinguished within a short time. The special mine fire-fighting equipment from Fairmont was brought into play.

The fire is believed to have been started by a short circuit of electric wires. It was discovered by miners going to work on the night shift, having started when no one was in the mine. It is one of the Consolidation's large mines, employing several hundred men.

Charleston.—The question of securing settlement for coal shipped is becoming such a serious one that unless steps are taken by the Government to insure prompt settlement for deliveries, a great many companies will become seriously embarrassed and will be compelled to suspend operations for lack of adequate funds. For instance it is estimated that at the end of November only two per cent. of all the coal shipped from the Pocahontas field had been paid for. It is

stated that the question of providing for prompt payment of coal is being given serious consideration by the railroad administration; that instructions have been given regional directors that coal taken by the railroads is to be paid for without delay, and that coal delivered to others is to be paid for promptly. A system of credits for operators is now being worked out with the Federal Reserve Board, it is said. However, great confusion is resulting from the fact that no record has been kept of diversions in so many cases.

INDIANA

Clinton.—Six men were killed and three seriously injured in an explosion at Bogle coal mine No. 3, at Jacksonville, a village near here. All of the men were either mine officials or employees in the office of the company who, in attempting to get out sufficent coal for the boilers, set off a badly prepared blast. The mine has been closed by the strike. The mine was not badly damaged by the explosion. The dead men are: John Stark, Terre Haute, Ind.; Herbert Campbell and Joseph Robertson, Clinton, Ind., office men; S. G. Stephens, Terre Haute, Ind., civil engineer; Charles Watson, Clinton, Ind., assistant mine boss; and John Logsdon, Terre Haute, Ind., room boss.

Chilton.—A newly formed organization the Carter County Mining Co., has purchased an old property known as the Wood mine, in Carter County, near here. The new company is composed mostly of Cape Girardeau capitalists.

ILLINOIS

Belleville.—The owner of a strip mine near Millstadt, Ill., is doing a rushing business while the great strike is on. Farmers are driving for miles to get coal at the strip mine, which they are buying at eight cents a bushel. No men are employed in digging coal, and only as much is sold as the owner of the property can dig out himself. It is a one-man proposition, and the problems of organization are certainly boiled down to their lowest terms.

Duquoin.—A transfer in coal land was recently made by Albert J. Nason, of Chicago, to the Illinois Coal and Coke Co., which recently incorporated at Springfield. The land transferred is in southern Illinois, and it is said that the new owners are expecting to start extensive developments at once and to be planning additions to their acreage.

The air shaft of No. 2 mine of the Zeigler Coal Co., at Zeigler, has been considerably damaged from the giving away of the timbers near the bottom of the shaft. The recent rains are blamed for this condition and men are now at work repairing the damage.

A new slope mine has been completed by a new concern known as Baskin, Smothers & Ross, near Hurst, 16 miles south of here. The coal which was reached at a depth of 96 ft. was found to be excellent for mining with a good roof of slate running at a uniform height. A new switch will be laid to the mine from the Missouri Pacific R. R., affording an outlet for the product of the mine.

Benton.—A coal deal carrying a revenue stamp of $500, indicating a $500,000 consideration, has been filed in the office of the County Clerk of Jefferson County. The deed is from the West Frankfort Coal Co. to the Southern Gem Coal Co. Most of the land covered by it is in the southern part of Jefferson County. The remainder is in the northern part of Franklin County. Four Italians, who participated in the $42,000 payroll robbery at the Middle Fork mine here, June 27, pleaded guilty in the Circuit Court to highway robbery and were given indeterminate sentences in the penitentiary. Judge Kern announced that he would recommend that they be kept confined as long as they live. In the holdup they wounded William Develbiss and John Dolan, employees of the company. Dolan is still in a critical condition in a St. Louis hospital.

Carlinville.—Real estate transfers, filed in the Recorder's office here, show that the Standard Oil Co. is buying coal lands in South Otter Township as far east as the Palmyra line. If the company takes up all the coal land in that vicinity, its holdings will be increased several thousand acres. It now has 30,000 acres.

Belleville.—A night school for the study of mining is to be opened at the Township high school here. State Mine Inspector Wright is at the head of the movement. Only miners holding cards will be enrolled. The Illinois Mine Examiners' Board will have an examination here Dec. 11 to examine miners for state certificates.

KENTUCKY

Lynch.—It is announced from this place, the central city of the United States Coal & Coke Co., a subsidiary of the United States Steel Corporation, on Cumberland River, that the company is still acquiring large areas of coal lands in the Big Black Mountains section. It is said that this company now has over 60,000 acres of coal lands, making it the second largest holding company in eastern Kentucky. The maximum capacity of the plant, 10,000 tons, will not be reached before next spring, although splendid progress has been made around Lynch.

MISSOURI

Hume.—Joseph Klaner, a coal operator of Pittsburg, Kan., has leased a large tract of coal land south of here and will use steam shovels in stripping operations. The Kansas City Southern is building a switch to the mine. The mine will employ about 100 men when in full operation.

NORTH DAKOTA

Wilton.—On Nov. 26, the tipple of the Washburn Lignite Coal Co., at the Wilton mine, was completly destroyed by a fire of mysterious origin. This disaster caused a property loss of $50,000, threw 300 men out of employment and halted the daily production of from 1200 to 2000 tons of coal. This greatly complicates the local fuel situation. The tipple was at the No. 2 shaft of the company, and there seemed to be no natural cause by which can be explained the mass of flames which seemed suddenly to envelop the whole structure. Nothing could be done to save the tipple, and the efforts of firemen were directed to saving the nearby power house. Miners succeeded in closing the mouth of the shaft, thus preventing the fire from gaining a start in the mine workings, which might have been followed by most disastrous consequences. The tipple was said to be the largest and most modern in the state. The Washburn company's property is said to be valued at $1,550,000. The labor situation has been most acute at this mine. Just recently these properties were restored to their owners, after having been in the possession of the state for a week. The radical element here hoped to obtain the mines themselves. It is stated that the tipple cost $30,000, and was insured for $25,000.

Industrial News

Elkins, W. Va.—The Greenmar Coal Co., recently organized, with a capitalization of $50,000, has taken over the Strader mine at Strader, W. Va., operated by the Strader Coal Co. This mine has a 4-ft. seam of Middle Kittaning coal, the lease covering 375 acres. Officers of the newly organized company are W. H. Green, president; J. C. Green, vice-president; J. F. Brown, secretary, and A. F. Martin, treasurer. The company expects to be able, through a number of improvements, to materially increase the output of the mine. Those interested in the Greenmar Coal Co. are also chiefly interested in the W. H. Green Coal Co., which has had several years of successful operation at Adrian. J. C. Green will have charge of the Strader operation.

Clarksburg, W. Va.—The Melhare Coal Co., composed largely of eastern capitalists and Clarksburg people, has leased on a royalty basis about 305 acres on Davidson's Run, near Reynoldsville, Harrison County, with a view to early development. This property represents the consolidated holdings of John A. Gawthrop and the Sharpa' heirs, Gawthrop having purchased the holdings of the latter for a consideration of $34,144. No time will be lost, it is stated, in starting development work. The Mebare company was organized with an authorized capital of $100,000, with the following people principally interested: F. R. Long, Montclair, N. J.; C. Waldron, Rutherford, W. Va.; Carl L. Horner, Clarksburg, W. Va.; H. T. Hardesty, Wilsonburg, W. Va.; Philip P. Steptoe, Clarksburg, W. Va.

Logan, W. Va.—With a total authorized capital of $100,000, the Faulkner Coal Co. has been organized to undertake the development of coal lands near Faulkner, in Logan County, W. Va. W. E. Deegans being one of the leading spirits in the organization of the company. Others interested are J. M. Turner, Welch, W. Va.; G. E. School, Huntington, W. Va.; J. H. Taylor, Pinson Fork, W. Va.; J. Frank Grimet, Huntington, W. Va.

Elkins, W. Va.—The Brewer-Harrison Coal Co., a new West Virginia coal producing concern, has as its largest stockholders men long connected with the mining industry of West Virginia, among them being W. W. Brewer, of Belington and Weaver, and H. H. Harrison, of Pierce. Associated with them are: E. S. Baker, of Weaver; W. H. Young, of Clover Lick, and E. A. Bowers, of Elkins. The company plans the opening of mines in the Collins district, of Lewis County, having a capital of $125,000.

Piedmont, W. Va.—The Kalbaugh Coal Co. plans to operate mines in Mineral County, W. Va., having just been organized, with a capitalization of $25,000. This concern was organized principally through the efforts of Z. T. Kalbaugh, Piedmont, W. Va.; N. S. Brown, St. Louis; H. B. Kalbaugh, Westernport, Md.; E. A. Gamble, Westernport, Md.; T. F. Shaffer, Cumberland, Md.

Bluefield, W. Va.—The sum of $50,000 is understood to have been the consideration involved in the purchase of the property, and assets of the Hamlin Coal Co., operating near Dante, Va., on the Carolina, Clinchfield & Ohio R. R., by E. S. Reid, A. S. Adams and others of Chatham, Va. Extensive improvements will be made to the property, and a number of new dwellings will be built for miners.

Bluefield, W. Va.—What was formerly the Buchanan Coal Co. is now the Mayers Coal Corporation, a reorganization, having been effected following the purchase of the company by W. R. Crenshaw and others, of this city. The capital of the new company has been fixed at $150,000. The plant and holdings of the company are near Drill, Va., on the Clinch Valley division of the Norfolk & Western R. R. It is understood that the reorganized company has secured additional acreage, and will increase production to 1000 tons a day.

Charleston, W. Va.—With the prospect of being able to ship coal over the Hazy Creek extension of the Chesapeake & Ohio Ry., on Coal River, owing to the fact that that extension is nearing completion, a number of companies are pushing work on the opening of new mines on Hazy Creek, among such companies being the Hazy Eagle Coal Co.

Sprigg, W. Va.—The Crystal Block Coal & Coke Co. is having plans prepared for the immediate rebuilding of the coal tipple here, in Mingo County, recently destroyed by fire, with loss estimated at about $50,000.

Bradel, Ky.—The Power Coal Mining Co. has recently filed notice of a change in its corporate name to the Wheeler Coal Co., at the same time increasing its capitalization from $15,000 to $100,000, to provide for general business expansion. Its plant is in Knox County.

Charleston, W. Va.—The Hazy-Eagle Colliery Co., recently organized, is understood to be arranging for the installation of the necessary mining machinery, equipment, etc., for the immediate development of a tract of about 1100 acres of coal located in Raleigh County. George Morrow is president; C. E. Krehs, vice-president, and Paul N. Newton, secretary and treasurer. Clark & Kreha, Charleston, are consulting engineers.

Regina, Ky.—The Winston Elkhorn Mining Co. is having plans prepared for the construction of a new coal tipple for increased operations. It is understood that arrangements are being made by the company for the erection of a number of houses for the miners. This operation is in Knox County.

Winding Gulf, W. Va.—The Winding Gulf Colliery Co., in Raleigh County, has completed arrangements for the rebuilding of its machine shop, recently destroyed by fire, with loss estimated at about $60,000.

Wolf Summit, W. Va.—The Wolf Summit Coal Co. has had plans prepared for the sinking of an additional shaft at its property here in Harrison County, for increased operations. The company contemplates the installation of complete mining equipment, machinery, etc., including loading apparatus.

Artemus, Ky.—The Wheeler Coal Co., in Knox County, recently organized with a capital of $100,000, is arranging for the commencement of operations at an early date for the development of approximately 300 acres of coal land, to have a daily capacity of 600 tons. The company has completed negotiations for the acquirement of the Wheeler Jellico Coal Co., the New Trooper Coal Co., and the Power Coal Co., located in this district. R. Wheeler is president and manager.

Evansville, Ind.—W. T. Campbell, president of the Vicksburg Towing Co., Vicksburg, Miss., has recently been in Evansville, Ind., looking for a site for a shipbuilding plant which will employ about 2400 men. Barges and steamboats to be built at the proposed new plant will be used to distribute coal mined in the Kentucky fields. Mr. Campbell is associated with interests in the development of coal lands in the Green River Valley in western Kentucky, where it is proposed to open several new mines within the coming year. The Vicksburg Towing Co. has a contract to distribute coal mined in the Kentucky fields. For this purpose it is said it will have to build 2000 barges with a capacity of 500 tons each and 36 sternwheel steamers.

Pikeville, Ky.—The Praise Elkhorn Coal Co., recently incorporated with a capital of $30,000, has perfected its organization, and is arranging plans for the development of about 300 acres of coal property in the vicinity of Dunleary, Ky. It is proposed to install equipment to give a daily capacity of about 150 tons. H. H. Porter is president; J. W. Cockill, vice president and manager, and W. W. Gray, secretary and treasurer.

Elkins, W. Va.—The Greenbrier Coal Co. has incorporated with a capital of $50,000 to engage in general coal mining operations in the Elkins district. A. F. Martin, W. H. Green and J. F. Brown are the incorporators.

Columbus, Ohio.—Loading of the storage slack piles in the Hocking Valley field, started recently to relieve the stress of the situation, has been stopped because of the action of miners. Laborers were secured to load these piles and after working for some time they ceased work for some reason, presumably because of pressure brought by union miners and sympathizers. The slack piles went a long way to relieve the approaching local fuel crisis.

Columbus, Ohio.—Operators in Ohio and in fact all parts of the country who are either mining or shipping coal are much concerned over the financial situation. Because of the Federal Government regulation, it is found impossible to collect for coal either held on tracks or sold under the distributor, promptly, and many of the companies are short of funds. This matter has been brought to the attention of the Federal Government, and a plan of issuing credits for such coal to be honored by the Federal reserve banks is proposed and may be put into force in the near future. If that is done the situation will be relieved.

Macdonald, W. Va.—The New River Co. is constructing a new tipple at its Summerlee mine at a cost of $35,000, and expects to have the new plant completed and ready for use by Jan. 1. Operations have been suspended during the erection of the tipple, miners of the Summerlee mine finding employment at the Lochgelly operation. It will be possible to screen coal to four different sizes after the new tipple is put in commission. At the same mine, self-dumping cages and automatic caging devices at the shaft bottom have been provided. Similar equipment as well as new screens and conveyors are being installed at the Whipple mine of the company. The Whipple tipple was the first steel tipple erected in the New River field.

Williamson, W. Va.—Negotiations have been consummated under the terms of which the War Eagle Coal Co. has acquired the leaseholds, equipment and assets of the Traders Coal Co. operating in the Williamson field, at a consideration said to have been $125,000. The company acquired was owned and operated by C. L. Biddison and others, most of whom were from McDowell County. The plant of the Traders Coal Co. is a comparatively new one, having been in operation only a few years. Operation of what was the Trader company plant will be directed by Geo. W. Coffey, superintendent of the War Eagle Coal Co.

Huntington, W. Va.—Though people in the northern part of West Virginia are largely interested in the newly organized Sprigg Coal Co., the concern will operate in Mingo County, in the southern part of the state, in the Lee district; the general headquarters of the company will be at Huntington. This company is capitalized at $50,000, and was organized by the following parties: J. C. Miller, Charles Porter, William J. Hare, John R. Bennett and C. Goodwin, all of Grafton, W. Va.

Moundsville, W. Va.—Extensive repairs having been made at the plant of the First Street coal mine, of this city, where the tipple was destroyed a few months ago, operations have been resumed and the company is once more mining and shipping coal with about 50 men at work. Orders have been issued, however, to former employees who will not work now, to remove their tools.

Buckhannon, W. Va.—The Philmont Coal Co. will establish an operation in the Warren district, of Upshur County, where the corporation expects soon to begin preliminary development work on the opening of a mine. This company has just been organized and, is capitalized at $100,000, the following Philadelphia, Penn., people being actively interested in the new concern: Llewelyn O. Knipp, George H. Grove, Hiram P. Grove, M. P. Patterson and Charles H. Grove.

Bluefield, W. Va.—Another Mercer County mine will be opened at Goodwill, in the Rock district, by the Northwest Fuel Co. This company having just been organized for that purpose, with a capital of $25,000, by the following Mercer County people: H. J. Hartsock, J. E. Biggs, Mary J. Biggs, Frank C. Biggs and E. E. Hartsook, all of Bramwell, W. Va.

Leeds, Ala.—Representatives of French interests are here to open up mines on the Henry Ellen seam, ten miles from here. The party includes a geologist and mining engineers, who are going over the properties. No railroad reaches this point, and it is possible that one will be built to transport the coal to Birmingham. In the meantime the coal will be mined and trucked to that city.

Obituary

Henry Dwight Merrill, age 85, one of the oldest figures in the coal and iron manufacturing business in the South, died Nov. 26, at the home of his daughter, Mrs. Beulah M. Chairsell, Birmingham, Ala. Mr. Merrill was born in Pittsfield, Mass., in 1834, and came to the South at the outbreak of the Civil war. He located at Holly Springs, Miss., where he engaged in business, operating the first armory for the Confederate Government making rifles. The first cannon of the southern forces also were turned out in this plant.

Personals

William H. Kramer, of Somerset, Penn., has been appointed manager of the Pennsylvania division of the Consolidation Coal Co., with Captain Alfred Pearson, also of Somerset, assistant manager. Mr. Kramer takes the position of Samuel Steinbach, who resigned to enter the service of the Bethlehem Steel Co. Mr. Kramer came to Somerset from Philadelphia in 1900 as a clerk for the Althouse Coal Co., near Berlin. When the company consolidated with the Somerset Co., now the Consolidation, Mr. Kramer took a clerkship with the Consolidation plant at Garrett, coming to Somerset in 1904. He was made chief clerk in 1907, which position he held until Dec. 1. Captain Pearson, formerly chief engineer at the plant, came to Somerset eight years ago from Virginia. L. M. Carter has been advanced to chief engineer.

Hugh Archibald, a mining engineer, with headquarters in Scranton, Penn., and formerly associate editor of "Coal Age," read a paper entitled, "The Need of Better Management in Mining Operation," on the afternoon of Dec. 6, 1919, at the annual meeting of the Taylor Society, in the Engineering Societies building, 29 W. 39th street, New York City.

Dr. W. R. Crane, who has been acting as chief engineer of the War Minerals Relief Commission, since the retirement of J. E. Spurr, who resigned to become editor of the Engineering and Mining Journal, has been appointed chief engineer in place of Mr. Spurr. Dr. Crane was formerly dean of mining at Pennsylvania State College, and during the war gave his efforts most unremittingly and patriotically to the stimulation of war-time mineral industries.

J. B. Connors, a brother of M. S. Connors, Federal manager of the Hocking Valley Railway Co., and formerly a coal man of Dayton, Ohio, died recently at the age of 63 years. He was previously superintendent of the Norfolk & Western R. R.

J. F. White has been appointed district mine inspector for the eleventh district, with headquarters at Logan, W. Va., according to announcement just made by W. J. Heatherman, Chief of the West Virginia Department of Mines. Mr. White was [illegible] ant of the No. 10 operation of [illegible] County Coal Corporation.

H. A. Light has been appointe[illegible] superintendent of the Coal Land [illegible] ment Co., which will shortly begin mining coal in Lewis County, W. Va., near Brow[illegible] ville. Mr. Light has established headquarters for the company in Weston.

John Mahony has been appointed general manager of mines of the Pittsburgh Terminal Railroad & Coal Co., with headquarters in the Wabash building, Pittsburgh, Penn.

Trade Catalogs

Jeffrey Straitio Ventilators. The Jeffrey Manufacturing Co., Columbus, Ohio. Bulletin No. 270. Pp. 8; 7½x10⅝ inches; illustrated. Brief description of special fan for ventilation of small mines, development of larger ones or for boosting purposes.

Pinitte Rigid Couplings for Line Shafts. Smith & Serrell, Inc., 90 West St., New York City. Bulletin No. 102. Description of the device.

Coal and Rock Drills—Miners' and Roadmen's Tools—Specialties. The Leetonia Tool Co., Leetonia, Ohio. Catalogue No. 3, p. 75; 8x10½ inch; illustrated. Complete descriptive catalogue. This company also announces its ability to manufacture anything of a special character in its line.

Dinwiddie Automatic Mine Door. Dinwiddie Steel and Manufacturing Co., St. Louis, Mo. Pamphlet. Pp. 16; 5⅝x8¾ inches; illustrated. Description of the door, its controlling devices and its operation.

Aerial Thawing Outfits and Torches Aerial Burner Co., Inc., Union Hill, N. J. Folder. Pp. 8; 6x9 inches; illustrated. Description of apparatus used in thawing out frozen materials, machinery and equipment

The Optical Pyrometer. The Leeds & Northrup Co., Philadelphia, Penn. Catalogue No. 86-B. Pp. 28; 7⅞x10½ inches; illustrated. Description of a portable instrument for measuring high temperatures at various works; conditions of use and instructions for using.

Allis-Chalmers Oil Engines, Diesel Type. Allis-Chalmers Manufacturing Co., Milwaukee, Wis. Bulletin 1532-A. Pp. 19; 7⅞x10½ inches; illustrated. Description of the Diesel oil engine and its application.

Loading Rock with the Erie Shovel. Ball Engine Co., Erie, Penn. Bulletin S-36. Six-page folder; 8½x11 inches; illustrated. Mainly illustration of the Erie shovel at work under various conditions.

Publications Received

Abstracts of Current Decisions on Mines and Mining. By J. W. Thompson. Reported from January to May, 1919. Bulletin No. 181. Law Serial No. 19. Department of the Interior. Bureau of Mines. Unillustrated; pp. 175; 5⅞x8⅛ inches.

Coal in 1917. Part B. Distribution and consumption. By C. E. Lesher. Bulletin 11:35. Mineral Resources of the United States, 1917, Part II (pp. 1203-1259). Department of the Interior. Bureau of Mines. Unillustrated; pp. 1203 to 1259; 5⅞x9⅛ inches.

Report on the Coal Trade of Canada. For the year ended Mar. 31, 1918. Canada. Dominion Bureau of Statistics. Internal Trade Division. Unillustrated; pp. 59; 6½x9¾ inches.

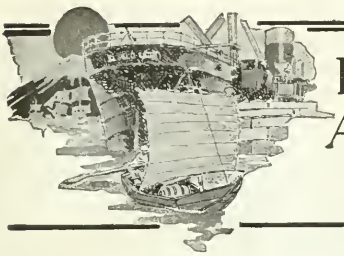
Coming Meetings

The Wholesale Coal Trade Association of New York will hold its next meeting Jan. 20, 1920, at the Whitehall Club, New York City. Secretary, Charles S. Allen, 1 Broadway, New York City.

Northern West Virginia Coal Operators' Association will hold its next meeting Feb. 10, 1920, at Fairmont, West Va. Secretary, George T. Bell, Fairmont, West Va.

American Institute of Mining and Metallurgical Engineers will hold its next meeting Feb. 16 to 19, in New York City. Secretary Bradley Stoughton, 29 West 39th St., New York City.

National Conference of Business Paper Editors will meet at the Astor Hotel, New York City, Jan. 16, 1920. Secretary, R. D. Hall, 36th St. and 10th Ave., New York City.



FOREIGN MARKETS AND EXPORT NEWS

Anthracite Shipments for November, 1919

The shipments of anthracite for November, as reported to the Anthracite Bureau of Information at Philadelphia, amounted to 5,971,671 gross tons, as compared with 5,276,659 tons for the same month last year, an increase of 695,012 tons, and with 6,560,150 tons with October of this year, a decrease of 588,479 tons. The decrease as compared with the preceding month was due entirely to the fewer number of working days, for in addition to being a shorter month, November this year had five Sundays, All Saint's Day, Election Day, Armistice Day, and Thanksgiving Day, so that there were only 21 full working days whereas with only four Sundays and only two holidays (Mitchell Day and Columbus Day) October furnished 25 full working days. The average daily shipments in November showed a substantial and gratifying gain (considering the shortage in bituminous coal production) over October, the average daily records being 284,365 tons for November against 262,406 tons for October. The total shipments for the coal year from April 1 to November 30, have amounted to 46,971,921 tons, as compared with 44,085,610 tons in 1916, the latest normal year, a gain of approximately 3,000,000 tons.

The shipments by railroads were as follows:

Railroad	November, 1919	November, 1916	Coal Year, 1919-1920	Coa Year 1916-1917
Pittsburgh and Reading	1,358,643	1,200,814	9,298,481	8,383,663
Lehigh Valley	1,079,266	1,082,453	8,631,660	8,074,729
New Jersey Central	506,737	546,348	4,291,891	4,254,101
Delaware, Lackawanna and Western	860,356	979,607	7,202,048	6,921,568
Delaware, and Hudson	663,782	628,239	5,394,387	4,776,686
Pennsylvania	406,606	438,869	3,333,221	3,665,338
Erie	620,703	674,261	5,121,336	4,975,491
New York, Ontario and Western	161,385	162,257	1,364,363	1,284,149
Louisville and Nashville	314,193	280,149	2,334,534	1,749,885
Total	5,971,671	5,992,997	46,971,921	44,085,610

Coal and Coke Exports for October

Coal and coke exports, from reports of the Department of Commerce, for the month of October, 1919, have been favorable. As can be seen from the following tables, Canada still continued to receive the largest amount of coal and coke; Buffalo remains the largest customs district which shipped their exports, and the Virginia district is the largest specific district which supplied bunker coal to the foreign trade.

The domestic exports of coal and coke from the United States, by countries, is as follows:

Countries	Coal: Anthracite 172 Tons	Coal: Bituminous 173 Tons	Coke 174 Tons
Austria-Hungary	150	.....	297
Azores and Madeira Isl.	.....	9,003	.....
Belgium	.....	200	.....
Denmark	.....	20,548	.....
France	802	183,812	.....
Germany	.....	632	.....
Gibraltar	.....	4,805	.....
Greece	.....	25,157	467
Italy	2,299	423,939	7,650
Netherlands	1	174,430	2,831
Norway	.....	35,051	132
Portugal	.....	24,201	82
Spain	.....	17,973	.....
Sweden	.....	60,734	.....
Switzerland	.....	69,990	2,422
Turkey in Europe	.....	4,005	.....
England	.....	5,003	.....
Bermuda	683	1,553	.....
Canada	425,511	1,448,605	47,882
Guatemala	1	50	1
Honduras	195	1,003	3
Nicaragua	154	89	3
Panama	.....	5,396	.....
Salvador	.....	1	5
Mexico	442	8,757	14,831
Miquelon, Langley, etc	30	.....	.....
Newfoundland and Labrador	1,775	1,300	.....
Barbados	50	10,144	.....
Jamaica	.....	4,587	15
Trinidad and Tobago	.....	6,632	.....
Other British West Indies	.....	5,656	.....
Cuba	1,649	115,366	554
Danish West Indies	.....	5,517	.....
Dutch West Indies	.....	4,286	.....
Dominican Republic	.....	335	1
Argentina	.....	95,865	195
Brazil	.....	71,957	280
Chile	.....	1,035	3,691
Ecuador	.....	.....	25
Peru	.....	6,872	582
Uruguay	.....	8,915	2
Venezuela	.....	.....	11
Canary Islands	.....	1,819	.....
French Africa	.....	23,674	.....
Portuguese Africa	.....	17,121	.....
Egypt	.....	28,659	.....
Total	433,742	2,934,686	81,962

Exports for the same period as was reported by customs district were:

Customs Districts	172 Anthracite Tons	173 Bituminous Tons	174 Coke Tons
Maine and New Hampshire	139	62	56
Vermont	1,602	2,036	273
Massachusetts	286	.....	.....
St. Lawrence	135,872	192,084	7,199
Rochester	48,875	60,935	98
Buffalo	233,317	287,027	29,378
New York	6,929	3,959	5,265
Philadelphia	2,332	261,277	5,939
Maryland	2,259	407,382	7,154
Virginia	.....	765,768	831
South Carolina	.....	27,426	.....
Georgia	2	7,113	.....
Florida	.....	958	.....
Mobile	.....	1,998	.....
New Orleans	350	1,452	54
San Antonio	398	1,684	959
El Paso	43	3,290	1,949
Arizona	.....	3,768	11,923
Southern California	1	5	.....
San Francisco	.....	1	5
Washington	73	611	184
Dakota	552	4,466	142
Duluth and Superior	709	4,084	24
Michigan	1	83,154	8,912
Ohio	2	814,146	1,616
Porto Rico	.....	.....	1
Total	433,742	2,934,686	81,962

Bunker coal supplied to vessels in the foreign trade for the same period at specified districts was:

Districts:	Tons
Maryland	86,792
New York	128,543
Philadelphia	83,300
Virginia	273,078

Foreign Bunkering Prices

(Dec. 1, 1919)

Port:	Dollars
Gibraltar (plus 11c. export duty)	$23.80
Algiers	27.12
Malta	26.93
Oran	27.50
Port Said (plus 95c. emergency tax)	27.69
Newcastle	16.50
Southampton	19.40
Liverpool (Welsh coal)	19.78
Plymouth	19.40
Hull	9.60
Fowey	18.83
London-Gravesend	20.20
Dartmouth-Portland	20.00
Cardiff	14.50
Swansea	11.00
North of Scotland	No coal available
Trondjem	26.40
Antwerp (Bascoup)	25.50
Antwerp (American)	33.00
Havre	No coal available
Bordeaux	No coal available
Azores	26.40
Madeira	22.54
Teneriffe	24.34
Las Palmas	24.34
St. Vincent	23.85
Barbados	20.35
St. Lucia	20.35
Trinidad	20.16
St. Thomas, V. I	20.16
Bermuda	25.00
Curacao, D. W. I	22.00
Rio de Janeiro	27.95
Pernambuco	29.00
Bahia	29.00
Santos	27.90
Rosario	26.95
Bahia Blanca	27.33
Buenos Aires	26.60
La Plata	26.60
Montevideo	46.60
Coronel	13.50
Delagoa Bay	6.25
Port Natal	7.00
Cape Town	9.20
Dakar	24.80
Singapore	15.10
Colombo	16.50
Aden (So. African or IndianCoal)	20.10
Aden (Welsh coal)	27.90
Newcastle (approx.)	2.75
Port Kembla	3.30
Adelaide	6.66
Albany	7.90
Fremantle	7.90
Melbourne	5.95
Sydney	.....
Sydney Harbor	3.68
Port Pirie	6.10

Note.—In compiling this table one shilling was worth 18 4c.

Foreign Freight Rates

(From New York)

	Rate	Tons of Displacement
Genoa-Leghorn	$26.50	1000
Spezia-Savona	26.50	1000
Piraeus	28 50	1000
Trieste-Venice	31 00	800
Algiers	26.00	800
Cadiz-Bilbao	23.50	1000
Barcelona	26.00	1000
Antwerp-Rotterdam	22 50	1000
Lisbon	22 50	1000
Gothenburg	24 00	1000
Marseilles	26.00	1000
Stockholm	26.00	800

Hamburg	25.00	1000
Rouen	23.00	1000
Malmo	25.00	800
Pernambuco	16.00	500
Bahia	16.00	500
Rio	17.00	1000
Santos	18.00	600
Rio Grande do Sul	19.50	500
Buenos Aires or La Plata	16.00	1000
Montevideo	17.00	750
Rosario	19.00	750
Bahia Blanca	17.50	1000
Nitrate Range	14.00	
Havana	7.50	600
Cardenas or Sagua	9.00	500
Cienfuegos	9.00	500
Caibarien	9.50	300
Guantanamo	9.50	500
	9.00	400
Manzanillo	9.50	300
Bermuda	9.00	500
Bermuda p.c. and dis. free		
Kingston	9.50	400
St. Thomas	10.00	500
St. Lucia	11.00	500
Barbados	11.00	500
Santiago	8.50	500
	9.00	400
Port of Spain, Trin	11.00	500
Curacao	10.50	500
Free p.c. Curacao		
Demerara	13.00	400

Coal Shortage in Poland

According to the "Board of Trade Journal," Poland and its annexed territories require 13 million tons of coal yearly, whereas the output, including that part of the Teschen district which is under Polish administration, is at the rate of 5½ millions tons only per annum. Efforts are being made by the Government to obtain supplies from Upper Silesia (600,000 tons per month), but the output there has only reached 40 per cent. of its normal figure. In the Teschen district the production is now estimated at 75 per cent. of the last prewar month, but political and transport difficulties hinder free supplies from either quarter. Transport difficulties are being largely surmounted, and the coal shortage prevailing in Poland is attributed to general causes affecting the whole European Continent. The introduction of the eight-hours day, incessant strikes, etc., have caused a reduction of 40 per cent. in the production of the Dombrowa and Cracow mines.

Coal Troubles in Germany

The coal problem continues, of course, to occupy general attention in Germany. In the course of a debate in the Prussian National Assembly Nov. 10, Herr Oeser, Minister for Railways, delivered a long speech, of which the following is an abridged report.

The Minister, among other things, stated that it had been said that the coal famine was due to a transport shortage. If that were the case, suitable steps would be taken to remedy it. The coal troubles, however, were the result of other causes as well, which could not be removed by any improvement in transport. In the Ruhr district in 1913 the number of wagons placed at the service of the pits averaged 29,546 per day; in 1917 it declined to 18,282, and in 1918 to 14,923. During the first seven days in Nov.—that is, before the suspension of the passenger traffic—the number of trucks rose to 16,661 per day. The call for wagons on Nov. 10 was for 15,812, and in the morning of that day over 16,000 trucks were put at the disposal of the pits, or more than were asked for. The railway authorities, therefore, were not responsible for the stocks at the pits in the Ruhr district not having been carried away. The conditions in Upper Silesia were not quite so favorable, but even there the shortage of rolling stock had been reduced to about 1.7 per cent., as compared with the number of trucks rendered available last year.

The Minister repudiated the suggestion that the coal famine was solely due to deficient transport arrangements, and remarked that on the contrary all the transport misery was brought about by the scarcity of coal. The supplies of coal delivered to the railways were inadequate, the quantity then on hand being only sufficient for six days at the rate of consumption on the Prussian-Hessian railway system. In addition, there was the dirty condition of the coal, which compelled the railways to increase their tonnage requirements very considerably. The complaints made regarding lack of punctuality in the railway services were due to the bad quality of the coal. In one district alone 154 trains were held up on a certain day because the coal was of a bad steam-raising quality. The grates of the locomotives were choked by excessive clinkering, and repairs were increasing.

Prices of American Coal in Fiume

Several coal importing firms in Fiume have been in negotiation for some time with Americaen coal exporters with a view to bringing the American product into this market. The lowest price obtainable has been $38.75 per ton, c. i. f Fiume, cash in exchange for documents in Philadelphia. The next lowest price was $40 per ton, c. i. f. Fiume, cash against documents Fiume. An English firm has quoted American coal at $6 per ton f. o. b. New York and $28 per ton freight New York to Fiume in English vessel, being $34 per ton c. i. f. Fiume.

The exporter who furnished the English quotation stated that French and English firms are granting credit for as long as 12 months, based on present rates of exchange. This enables firms in Fiume to do business that would otherwise be impossible. It is assumed that within the next 12 months a stable currency will have been provided and credits established in all the important money centers.

Shortage of Coal in New Zealand

Coal is not being mined in New Zealand in sufficient quantities for home consumption. For the past few years it has been necessary to import 400,000 tons annually, and owing to the strikes and the difficulty in securing shipments of Australian coal, and the shortage of output in New Zealand mines, the railroads, shipping and other industries have suffered. Returned transports brought New River and other grades of coal from Newport News as bunker supplies. The last shipment of this coal cost $7.18 per ton f. o. b. steamer. The supply of coal for the first five month of this year showed a shortage of 70,000 tons as compared with the amount supplied last year.

Italian Market for American Coal

The demand for American coal in Italy is increasing. England has reduced its total export of coal from 750,000 to 330,000 tons per month. It is thought that American coal can be put on the Italian market at a lower price than English coal. France sent to Italy during 1918, 2,000,000 tons of coal, but can now send none on account of the British situation.

During the 12-month period ended June, 1919, the Philippine Islands imported 396,934 gross tons of coal, valued at $3,029,140. For the same period in 1918 the quantity of coal imported totaled 395,275 gross tons, valued at $1,874,997.

An agency is desired by a man in Italy for the sale of American coal. Correspondence may be in English. Reference, 31019.

Coal Mining in South Africa

The annual reports of the Secretary for Mines and Industries and the Government Mining Engineer for the Union of South Africa contains much information in regard to the coal mining industry during 1918.

The war period has emphasized and established the importance of Durban as a coaling station for the British Empire. With its low price and good quality of coal, Durban's capacity for bunkering and shipping is only limited by the amount of coal which can be hauled from the northern Natal coal fields by the single main line of railway. If the Vryheid and South-Eastern Transvaal coal districts develop to their utmost capacity, it would appear that additional railway facilities will be essential.

During 1918, South Africa at last entered the ranks of the world's iron producers, and is at present using her own ores, fluxes, and fuel in the production of pig iron. The question of steel production is now receiving close expert attention, and it may well anticipate practical results before long.

Conditions in England Uncertain

The condition of the coal trade in Great Britain, as reported in the Nov. 21 issue of the "Colliery Guardian," can be stated as follows:

"The general position of the coal markets in all directions is at present more than ever dominated by the prevailing uncertainty of political conditions, the Government's most recent proposal to legislate to limit profits of colliery companies to 1s. 2d. per ton having had a depressing effect upon the trade, as evidenced in the sharp decline in this class of securities quoted on the exchanges where most of this class of business is transacted. On the other hand, the steady rate of output at most of the colliery centers has to some extent relieved anxiety on the score of supplies, and if only traffic facilities were equal to requirement, the outlook for the winter months might be regarded as fairly satisfactory.

"Reports of more speculative activity are indicated in recent market movements, contracting over long forward periods being freely discussed, and although sellers are somewhat hesitant about business over the whole of next year, there is a considerable inquiry for three and six months' terms, with negotiations in cases successfully carried through. Quotations remain at firm levels for export trade, but with a tendency to somewhat easier rates where contracts are fixed far ahead."

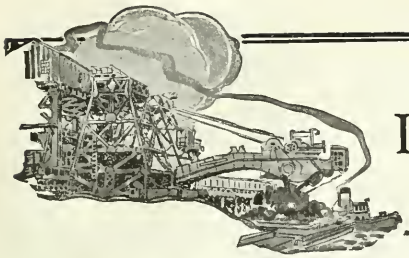
Scotch Coal Moves Slowly

The Scotch coal market is moving along on very quiet lines, but outputs are not up to the mark, which is unfortunate, as there are strong demands for practically all classes of material for home consumption. House coal is in specially good demand, the cold and snowy weather which is now experienced, increasing the requirements for this class of fuel, and at the depots the merchants are busily engaged in dealing with orders. Dross continues to be a difficult quality to dispose of, on account of traffic to the steel works being so much reduced. Large quantities of this quality of coal are still lying at the pits loaded in wagons and causing considerable congestion at the sidings. There is no improvement in the position as to the supply of empty trucks, and a good deal of idle time is attributable to this cause, especially in Fife and the Lothians, where, as a general rule, the pits are dependent on the North British Railway Co. for their supply of "empties." Conditions in the export branch of the trade are quiet, the chief cause of this state of affairs being the continued scarcity of tonnage. At Burntisland, Methil, and Leith this difficulty of securing boats is very acutely felt, as, in these districts the collieries are very much more dependent on shipping business than any of the other districts. Fair shipments are being sent to Ireland from the West of Scotland, and screened and unscreened are the usual qualities which are being shipped.

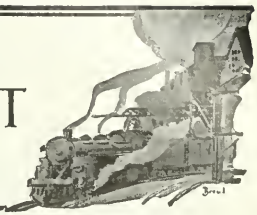
Coal Supplies at Halifax

The supplies at Halifax are none too large, as there is urgent need for fuel in Canada. This prevents many vessels from bunkering, and is a situation considered very serious for the French, Italian and Dutch liners, as British steamers are given preference in this coal station. Operators who have contracts to supply coal for bunkers, not only to America, are unable to secure permits for bunkering, thus causing a serious shortage at some of the other coal stations, especially those in the West Indies.

For the month of November, 1919, 143,071 tons of bituminous coal were shipped as compared with a shipment of 208,894 tons during the same month last year.



MARKET DEPARTMENT



Weekly Review

Conditions should be normal by the first of the year—Bituminous coal prices remain unchanged—Coke production not normal.

With the thermometer slowly falling and prospects of much colder weather ahead, the entire country is hearing rumors which tend to cheer, and some have too optimistically predicted that conditions will again be normal by the first of the year. In the Appalachian region and in certain of the Rocky Mountain states the mine workers show a slight tendency to return to work. However, in the Central Competitive Field there was but little change, and the coal that was mined in that region last week constituted only an insignificant tonnage, the product coming from wagon mines, steam-shovel pits, and certain co-operative plants.

Under favorable operating conditions, the nonunion mines still continued to turn out larger tonnages than normal, and the shipments were rapidly sent to the localities that most urgently needed them. Following advices from men of affairs, the state governments abandoned the idea of controlling and operating union mines, thereby lessening the anger of the striking miners.

During the past week dumping at freight terminals was continued though the amount did not come up to expectations. Though hampered by difficulties, such as severe weather which froze the coal in the cars, the coal consigned to the Great Lakes was satisfactorily dumped. The failures to receive shipments were due more to difficulties in moving freight on the rails than to a shortage of rolling stock.

Drastic regulations were made as to the conservation and distribution of fuel, the same plans being adopted as were put in force during the war. Electric lighting and power companies were ordered to prohibit the sale of electricity for outdoor electric signs, while theatres in the East were allowed but a limited time for evening displays. In like manner, transportation companies decided that the public would be benefited by better traffic throughout the day, if the heat supplied during the rush hour were cut off. Prices of bituminous coal, being under government control, were unchanged.

It is reported from Cincinnatti that there was rapid increase in the prices of anthracite pea and chestnut but the sales in that district were small. The railroads are confiscating whatever coal happens to be along their lines, and the operators are inconvenienced by the fact that the railroads do not pay for the coal so seized. This is indeed a serious state of affairs and causes them much worry.

In the anthracite region the operators are well satisfied that the demand for their product has been generously increased by the conditions in the soft-coal industry. They are slowly catching up with the losses which were incurred toward the close of Federal regulation and shortly thereafter. Colder weather and a greater willingness of their workers to increase production are other factors that cause them to rejoice. They have a steady call for steam sizes, and these are quickly disposed of, but the shipments do not meet with the demand.

Now that the government has control of bunkering of foreign vessels, the export sales have automatically stopped, but the lifting of the ban is being eagerly sought by American shippers. Not much can be spared from Canadian ports for there too the bunkering is under government jurisdiction, and exporters are forced to seek elsewhere the satisfying of their needs.

The coke production though it met the demand in the early weeks of the strike, is not what it was as the orders affecting the shipping of coal for coke manufacture are being strictly enforced. Much oil is being substituted wherever industries can procure it and make the changes that will permit of its burning.

WEEKLY COAL PRODUCTION

From a report of the United States Geological Survey the rate of production on the working days of the fourth week of the strike (Nov. 23-29) was 48.3 per cent of normal. During the first week it had been 29.6 per cent of normal; during the second 33.3, and during the third, 44.5 per cent.

Because of the Thanksgiving holiday, however, the actual output was a little greater than that of the preceding week. The total production is estimated at 5,429,000 net tons, an increase of 53,000 tons, or one per cent over the week before.

The output on Thanksgiving Day itself was 560,000 tons. On the five full-time days it averaged 974,000 tons. The average production per working day during the four weeks ended Oct. 25, which may be regarded as normal, was 2,015,000 tons.

The Central Interstate Wage Conference was in session in Washington during the first four days of the week, adjourning sine die on Thanksgiving Day. Production increased on Monday and Tuesday, as men returned to work in the Cumberland-Piedmont, Fairmont, and other fields of the Appalachian region. No break in the strike occurred elsewhere. Production on Friday was the second highest in the week, but Saturday showed the usual week-end drop.

The total output during the month of November was 18,815,000 tons. The littleness of this tonnage—by far the smallest in any month of recent years—is conspicuous in contrast with the production of October, which revised reports now place at 56,270,000 tons, the largest in the history of the country.

The output of anthracite fell off nearly 300,000 tons but the decrease appears to be entirely due to the Thanksgiving holiday. Compared with the corresponding week, last year, the production showed an increase of 185,000 tons, or 12 per cent. The total output since the beginning of the coal year now amounts to 61,555,000 tons, or about 5½ million tons less than during the corresponding period of 1918. At the present rate of production, however, the anthracite mines are rapidly catching up with their performance of last year.

The production of beehive coke continued to increase rapidly and the total output is estimated at 449,000 tons, the highest attained in any week since last February, with the single exception of the week of September 20, immediately before the steel strike.

Atlantic Seaboard

BOSTON

Trade much relieved over new prospect of settlement. Fuel authorities likely to await result of Indianapolis meeting before putting drastic regulations into effect. Receipts are still very light. Steamers detained at Norfolk since Dec. 5. Railroads confiscating coal all over territory. Sudden demand for steam sizes shows anxiety of some buyers.

Progress being made in shipment of domestic sizes.

Bituminous—The favorable outcome of the conference on Dec. 6 at Washington relieved the tension of the past week or ten days very much. While stocks are ample in most cases there has been a very natural scramble to get supplies for as long a period in advance as posaible. Coal has been shipped in fairly large quantities to steam users all over New England, and manifestly this has been done under the impression that either the ban would soon be lifted or that by some argument the authorities would be persuaded to release shipments when they arrive. Without doubt many consumers are apprehensive over the very light deliveries that have been made on contracts from certain districts, but the tone of seriousness that was noted the latter part of the last week was due more to the forbidding attitude of the Fuel Administration than to any impending crisis, so far as New England is concerned.

Mr. J. J. Storrow, who for some weeks has been serving on the district railroad committee, was appointed Dec. 5 to serve as Fuel Administrator of Massachusetts, serving this time, however, under the authority of the governor of the state. It was forecast that drastic regulations were to be put in force in the current week, but it is likely now that all such plans will be suspended until the result of the Indianapolis meeting is known. In general the trade is indifferent to these moves, there being, however, a very decided impression that the shippers themselves, with some intelligent direction or advice from the authorities, are in much better position to accomplish distribution than those whose interests lie in fields wholly foreign to the coal business. It is very much to be hoped that further interference will be made unnecessary by the meeting of the union leaders this week.

Meanwhile, such a volume of coal in transit has been taken by the railroads and there has been so heavy a movement west, together with drastic rules as to consignments, that actual receipts at New England destinations have lately been very light. On the Boston & Albany R. R., for instance, for a space of three or four days there was practically no bituminous coal received. This is certain to have a favorable effect upon the spot market when restrictions are removed. Much depends upon the rigor of the winter, however, and about that it is too soon to form an opinion.

At Hampton Roads on Dec. 5 the coal distribution tightened, and steamers arriving and about to load were held up unless and until permits could be had through the prescribed channels. All such processes take time and in the interim the consignee of the coal is obligated to pay the ship that is detained at the rate of 25c per ton per day. To the agencies it seems a large price to pay for the machinery of regulation.

The railroads in New England are now converting to their own purposes liberal tonnages of commercial coal, even though their reserves, in most cases, are as large as ever at this season. So far we have heard of no commercial shipments being diverted to other commercial users, and it is a matter of satisfaction to the trade that the power of diversion has not been exercised as during the war, when a great many needless complications resulted. There continues an unnecessary amount of car service at destinations, cars in many cases having been held for weeks, before the committee at Boston could decide upon their disposition. It is hoped very earnestly by the trade that the current week will see an end put to all these measures that are simply making it so much more difficult for shippers to take care of this territory.

The anxiety of some of the larger consumers has come out very prominently the last few days in a sudden demand for the steam sizes of anthracite. A number of sales were made, although New England was very slow starting. Such buying has been very discriminating, consumers having profited by their experience during 1918. All the sales have been practically for spot shipment and doubtless it will be found that several hundred thousand tons have come into New England during December, a tonnage that two months ago was not looked for.

Anthracite—There is still a great deal of pressure to get forward domestic sizes, both by rail and by water. In some of the larger cities there is beginning to be less demand for broken and egg, but the producing companies are still making heavy tonnage of egg, in particular, and retailers find themselves obliged to take these sizes, along with pea, to get stove and chestnut. There is more demand for pea than was the case 60 days ago, it having been found that the public in many localities will take kindly to a mixture of chestnut and pea, provided the price is adjusted, accordingly.

The barges carrying anthracite have practically resumed normal movement and there is a better feeling among the trade than was the case a fortnight ago. It is believed that now, unless there are further interruptions in transportation, New England will be able to nose its way through on domestic sizes.

NEW YORK

Anthracite steam coals in good demand with prices stronger. Heavy call for the domestic coals continues. Reports of strike settlement please the local trade. Public service corporations have good supply and are not likely to run short of coal. Operators complain because railroads do not pay their bills.

Anthracite—The demand for the steam sizes has grown to large proportions and the prospects are that these coals will soon be as scarce as the domestic commodity. This will be one of the results of the bituminous strike which also gives the anthracite operator an opportunity to regain some of the trade for these sizes lost several years ago.

When the strike in the soft coal mines was ordered on November 1, shippers hardly knew what to do with their supply of buckwheat, rice and barley. In many instances retail dealers seeing an opportunity of getting some egg, stove or chestnut coal, were willing to take a portion of the small coals and in this way shippers without storage facilities were able to keep their supply within bounds.

Instead of shaded prices all three coals are being quoted as full company circular at tidewater and for line trade some shippers are said to be quoting higher than company circular for buckwheat. Much of this coal is being used by consumers of bituminous who mix it with the latter size.

With the exception of the steam coals the market is practically devoid of interest. The demand for the domestic coals including pea, continues with chestnut in the lead. Local dealers are in no urgent need of supplies, but are taking all they can obtain to forestall any rush that may come later.

A large tonnage of the domestic coals including pea continues to go westward and into New England while along the nearby rails salesmen report a good demand.

Although the reports received here indicate a large production, some operators believe a large tonnage could be sent to market if the mine workers were inclined to work longer hours. From reports received here the trade feels satisfied there will be no serious troubles in the hard coal fields as a result of the strike in the bituminous regions.

For the six days ended Dec. 4 the dumpings at the local railroad docks were 4307 cars as compared with 5484 cars for the previous seven days ending Oct. 28.

Bituminous—The possibility that the strike would be ended early this week was good information to the local trade, as the New York public had been threatened with various restrictions in fuel consumption in addition to those already imposed. Orders had been issued and already enforced to turn off the heat in the elevated and surface cars, and that the large electric signs throughout the city should remain dark with the exception of one hour each evening. It was also intended to conserve coal by asking families to limit their cooking and to reduce the lighting in the houses as much as possible. In addition, train schedules were to be altered and many trains discontinued, in fact it was anticipated that the war-time schedules would be put into effect on Dec. 10.

Local consumers have not been much affected so far by the strike as most of them have large stocks of coal in reserve and until the priority list was put into effect last week were able to get sufficient coal to meet their daily requirements.

Should the strike be called off within the next few days, shippers believe that conditions will soon become normal and that there will not be any big rush for coal.

Some complaint was heard that certain railroads were neglecting to pay operators for the coal confiscated for the use of the various roads. This in some instances has resulted in serious inconvenience to the operators.

There has been a decline in the bunkering demand due to the orders of the Central Coal Committee at Washington discontinuing the coaling of vessels flying foreign flags, and those flying American flags must secure permits approved by the Committee. Foreign vessels leaving this port must secure their fuel supply at other ports, most of them securing it at Halifax.

The Railroad Administration reported 5028 cars of bituminous on the tracks at the various terminals on Dec. 4, as compared with 4250 cars on Nov. 28, an increase of 778 cars, due to the tightening of deliveries. During the six days ended Dec. 4 there were 3015 cars of bituminous dumped at the local docks as compared with 2531 during the seven days ended Nov. 28.

PHILADELPHIA

Anthracite trade gets further impetus from first real cold spell. Main strain still upon large sizes. No fear of a fuel shortage. Pea- coal very active. Independents get premium of 75c on this size. Dealers carefree. No drastic conservation orders issued by authorities yet. Steam sizes in strong demand. Car supply good. Credits in excellent shape. Bituminous shortage now being felt by smaller users. Big stocks on tracks. Increase in production reported. Drastic regulations only rumored.

Anthracite—The first real cold spell of the winter, with the temperature down to as low as 20 in the suburban section, brought many calls on the retail man. As has been the case all season, the bulk of the orders are for stove and nut, and as a result of the new business coming in most yards have been cleaned out of these sizes. Were it not for the pea coal which most dealers have in ample volume there would have been illttle for the dealers to do.

Calls upon the shippers for increased shipments of the large family sizes have availed the retail trade nothing at all. About the only explanation offered is that this market has been as well cared for as can be expected, and that it is the intention to make good further shipments. The operators believe that the boom in ordering on the part of the consumer is more from the fear of a possible cessation of work in the anthracite mines in sympathy with the other miners, than from a real need of fuel. Some dealers have even admitted this when they had endavored to substitute pea coal for the larger sizes, when their customers said they would not give cellar room to the smaller size, or words to that effect.

The hope is held out to the trade that good shipments of egg, stove and nut will be coming in right along, especially if the weather continues fairly mild, without any heavy snow storms to impede traffic. The producers continue to express confidence that they will be able to handle the local situation if the people will only be patient, and they also intimate that the retail men must work with them in an equitable distribution of coal.

The cold snap late in the week wound up with a snowfall of about an inch, and this brought out the real buyers of pea coal, who always hold back until necessity compels them to buy. As a result the piles of this size have been diminishing very fast during the past ten days or so, and the dealers are now almost a unit in asking for further shipments of pea. It is also believed that a very considerable portion of the pea coal lately delivered has been going to small manufacturing plants, as the delivery of bituminous coal is shut off to these concerns. This week one more of the big independent companies jumped the price of pea coal, and this concern is now selling it for $6.00 at the mines or 70c above company price. Most of the independent companies are now selling pea at this figure, some at 5c more.

As yet the retail dealers have received no instructions whatever from the fuel authorities as to the manner of their distribution. The daily papers are full of all sorts of rumors, and usually when they are tied down to any one in authority they are issued merely in the form of suggestions. On the part of the dealers, it can be said that most of them are endeavoring to exercise their judgment in properly placing such coal as comes to their yards, feeling in this way they can best obviate the necessity of a return to the troublesome method of fuel distribution as in effect during the war.

The steam trade is growing more active with each passing day and should the soft coal strike continue for two weeks more it is believed it would be a difficult matter to place an order for prompt delivery of any steam size. At the present time there are extremely heavy stocks of both rice and barley in storage, but the former size in particular is moving out in larger volume each day, particularly large calls for it com-

ing in from the West, where they learned to use this size during the war. Barley is not yet in the same class, but is improving daily. The daily production of the steam sizes is very heavy, as all the large companies have extensive washeries in operation, many of which were started last year and have now gotten down to maximum production. Even though the percentage of buckwheat from these operations and the regular mines is very heavy, this size is reaching the point where many shippers actually claim it to be short. Some of the independent operators who had difficulty in moving buckwheat at a cut under company price of $3.40 are now asking as high as $4.00 for single car lots.

A fortunate phase of the anthracite situation is the good car supply, as most operations have at all times sufficient rolling stock to meet their needs. Of course if all the mines were able to reach their maximum production it is possible that even here there might be difficulty. There is harly an operator who does not report he could use from 15 to 20 per cent more workers.

The financial situation as regards payments remain excellent, as all dealers strain every effort to keep their bills paid up to the terms of the shippers, and as a result, the producers have little trouble on this score.

Bituminous—More consumers are feeling the pinch of short supplies in this market. Usually these are the smaller concerns who have had little opportunity to put in reserve stocks. These concerns are now scouting about trying to get fuel of any kind, such as coke or small anthracite sizes to keep themselves running. Others are on the point of shutting down, especially those not on the preferred list of the fuel authorities. There is quite a tonnage of coal standing in cars and should the strike be declared off within the next week there would really he a surplus of fuel especially if consignees were compelled to take in what is consigned; as it now stands, more than one consumer can see his coal standing on the tracks, but is not allowed to have it.

The operators report a slight gain in the amount of coal produced in the Central Penn. region, but this has in no way helped them to take care of their local trade. It is also believed that a gain has been made in the Fairmont district, but an even larger proportion of this coal is being sent westward to relieve the more serious conditions there.

There is all kinds of talk current in the trade as to drastic regulations as to the cutting off of fuel and power but outside of the curtailment of some special passenger traffic on Sunday, no orders have been issued enforcing a cut in the fuel consumed. The public utility plants in this district still have stocks sufficient for two or three months.

Many of the local producers of bituminous are complaining of the slowness of being reimbursed for coal which has been commandeered, and unless some action is taken soon some of them will be compelled to go to the expense of borrowing funds to meet current expenses. It is now reported that a plan of having banks accept notes for such coal will he put into effect to relieve this situation.

BALTIMORE

Things grow tight in Baltimore and the city awakens to the fact that coal at tide does not belong to city as it is divided in part to New England. Drastic orders cut down movement this way and on bunkering. Hard coal situation without much feature.

Bituminous—The situation has tightened vastly and many industries are now living practically from day to day on government allotment. This includes some big ones. Others not on preferential or near-preferential classification, such as brick plants, have been refused coal and may close at any time The seading of five ships here to load coal at the piers from the reserve standing there awheel for New England railroads awakened the people of Baltimore to the fact that they cannot rely on that coal at tide. More will soon be sent allrail north, it is said, and the government has also ordered 1000 cars shipped from the New River field allrail to New England for railroad relief.

Because the Georges Creek and Upper Potomac mines were working nearly full last week an order was placed that left practically only that production for Baltimore and points east, the Somerset field and a large part of West Virginia production being diverted to the Middle West. The order cut off all coal east except that mined east of Thomas, W. Va., on the Western Maryland Railroad and Terra Alten, W. Va., on the Baltimore & Ohio Railroad, and the Sand Patch Tunnel on the Connellsville division. Another order placed here cut off all loading of bunker coal on overseae ships. This meant the stoppage of putting coal aboard foreign vessels to carry them to the nearest foreign coaling station, and on American ships for either round-trip or one way voyages. Coastwise and bay vessels were left for the time being to get bunker coal sparingly under permits.

The order putting the east practically on an east-of-the-Allegheny production, cutting off from Baltimore the old reliable Somerset region, was probably impelled by the knowledge that the Georges Creek and Upper Potomac were the only other regions working nearly full and the west was hard put for coal of any kind in the past week, however, some trouble came in the Georges Creek region, where two mines at least were hit by united walkout and several by individual desertions, whether merely for the Thanksgiving period or for the period of the strike dispute was a question. In addition many men in the Upper Potomac walked out, mines at Thomas, Coketon, Pierce, Ben Bush and Kempton were closed among others. Many men were also reported deserting anew the workings in the Meyersdale region, so that midweek finds the trade here greatly disturbed. The closing up of last week and the early days of the week saw a big improvement in Baltimore & Ohio R. R. loadings, some 2500 cars being averaged some days. This is only about 700 cars short of a normal run.

Anthracite—The hard coal receipts are about seasonal, except that the receipts are higher than usual. Light receipts are offset to some extent at least by the fact that there is probably a larger per centage of consumers with coal in cellars than ever before at the end of November. The reserve supplies in yards here are small, and again this is offset by the fact that the weather continues rather mild.

Lake Markets

PITTSBURGH

Another week has passed without there being a general resumption of work at the union coal mines, and restrictions upon coal consumption are increased. Pittsburgh is under the same restrictions as other districts, in the matter of consumption, but is particularly well fixed as to supplies, there being shipments from various non-union districts in western Pennsylvania, particularly the Connellsville region. The Pittsburgh district proper is altogether union and there is practically no mining. Domestic consumption is particularly well taken care of by reason of the supply of river coal, in process of accumulation for months before the strike.

Supplies from Non-union Districts. Steel Stocks Almost Exhausted.

Some of the steel works in the Pittsburgh and valley districts have been securing more or less coal from their operations in the Connellsville region, but this movement is now largely shut off by the fuel distribution authorities. For the main part the steel mills have been running on stocks since the inception of the strike, and these stocks are now very near the end, the prospect being that if there is not a general resumption at the union coal mines within a fortnight one-half or more of the steel industry will have to close.

On Dec. 2 the Fuel Admioistration decided that production of beehive coke should be restricted by 25 per cent., and the regulation is being put into operation for the Connellsville region by limitiog the supply of coal care. The region has been making about 230,000 net tons of coke a week, involving the consumption of about 350,000 tons of coal, so that about 90,000 tons of coal a week should be added to the coal shipments.

There are occasional transactions covering small lots of coal, but there is very little to he bought. We quote the market at Government prices, $2.35@2.50 for mine-run and 25c. higher for screened, per net ton, Pittsburgh district.

CLEVELAND

With less than the city's minimum coal requirements coming in, reserves are melting away and drastic curtailment has been ordered. It is estimated fully 200 plants in the Cleveland district proper are shut down or operating part time. Settlement of the strike in the Ohio fields is expected daily.

Bituminous—According to a report of the local fuel distribution committee, the situation in Cleveland is: City's normal daily consumption, 40,000 tons; normal daily consumption by the so-called essentials, 8,000 tons; present daily receipts, 2,000 to 2,500 tons; reserves at start of strike, 100,000 tons.

Although hopes are bright that within a few days—a week at the most—southern and eastern Ohio mines will again he operating, plans are being made for radical curtailment of fuel all around. Lighted outdoor advertising and theater signs are to become dark once more. Street car heating is to be reduced as far as possible. Non-essential industries getting electric power from central stations will likely be cut off, and some may have to cease operations voluntarily because of lack of coal to keep heating and sprinkler systems going.

Iron and steel plants in the Cleveland district, which have just attained an average production of 80 per cent., have been compelled to cut operations to 50 per cent. because of no fuel. Many plants at which strikers have just returned have been compelled to turn the workmen away. In some instances, particularly several large rubber companies at Akron, Ohio, boiler equipment has been switched over to burn oil as fuel.

Where southern and eastern Ohio mines normally produce 1500 tons and upward daily, they now are turning out about 35 cars a day. Railroads are confiscating a part of the meager portion of this 35-car production consigned to Cleveland, and in some instances Cleveland fuel has been reconsigned to Chicago. Hope for resumption of Ohio mines lays in the conference Governor J. M. Cox has called at Columbus. It is reported he has offered the miners a 25 per cent wage increase, and several operators have openly declared their willingness to pay it.

The strike has come to have a bad taste in the public's mouth. At the outset, sympathy was wholly with the operators and against the miners. Government interference, McAdoo's injection of profiteering charges and Garfield's failure to effect a settlement have cost the public's sympathy with the operators. It is felt that had the operators been left to make a settlement with the miners, peace would have come long since. So now the public is indifferent as to the settlement, just so long as one is made. This is sentiment expressed editorially and by leading producers and consumers here.

The few cars of bituminous coming into Cleveland are being rationed by the local fuel committee. Hospitals are operating on a 24-hour schedule, and other so-called essentials have not a great deal more on their stockpiles. The one "Gibralter" is the Cleveland Electric Illuminating Co., the largest public utility, which supplies from 150,000 to 160,000 kilowatts daily. It has close to 50,000 tons of bituminous in its stock pile. Retail dealers are not taking any orders for bituminous and have no prices. Domestic demand for bituminous, as well as anthracite and Pocahontas, has fallen off despite the freezing weather of the last two weeks, for domestic consumers are adequately supplied. Emergency needs are being met by $11 coke. Anthracite and Pocahontas prices remain unchanged, with receipts light.

Lake Trade—What is believed to be the last bituminous cargo of the season was loaded at Toledo, Ohio, Dec. 8 for Lake Michigan. Several cargoes for Lake Superior have been taken in the past week. Lake Erie docks have dumped an average of 350 cars a day, compared with 2500 cars a day in a normal November. Cargoes to Lake Michigan and Lake Superior in the last few days have been bringing $1.25 a ton, against the summer freight rate of 50c to Duluth and 47½c to Lake Michigan.

In November Duluth received 310,200 tons of bituminous against 1,076,000 in November, 1918. To Dec. 1, Duluth receipts of bituminous have been 6,855,900 net tons, against 9,541,900 tons of the same week the year previous.

CINCINNATI

Hills of bituminous fluctuate. Normal production looked forward to with improvement of labor situation. Consumers subject to drastic restrictions.

The local coal market was featured last week with a fluctuation in prices. In the early part of the week bituminous coal sold at $6.75 delivered, and by Saturday was

$7.25, but their sales were small. At the present time jobbers are filling orders only from regular customers and are taking on no new business. Rail receipts have almost stopped. The market is depending entirely upon the river for fuel. Condensed reports received on the coal market during the past week were as follows: New River district improving, Fairmont district 60 per cent. of the miners at work, Kanawha and Kentucky district not much improvement.

Some coal men say that if the West Virginia and Kentucky operators had had any amount of barges on hand when the coal strike was declared Cincinnati would not have suffered because coal could have been brought here from the nonunion mines by water. With the improvement in the labor situation at Fairmont, W. Va., coal men look for normal production next week. A score or more of manufacturing plants in this vicinity have closed down because of the lack of steam coal of which the local market is practically stripped and all available is being distributed to public utilities and essential industries.

Cars of coal on tracks here decreased from 500 to 200 during the past week with none coming in. Some improvement in routing cars to the Kentucky coal fields has been noticed. Prices on coal are believed to ease up somewhat because of the recent rumor that the government will set a fixed price on all coal. There is little or no smokeless coal to be had, owing to the heavy demands from eastern markets.

Passenger service on all railroads in and out of Cincinnati is to be reduced Dec. 9, from 12 to 25 per cent., as a coal conservation measure. Retail dealers have sent out a warning to domestic consumers to prepare themselves for far more drastic restrictions than they have thus far been subjected to. It became known last week after a careful survey of this district, comprising four states, that local industrial plants and dealers were better stocked with coal at the beginning of the strike than any other city in the country. No improvement in the coal situation is looked for here until the grievances between the operators and miners are thoroughly settled.

COLUMBUS

No change in the strike situation in Ohio has taken place. With the exception of a few small wagon mines and co-operative concerns, including stripping operations, no coal is being produced in the state. Efforts are being made by Governor Cox to secure a wage settlement in the state.

The fuel situation in central Ohio and in fact in all parts of the Buckeye State is approaching a crisis. Central Ohio was apparently the best supplied of any section in the Middle West for some time, and little concern was expressed by steam users. But the situation is steadily growing worse until many manufacturing plants face a shut-down unless something is done to increase the supply of coal. So far the local distributor, B. F. Nigh, has been able to supply practically all calls for fuel, but surplus stocks are being depleted and with little coming in from the outside, steps are now being taken to husband the supply.

Orders have been issued to discontinue the lighting of electric signs and to do away with all unnecessary store illumination. So far no steps have been taken to curtail the business hours in mercantile establishments, but that is looked for soon if relief does not appear. Retailers have been supplied in most cases but this done after investigation of the needs. Retail stocks are low but when it is shown that coal is needed to take care of the public it is forthcoming. Hospitals and schools are also supplied and public institutions have been taken care of. Some manufacturing concerns are running low on fuel, and these may be shut down at any time. The public service concerns are fairly well supplied in central Ohio, but in the northern part there is considerable inconvenience because of lack of fuel. Service is being crippled in many instances.

Governor Cox late last week called upon Ohio operators and miners to get together on a wage scale, and the whole of Dec. 5 was spent in conferences. First, the operators were called in and they told their side, and later the miners' officials were heard. There was no joint conference between the two sides. It was believed for a time that prospects for an agreement on a wage scale in Ohio were bright, but operators and jobbers cannot see the matter in that light. It is figured that in case the operators agree to give a certain advance, say 20 or 25 per cent., this must be ratified by the national officers of the United Mine Workers, and that would be unlikely. So the matter rests where it was before.

Prices of coal delivered have not changed materially recently. A large part of the coal sold by dealers was on previous orders and the usual prices are secured. Hocking lump sells from $6.00@6.50 and mine-run from the Hocking field at $5.25@5.75. Pomeroy lump is strong at $6.50. West Virginia splints are quoted at $7.50 for lump, and $6.75 for mine-run. Pocahontas is scarce and sells in the neighborhood of $8.50.

BUFFALO

Still waiting for the miners to go to work. Slowly, slowly disappearing. Not agreed as to the amount. Coal men have nothing to do. Anthracite moving well by lake, but soon to stop.

Bituminous—The supply is not what it was, of course, but the authorities do not agree very well as to how much is left. Oddly enough it is now reported that the nonunion miners, who remained at work pretty well at first, are not doing as much as they were. Somebody says that the country bank miners are having a fine trade and then a telegram is received which reports that the West Virginia strikers have been ordered back to work by their leaders.

All these things may be true and they may not. The shippers have nothing to do but sit about and discuss them. One man will express a positive opinion that the strike is about at an end and the next one will say that it will last till the union and the operators get together and form a new wage scale. Some have confidence in the Government and say that Garfield never gives up, and others are sure that the efforts by authority have come to nothing.

The consumers are becoming uneasy. This section hears that the scarcity is regarded more severe westward than it is here, and so the coal is all being sent past us and soon we shall have none. Coal starts for a consignee and instead of the car there comes a notice that it has been confiscated by the railroads. Canada is getting no coal at all, and is fortunate that so much was bought before the strike was ordered. For that precaution the consumers, there and also here, can thank the jobbers, as they were persistent in predicting strike and fairly ordering their customers to lay in all they had storage for.

What little coal is moving goes on at old prices, $4.45 for Allegheny Valley sizes, $4.80 for Pittsburgh and No. 8 lump, $4.65 for same three-quarter, $4.20 for mine run and $4.10 for all slack, with $4.60 for smokeless and $5.70 for Pennsylvania smithing, all per net ton, f. o. b. Buffalo.

Anthracite—The situation is about to change radically on account of this being the end of the lake season. Only a few cargoes will be loaded now and then, the supply will be turned into the city trade till that is satisfied, as it was last year. The consumers have remained pretty quiet lately, but they are getting impatient, and if the supply should continue small after the loading to the lakes ceased there would be a big howl.

All furnaces which can burn coal will have to give up their natural gas on the 15th, and that will make a big increase of coal consumption. Prices are so high that some are buying soft coal and small sizes to mix in, as the cost can be much reduced in that way. Quotations are as follows:

	On Cars Gross Ton	At Curb Net Ton
Grate	$8.55	$10.20
Egg	8.80	10.65
Stove	9.00	10.85
Chestnut	9.10	10.85
Pea	7.75	9.30
Buckwheat	5.70	7.75

The lake trade has been badly hampered for some time by bad storms on the upper lakes, but there has not been much disturbance here till last week, when the wind rose to 84 miles an hour, though the damage done was not as great as might have been expected. Shipments for the week were 93,255 net tons, of which 27,200 tons cleared for Milwaukee, 23,900 tons for Duluth and Superior, 17,000 tons for Fort William, 12,900 tons for Chicago, 7,000 tons for Waukegan and 5,255 tons for Ashland. All rates have been $1 lately, with some offers of $1.25.

The shipments for November were 570,700 tons as against 638,700 tons for the same month last season. For the season they were 4,276,518, as against 3,471,993 last season.

Coke

Buffalo—The demand is somewhat better, as the furnaces return to steady operation. The strikers are defiant and are reported to have made some violent threats lately, but the mills are all running on what is said to be full time. The spurt in iron ore receipts lately is now over, as the ore freezes in the upper lake pockets and cannot be loaded. Coke prices are still based on $9 for 72-hour Connellsville foundry, $8 for 48-hour furnace and $7 for off grades.

DETROIT

Though in no immediate peril of serious shortage of bituminous, Detroit's diminishing supply arouses apprehension.

Bituminous—Information has come to the Detroit Coal Exchange that the Railroad Administration is seizing a larger part of the coal consigned to Detroit than was done in the period immediately following the enforcement of government regulation. F. E. Reeves, secretary of the exchange was advised that on Dec. 1 only one car of coal for Detroit was waiting in Toledo, through which practically all of the city's bituminous supply is carried.

So far Detroit appears to have experienced little hardship from the bituminous miners' strike. The volume of shipments has been greatly reduced, but the supply has not been shut off and the coal received has served to make provision for consumers who are dependent on continuance of a more or less regular movement. With this assistance and the reserves established by many of the large consumers during the summer months, there apparently has been enough coal to meet the requirements of all classs of consumers.

Ewald Sheiwe, president of the Detroit Coal Exchange, who has supervision of distribution under the Regional Committee, estimates that there is enough coal to take care of the needs of factory and household consumers for approximately a month, which places Detroit in a more favorable position than many of the other western cities. Just what results will follow the enforcement of the government restrictions on delivery to the first five classes in the priority list is yet to develop.

Anthracite—Falling temperatures during the week have created a more urgent demand from household consumers for the prepared sizes of anthracite. Retail dealers' stocks are very low, and their attempts to obtain additional supplies are not meeting with as prompt a response as would be desirable. Complaints are made about delay in filling orders and about slow movement of shipments after coal is loaded on the cars.

Lake Trade—From the present outlook no coal for lake shipment will be loaded after the end of the present week. Loading during the week was limited to a few cargoes of anthracite for delivery at the American and Canadian head of the lakes and about a half dozen cargoes of bituminous for Lake Michigan ports to help out the winter fuel supply of the northwestern railroads.

TORONTO

Coal situation very serious. No bituminous for industries until hospitals and public utilities are supplied. Many factories likely to close down.—Anthracite supply adequate for present demand.

The coal situation is very serious, and unless relief is obtained shortly many industrial plants will have to suspend operations. H. A. Harrington, Provincial Fuel Administrator, states that the needs of the hospitals and public utilities will be first supplied, and no bituminous will be delivered to industrials until they have been provided for.

Stocks at the hospitals are nearly exhausted. There is plenty of anthracite on hand and coming forward for present demands. Some of the manufacturers are burning steam sizes of hard coal. Some bituminous is being brought in from outside points of Ontario and is selling at an average of about $15 per ton delivered, but the supply from this source will be very shortly exhausted.

LOUISVILLE

Small mines throughout Kentucky fields reported to start operations. Some sections doing very little, and production light. Retailers out of coal.

The situation so far as production is concerned is more promising than it has been. Reports from various sections of the state indicate larger and better operations. The Straight Creek field in southeastern Ken-

tucky is going back fast, and operations in Knox County are improving. Hazard County is operating as near to full as car supply will permit. Mines in northeastern Kentucky are reporting operations. Harlan County shows a few commercial mines in operation, but the only two plants of any size that are working in that field are the mines of the Wisconsin Steel and United States Coal companies.

It is claimed that the Southern Appalachian Field is the strongest organized field south of the Ohio River. Secretary McCoy, of the organization at Knoxville, has disputed statements of labor leaders, relative to the number of men who have returned to work.

Secretary Herd, of the Hazard Operators' Association, claims that car shortage if holding down operations in the Hazard field, where labor troubles have not interfered materially.

Announcement was made at Middlesboro, Kentucky, on Dec. 2, to the effect that thirty-five local miners' unions, of District 19, had signed up under the fourteen per cent. agreement, and that a total of 1500 had returned to wok. The contracts have the endorsement of S. A. Keller, of Middlesboro, president of the District. Mr. Keller has gone to the Jellico fields, and stated that he figured that the miners in that section would agree to the new temporary agreement if the operators would agree to temporary agreements to be followed by a joint conference when the strike is settled in the Central competitive field. He believed that he could insure 100 per cent. of the men at work by the end of the week.

Western Kentucky and southern Indiana miners are reported to be going back fast, but production is not increasing as fast as reports would indicate.

Starting Monday industrial plants in Louisville went on a forty-eight hour per week basis, and all theaters, business houses, office buildings, stores, etc., were regulated, under orders of the Southern Committee at Atlanta.

Retailers of Louisville report that their etocks are very low, and that they are getting practically no coal, as the railroads are very slow in making releases. Mild weather has held down retail demand, but threatened colder weather may bring some heavy demand and actual suffeffring.

BIRMINGHAM

Increase in coal production.. Retail docks are low. Mine workers rescue operations. New fuel order will increase supply for distribution.

Coal production in Alabama for the week anding Nov. 29 reached the highest figure for any like period in 1919, with the exception of the three last weeks in October, when extraordinary efforts were being exerted to accumulate coal on account of the approaching strike. Statistics showing that 291,874 tons of coal were mined during the last week in November, which was an increase of about 20,000 tons over the previous week. However, unless government restrictions are lifted shortly non-essential fuel consumers in Alabama territory will suffer a coal shortage along with those in other sections of the country, war-time restrictions being in effect and much is being diverted to western and southwestern territory not normally supplied from this district. Coal produced in the Walker County field and from other mines adjacent to the Frisco not confiscated by that line is liverted to western territory.

The order of the fuel administration cutting the use of coking coal by furnace companies 50 per cent. will add greatly to the tonnage made available for distribution to the preferred classes, as several of the largest furnace producers have not taken on any commercial business in several years.

Retail yards are beginning to run low on stocks, and very little coal is being received locally to replenish the supply of domestic grades. Wagon mines around Birmingham and in other parts of the district are helping out the situation to some extent, and much coal is being handled by trucks for both domestic and steam use.

The working forces at the mines have been stimulated considerably as a result of the increase of 14 per cent. in wages made effective Dec. 1, and with the exception of a number of small mines in the Cahaba field, which remain idle account of miners refnsing to take up their work, all other operations are working, some few with forces somewhat under normal.

Coke

CONNELLSVILLE

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Nov. 29 at 237,455 tons, an increase of 6151 tons. Wage advance of 14 per cent. Wild market in spot coke owing to order restricting production. Contracting largely concluded.

Effective Monday, Dec. 1, the Connellsville region advanced wages all around by 14 per cent., this covering mine labor and oven labor equally. The region has always been nonunion, but there has been much restlessness and it was regarded as important to post notices advancing wages as soon as it was decreed at Washington that the union bituminous scale for the central competitive district should be advanced. The wage advance adds nearly 50c to the cost of producing a ton of coke.

There has been an absolutely wild market in spot coke since the decision at Washington of Dec. 2, that beehive coke production should be restricted by 25 per cent. Furnaces not usually tributary to the region have been buying for some time, through their usual sources of supply which were shut off, while many furnaces having contracts for Connellsville coke tried to buy spot lots as a reserve against their contract shipments being curtailed.

The market a week ago was quotable at $6.25 for spot furnace. Tuesday of this week it became $8, with $8.50 the next day and $10 the day following. Foundry coke has sold at about the same prices. The total turnover has been small and there is no regularly quotable market. The 25 per cent. restriction in output is about to be put into effect, through the medium of the car supply. Some operations will have to erect temporary trestles for loading coal.

More than half the furnace coke contracting for the first half or all of 1920 has been done. Early contracts, six weeks or more age, were at $5, after which $5.50 was done, and finally two or three weeks ago $6. Then ratio contracts were turned to and a great deal of business has been put through at 5½ to 1, based on basic pig iron at valley furnaces. A few contracts have been made at 5 to 1. At the present market, $33, the contracts would invoice coke at $6.60 and $6 respectively.

Middle West

MILWAUKEE

Coal still arriving by lake, but stocks are being drawn upon heavily by the Fuel Administration. Strict economy urged.

Coal men are having another taste of wartime restrictions, with the accompanying public hysteria. Dockmen and government representatives have agreed upon rules which will result in minimum coal consumption by manufacturers as well as in private homes. Distribution will be restricted so that the supply of fuel may reach as wide a range as possible. Cargoes are still arriving by lake and more are booked to come. Train loads are going to the interior daily, however, and the huge coal piles on the docks are beginning to show the effects of the drain. November receipts fell behind the record of yast year, the aggregate being 127,007 tons of anthracite and 176,77 tons of soft coal. December is also bound to show a decrease as against the eame month of last year.

ST. LOUIS

Coal shortage acute here now. A little smokeless, Kentucky and Alabama coal coming in. Gas coke supply about exhausted. Byproduct will last about ten days longer. No mines working.

The local situation is beginning to become an acute proposition now. All of the Illinois coal that was held in Missouri is gone, but there is some smokeless mine-run coming in from West Virginia, some good coal from eastern Kentucky, and also from Alabama, but most of it is in mine-run form and is retailing at from $8.00@10.00 a ton.

Steam plants are using oil, and a few are putting in gas under their boilers. Perhaps as high aa 15 to 20 per cent. of the industrial plants in St. Louis are now using oil. Other plants are being rapidly fitted up for oil, and in the meantime are getting along on coke and wood. The burning of oil is considerably higher than the cost of coal.

The supply of gas coke is about exhausted, and it is estimated that the byproduct coke, at the rate it is being loaded out now, will last about ten days. Practically no gas coke is being shipped out of town, and only a limited quantity of the byproduct, and then in emergency cases.

The conservation measures in St. Louis are a farce, as they are not systematically outlined and are too vague to be taken or considered seriously.

All the nonessentials had ample time to load up with coal, while the essentials could not get any and now there is no coal for anyone. It was failure to properly distribute the coal in the beginning that has caused the eitnation in St. Louis to be as acute ae it is.

In the country districts in some places the situation is serions beyond description where light plants and public utility plants have been obliged to shut down, and only by the cutting of green wood have the water works been able to keep going, and this applies also to several public institutions.

In the western part of the state, as well as in the central part of Missouri, the local strip mines are being taken over by the state and being worked. At Moberly and one or two other places the mines are working because the operators gave the miners thirty-one per cent. increase, but the tonnage produced is so small as not to be considered a factor in the local situation.

There are no mines in Illinois working and no chance of any going to work, judging from conditions at present. There are no restrictions on prices and there is considerable profiteering on the part of the retailer, who is forced to do it because the railroads charge him for coal about twice as much as they should. The railroads are also charging 15 cents for rebilling charges, etc., in spite of the fact that Director General Hines said there is no authority for this charge. The whole situation as far as the Middle West is concerned has been badly managed from the very beginning, and in St. Louis in particular.

Recent Coal and Coke Patents

Coal mining chute. A. Malinowsky, Throop, Penn., 1,306,704. June 17, 1919. Filed Sept. 12, 1918. Serial No. 253,749.

Segmental grate bars. C. R. Waid, Birmingham, Ala., 1,306,729. June 17, 1919. Filed Aug. 16, 1918. Serial No. 250,210.

Mining machine. F. L. O. Wadsworth assignor to Jeffrey Mfg. Co., Columbus, O., 1,304,829. May 27, 1919. Filed Feb. 19, 1912. Serial No. 678,567.

Miner's cap. M. J. Gibbons, Shenandoah, Penn., 1,305,895. June 3, 1919. Filed Dec. 6, 1918. Serial No. 265,584.

Furnace stoker. T. A. Marsh assignor to Green Engineering Co., East Chicago, Ind., 1,305,482. June 3, 1919. Filed Feb. 16, 1917 Serial No. 148,926.

Coal cleaning apparatus. W. J. Patterson and R. M. Bickley, assignors to Heyl and Patterson, Pittsburgh, Penn. 1,312,867 August 5, 1919. Filed March 5, 1919. Serial No. 280,854.

Mine working machine. N. A. Newdick, Columbus, Ohio. 1,308,137. July 1 1919. Filed Jan. 24, 1916. Serial No. 73,814.

Briquet machine. S. E. Moren, Buvahlk, Minn., 1,306,309. June 10, 1919. Filed Oct. 10, 1918. Serial No. 257,606.

TO TAKE FURTHER STEPS TO SAVE BUNKER COAL

Further conservation of bunker fuel is planned by the Central Coal Distribnting Committee by putting into effect new restrictions on the distribution of bunker coal. Ruling has been made by the Committee that all merchant vessels, engaged in the trans-Atlantic service, and not sailing on a regular schedule, must obtain their bunker supplies by individual licenses to be issued by the port committee at the various American ports.

The committee's ruling, it was announced, does not affect shipping engaged in the coastwise service, nor vessels plying the trans-Atlantic trade routes on a regular schedule.

CURRENT PRICES—MATERIALS & SUPPLIES

IRON AND STEEL

PIG IRON—Quotations compiled by the Matthew Addy Company as per Department of Commerce Committee Schedule.

	Current	One Month Ago
CINCINNATI		
No. 2 Southern	$34 60	$32 60
Northern Basic	34 00	31 05
Southern Ohio No. 2	36.55	31.55
NEW YORK, Tidewater delivery		
2X Virginia (silicon 2.25 to 2.75)	39 40	35.65
Southern No. 2 (silicon 2.25 to 2.75)	41.40	36.50
BIRMINGHAM		
No. 2 Foundry	33.00	30.00
PHILADELPHIA		
Eastern Pa.	38 10*	33.00*
Virginia No. 2	39 10*	34 40*
Basic	34 60*	29.00†
Grey Forge	34.60*	29.40*
CHICAGO		
No. 2 Foundry Local	36.25	31 40
No. 2 Foundry Southern	34 60	29 40
PITTSBURGH, including freight charge from the Valley		
No. 2 Foundry Valley		32.40
Basic	34 40	28.40
Bessemer	35.40	29 35

* F. o. b. furnace. † Delivered.

STRUCTURAL MATERIAL—The following are the base prices, f o b. mill, Pittsburgh, together with the quotations per 100 lb. from warehouses at the places named:

	Mill Pittsburgh	New York Current	New York One Year Ago	St. Louis	Chicago
Beams, 3 to 15 in.	$2 45	$3 47	$4 27	$3 54	$3 47
Channels, 3 to 15 in.	2 45	3 47	4 27	3 54	3 47
Angles, 3 to 6 in., ¼ in. thick.	2 45	3 47	4 27	3 54	3 47
Tees, 3 in. and larger	2 45	3 47	4 27	3 54	3 47
Plates	2 65	3.67	4 52	3 54	3.67

BAR IRON—Prices in cents per pound at cities named are as follows:

Pittsburgh	Cincinnati	St. Louis	Denver	Birmingham
2.75	3.25	3.44	4.30	3 25

NAILS—Prices per keg from warehouse in cities named:

	Mill Pittsburgh	St. Louis	Denver	Chicago	Birmingham	San Francisco	Dallas
Wire	$3 25	$3 90	$4 90	$3 90	$4 50	$5 25	$5 00
Cut	4 925	5.40	5.61	5.50	.	6.65	6.40

TRACK SUPPLIES—The following prices are base per 100 lb. f o.b. Pittsburgh for carload lots, together with the warehouse prices at the places named:

	Pittsburgh	Chicago	St. Louis	San Francisco	Birmingham	Denver
Standard railroad spikes ⅝-in. and larger	$3.35	$4 27	$4 44	$5 65	$4 50	$5.05
Track bolts	4 35	5 17	Prem. 6 65	6.00	6.05	
Standard section angle bars	2.75	2 75	Prem. 4 60	....	4 40	

COLD FINISHED STEEL—Warehouse prices are as follows:

	New York	Chicago	Cleveland	St. Louis
Round shafting or screw stock, per 100 lb. base	$5.00	$4.90	$4.75	$5.00
Flats, squares and hexagons, per 100 lb. base	5.50	5.40	.....	5.50

HORSE AND MULE SHOES—Warehouse prices per 100 lb. in cities named:

	Mill Pittsburgh	Cincinnati	Chicago	St. Louis	Denver	Birmingham
Straight	$5.75	$7 50	$6 50	$7 00	$8.15	$7 00
Assorted	5 85	7.50	6 50-7.00	7 25	8.40	7.25

Cincinnati—Horseshoe nails sell for $4.50 to $5 per 25-lb. box.

CAST-IRON PIPE—The following are prices per net ton for carload lots:

	New York Current	New York One Month Ago	New York One Year Ago	Chicago	St. Louis	San Francisco	Dallas
4 in.	$61.30	$57 30	$70 70	$62.80	$61.00	$82 55	$70.30
6 in. and over	58.30	54 30	67 70	59.80	58.00	79.55	67.30

Gas pipe and 16-ft. lengths are $1 per ton extra.

STEEL RAILS—The following quotations are per ton f o.b. Pittsburgh and Chicago for carload or larger lots. For less than carload lots 5c. per 100 lb. is charged extra:

	Pittsburgh Current	Pittsburgh One Year Ago	Chicago Current	Chicago One Year Ago
Standard Bessemer rails	$45.00	$55 00	$45.00	$65 00
Standard open hearth rails	47.00	57 60	47.00	67.00
Light rails, 8 to 10 lb.	2 58‡*	3.13*	2 585*	3 13½*
Light rails, 12 to 14 lb.	2 54*	3.09*	2 54*	3.09*
Light rails, 25 to 45 lb.	2 45*	3.00*	2 45*	3 00*

* Per 100 lb.

OLD MATERIAL—The prices following are per gross ton paid to dealers and producers in New York. In Chicago and St. Louis the quotations are per net ton and cover delivery at the buyer's works, including freight transfer charges:

	New York	Chicago	St. Louis
No. 1 railroad wrought	$24.00	$23 00	$25 00
Stove plate	17.50	24 00	26.50
No. 1 machinery cast	25.50	29.75	30.00
Machine shop turnings	12.00	10 85	15 50
Cast borings	14 00	11 85	15.00
Railroad malleable cast	16.50	24.00	25.00

COAL BIT STEEL—Warehouse price per pound is as follows:

New York	Cincinnati	Birmingham	St. Louis	Denver
$0.12	$0.16½	$0.18	$0.11	$0 18½

DRILL STEEL—Warehouse price per pound:

	New York	St. Louis	Birmingham	Denve
Solid	14c.	13c.	15c.	15c.
Hollow	18c.	....	....	22c.

PIPE—The following discounts are for carload lots f.o.b. Pittsburgh; basing card of Jan. 1, 1919 for steel pipe and for iron pipe:

BUTT WELD

Inches	Steel Black	Steel Galvanized	Inches	Iron Black	Iron Galvanized
⅛, ¼ and ⅜	50%	24%	½ to 1½	30½%	23½%
½	54½%	40%			
¾ to 3	57½%	44%			

LAP WELD

2	50½%	35%	2	32½%	18½%
2½ to 6	53½%	41%	2½ to 4	34½%	21½%

BUTT WELD, EXTRA STRONG PLAIN ENDS

⅛, ¼ and ⅜	46½%	29%	½ to 1½	39½%	24½%
½	51½%	39%			
¾ to 1½	55½%	43%			

LAP WELD, EXTRA STRONG PLAIN ENDS

2	48½%	37%	2	33½%	20½%
2½ to 4	51½%	40%	2½ to 4	35½%	23½%
4½ to 6	50½%	39%	4½ to 6	34½%	22½%

Stocks discounts in cities named are as follows:

	New York Black	New York Galvanized	Cleveland Black	Cleveland Galvanized	Chicago Black	Chicago Galvanized
⅜ to 3 in. steel butt welded	47%	31%	43½%	34½%	57½%	44%
3½ to 3 in. steel lap welded	42%	27%	45½%	30½%	53½%	41%

Malleable fittings. Class B and C, from New York stock sell at list + 12½%. Cast iron, standard sizes, 10% off.

WIRE ROPE—Discounts from list price on regular grades of bright and galvanized are as follows:

	New York and St. Louis
Galvanized iron rigging	+12½%
Galvanized cast steel rigging	7½%
Bright plain rigging	35%
Bright cast steel	22½%
Bright iron and iron tiller	5%

STEEL SHEETS—The prices in cents per pound from jobbers' warehouse at the cities named:

	Pittsburgh, Mill in Carloads	New York Current	New York One Month Ago	New York One Year Ago	Cleveland Current	Chicago Current
*No. 28 black	4 35	5.50	5 62	6.495	5.27	5 62
*No. 26 black	4 25	5.40	5 52	6.395	5 17	5 52
*Nos. 22 and 24 black	4 20	5 35	5.47	6 345	5.12	5 47
Nos. 18 and 20 black	4 15	5 30	5.42	6.295	5.07	5 42
No. 16 blue annealed	3 75	4 77	4 77	5.695	4 67	4 77
No. 14 blue annealed	3 65	4 67	4 67	5.595	4 57	4 67
No. 10 blue annealed	3 55	4 57	4.57	5.495	4.47	4 57
*No. 28 galvanized	5 70	6.75	7 42	7.745	6.62	6 97
*No. 26 galvanized	5 40	6.45	7.12	7.445	6.32	6 67
No. 24 galvanized	5.25	6.30	6.97	7.295	6.17	6.52

* For painted corrugated sheets add 30c. per 100 lb. for 25 to 28 gages; 25c. for 19 to 24 gages; for galvanized corrugated sheets add 15c., all gages.

SHOP SUPPLIES

NUTS—From warehouse at the places named, on fair size orders, the following amount is deducted from list:

	New York Current	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago	St. Louis Current
Hot pressed square	$1.50	$2.25	$1 40	$1.85	$2 00	$2.25
Hot pressed hexagon	1 50	2 25	1.20	1.85	2.00	2.25
Cold punched square	1 50	2 25	.75	1.30	1 30	2.25
Cold punched hexagon	1 50	2 25	.75	1.30	1.30	2.25

CHARLES E. GOLDEN,
President and General Manager.

Worth Many Times Their Cost

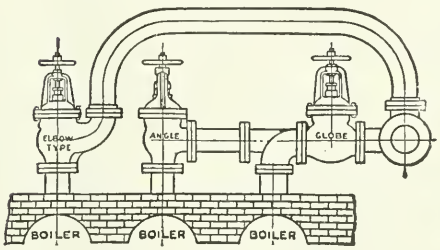
Golden-Anderson Life & Property Insurance Valves

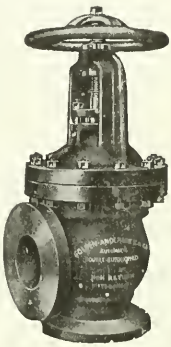
Most boiler accidents happen at times when you can least afford them. Isn't it true?

Any safety device that certainly minimizes your chances of a serious disaster—plant shut-down, or liability due to loss of life—is worth its cost to you many times over.

The Golden-Anderson Life and Property Insurance Valve not only insures you against accidents "when you can least afford them," it insures you against property damage and loss of life, due to a steam pipe or boiler tube break, *at all times.*

1. The only valves which can be tested at any minute while in service.
2. Prevents flow of steam from other boilers to one in which a tube has ruptured.
3. Cut off all boilers when steam main burst.
4. Pressure equalized between boilers automatically.
5. No live steam can enter cold boiler—thus protecting workmen.
6. Fitted with Double Corliss Dash Pot, preventing pounding, chattering and spinning.
7. 1700 in use in U. S. Steel Corp.

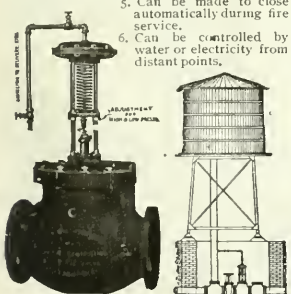




GOLDEN-ANDERSON

Automatic Cushioned Controlling Altitude Valves

1. Eliminate loss of water in reservoirs, standpipes, tanks, etc., by keeping the level constant.
2. Operate without floats or fixtures.
3. Uninterrupted service and a positive water supply assured without danger of water hammer surges or burst mains.
4. No metal to metal seating. Positively cushioned by water and by air.
5. Can be made to close automatically during fire service.
6. Can be controlled by water or electricity from distant points.

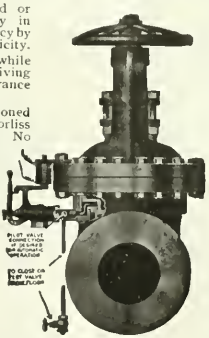


Sizes to 24 in.

GOLDEN-ANDERSON

Double Cushioned Quick Closing Emergency Trip Valves Provide Against Runaway Engines and Disastrous Accidents

1. Give perfect automatic control of the steam or air flow in any pipe line from one or more distant points.
2. Can be opened or closed instantly in case of emergency by steam or electricity.
3. May be tested while in service giving complete assurance of safety.
4. Positively cushioned by double Corliss Dash Pot. No banging, sticking or chattering.
5. Contain no springs or tight fitting parts.
6. Can be adapted for automatic closure in case steam pipe bursts.
7. Double extra heavy and virtually indestructible.

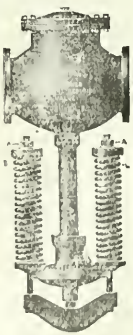


GOLDEN-ANDERSON

Automatic Cushioned Steam Pressure Reducing Valves

Extra Heavy "For High or Low Pressure Service"

1. Automatically keeps the reduced pressure perfectly constant even if the boiler pressure fluctuates.
2. Once adjusted it stays adjusted.
3. Thoroughly cushioned and guided. No pounding, jamming or chattering.
4. A patent safety piston absolutely prevents high pressure steam from penetrating into the low pressure side in case of a broken diaphragm.
5. Double extra heavy and practically indestructible and foolproof.



"Hosts of References"

"Every Valve With an Absolute Guarantee."

GOLDEN-ANDERSON VALVE SPECIALTY COMPANY

1213 FULTON BUILDING, PITTSBURGH, PA.

Semi-finished nuts sell at the following discounts from list price:

	Current	One Year Ago
New York	50—10%	50%
Chicago	50%	50%
Cleveland	60–10%	50%
St. Louis	45%	....

MACHINE BOLTS—Warehouse discounts in the following cities:

	New York	Cleveland	Chicago	St. Louis
¾ by 4 in. and smaller	40%	50%	35–5%	50–5%
Larger and longer up to 1 in. by 30 in.	30%	40%	25–5%	40–5%

WASHERS—From warehouses at the places named the following amount is deducted from list price:

For wrought-iron washers:
New York..... $1 25 Cleveland..... $3 75 Chicago..... $3.00

For cast-iron washers the base price per 100 lb. is as follows:
New York..... $7 00 Cleveland..... $3 75 Chicago..... $4 25

RIVETS—The following quotations are allowed for fair sized orders from warehouse:

	New York	Cleveland	Chicago
Steel ½ and smaller	50%	55% off	50%
Tinned	50%	55% off	50%

Boiler, ¾, ⅞, 1 in. diameter by 2 in. to 5 in. sell as follows per 100 lb.:
New York..$5.00 base Cleveland..$4.00 Chicago..$4.87 Pittsburgh..$4.72

Structural, same sizes:
New York $5 10 Cleveland $4 10 Chicago. $4 97 Pittsburgh. $4 82

CONSTRUCTION MATERIALS

LINSEED OIL—These prices are per gallon:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Raw, 5-bbl. lots	$1 80	$1 59	$2.05	$2 10	$2.09	$1 90
5-gal. cans	1 93	1 84	2 25	2 25	2.34	2.00

WHITE AND RED LEAD—Base price.

	Red Current Dry	Red Current In Oil	Red 1 Year Ago Dry	Red 1 Year Ago In Oil	White Current Dry and In Oil	White 1 Year Ago Dry and In Oil
100-lb. keg	14 00	16 10	14 00	14 50	14.00	14.00
25 and 50-lb. kegs	14 25	15 75	14 25	12 75	14 25	14 25
12½-lb. keg	14.50	16.00	14 50	15 00	14.50	14 50
5-lb. cans	16 00	17.50	.....	.....	16.00	16 00
1-lb. cans	17 00	18.50	.....	.....	17.00	17.00

500 lb. lots less 10% discount. 2000 lb. lots less 10–2½% discount.

COMMON BRICK—The prices per 1000 in cargo or carload lots are as follows:

Chicago	$12 00	Birmingham	$15 00
St. Louis, salmon	15.00	Denver (hard red)	14 00
Cincinnati	17.00		

PREPARED ROOFINGS—Standard grade rubbered surface, complete with nails and cement, costs per square as follows in New York, St. Louis, Chicago and San Francisco.

	1-Ply C.l.	1-Ply L.c.l.	2-Ply C.l.	2-Ply L.c.l.	3-Ply C.l.	3-Ply L.c.l.
No. 1 grade	$1 50	$1 75	$1 90	$2 15	$2 30	$2 55
No. 2 grade	1 35	1 60	1 70	1 95	2 05	2.30

Asbestos asphalt saturated felt (14 lb. per square) costs $5 00 per 100 lb.

Slate-surfaced roofing (red and green) in rolls of 108 sq.ft. costs $2.25 per roll in carload lots and $2 50 for smaller quantities.

Shingles, red and green slate finish cost $6.00 per square in carloads, $6.25 in smaller quantities, in Philadelphia.

ROOFING MATERIAL—Prices per ton f. o. b. New York and Chicago:

	Carload Lots N. Y.	Carload Lots Chicago	Less Than Carload Lots N. Y.	Less Than Carload Lots Chicago
Tar felt (14 lb. per square of 100 sq.ft.)	$70 00	$70 00	$71 00	$71 00
Tar pitch (in 400-lb. bbl.)	21 00	18 00	22 00	19 00
Asphalt pitch (in barrels)	34 00	34 00	37.50	37.50
Asphalt felt	68.00	68.00	72.50	72.50

HOLLOW TILE—Price per block in carload lots for hollow building tile:

	4x12x12	8x12x12	12x12x12
St. Paul	$0 087	$0 135	$0.185
St. Louis	.10	.18½	.31
Seattle	.09	.175	.30
Los Angeles*	.082	.154	.236
New Orleans	.165	.22	.325
Pittsburgh	.065	.115	.....
Chicago	.08	.144	.....
Denver	.125	.18	.25
Cincinnati	.08705	.1623	.2416

*F. o. b. factory, 4, 8 and 10 inch.

LUMBER—Price of pine per M in carload lots:

	1-In. Rough 10 In. x 16 Ft.	2-In. T. and G. 10 In. x 16 Ft.	8 x 8 In. x 20 Ft.
St. Louis	$49.00	$45.00	$41.00
Birmingham	40.00	48.00	43.00
Denver	43.25	35.00	43.00
Cincinnati	50.00	50.00	50.00

EXPLOSIVES—Price per pound of dynamite in small lots and price per 25-lb. keg for black powder:

	Low Freezing 20%		Gelatin 40%	Gelatin 60%	Gelatin 80%	Black Powder
New York	.....		$0.27½	$0.30	.....	$2.40
Boston	$0.22½		.24½	.26½	$0.31	2.20
Kansas City	.18½		.22½	.25½	.29	2.45
New Orleans	.23½	(50%)	.22½	.24½	.....	.....
Seattle	.13½		.18	.20½	.24½	1.70
Chicago	.18½		.20½	.25	.29½	2.15
St. Paul	.18½		.22½	.25½	.....	2 25
St. Louis	.18½		.22½	.23½	.29½	1.80
Denver	.17½		.21½	.24	.28½	2 25
Los Angeles	.25		.30	.35	.27½	3 00

MISCELLANEOUS

GREASES—Prices are as follows in the following cities in cents per pound for barrel lots:

	Cincinnati	St. Louis	Birmingham	Denver
Cup	7–8	3 6 3 7	8½	13½
Fiber or sponge	7	7 2	9	18
Transmission	9–10	13	8½	15
Axle	5	4½	4½	5½
Gear	5	6½	8½	8
Car journal	5	4 7	4½	15¾

BABBITT METAL—Warehouse prices in cents per pound:

	New York Current	New York One Year Ago	Cleveland Current	Cleveland One Year Ago	Chicago Current	Chicago One Year Ago
Best grade	90.00	90.00	80.00	80 00	75.00	75.00
Commercial	50.00	45.00	18 50	23 00	15.00	75.00

HOSE—Following are prices of various classes of hose:

	Fire 50-Ft. Lengths
Underwriters' 2½-in.	75c. per ft.
Common, 2½-in.	35%

	Air First Grade	Air Second Grade	Air Third Grade
¾-in. per ft	$0.55	$0.40	$0.25

Steam—Discounts from list

First grade	30%	Second grade	40% Third grade 40%

LEATHER BELTING—Present discounts from list in cities named:

	Medium Grade	Heavy Grade
St. Louis	30%	35%
Denver	10%	5%
Birmingham	30%	35%
Chicago	45%	35%
Cincinnati	25%	20%

RAWHIDE LACING—20% for cut; 45c. per sq.ft. for ordinary.

PACKING—Prices per pound:

Rubber and duck for low-pressure steam	$0.90
Asbestos for high-pressure steam	1.50
Duck and rubber for piston packing	1.00
Flax, regular	1.20
Flax, waterproofed	1.60
Compressed asbestos sheet	.90
Wire insertion asbestos sheet	1.10
Rubber sheet	.50
Rubber sheet, wire insertion	.70
Rubber sheet, duck insertion	.50
Rubber sheet, cloth insertion	.30
Asbestos packing, twisted or braided, and graphited, for valve stems and stuffing boxes	1.20
Asbestos wick, ½- and 1-lb. balls	.85

MANILA ROPE—For rope smaller than ½-in. the price is ½ to 2c. extra; while for quantities amounting to less than 600 ft. there is an extra charge of 1c. The number of feet per pound for the various sizes is as follows: ¼-in., 8 ft.; ⅜-in., 6; ½-in., 4½; 1 in., 3½; 1¼-in., 2 ft. 10 in.; 1½-in., 2 ft. 4 in. Following is price per pound for ¼-in. and larger, in 1200-ft. coils:

Boston	$0 27½	Atlanta	$0.29½
New York	.27	Denver	.27½
St. Louis	.24½	Kansas City	.26½
Chicago	.26½	New Orleans	.25½
St. Paul	.26	Seattle	.25
San Francisco	.24	Los Angeles	.28

PIPE AND BOILER COVERING—Below are discounts and part of standard lists:

PIPE COVERING Pipe Size	Standard List Per Lin.Ft.	BLOCKS AND SHEETS Thickness	Price per Sq.Ft.
1-in.	$0.27	½-in.	$0 27
2-in.	.36	1 -in.	.30
3-in.	.45	1½-in.	.45
4-in.	.60	2 -in.	.60
6-in.	.90	2½-in.	.75
8-in.	1.10	3 -in.	.90
10-in.	1.30	3½-in.	1.05
85% magnesia high pressure			List
For low-pressure heating and return lines			4-ply.... 58% off 3-ply.... 60% off 2-ply.... 62% off

WIRING SUPPLIES—New York prices for tape and solder are as follows:

Friction tape, ½-lb. rolls	48c. per lb.
Rubber tape, ½-lb. rolls	60c. per lb.
Wire solder, 50-lb. spools	46c. per lb.
Soldering paste, 2-oz. cans	$1.20 per doz.

COPPER WIRE—Prices per 1000 ft. for rubber-covered wire in following cities:

	Denver Single Braid	Denver Double Braid	Denver Duplex	Birmingham Single Braid	
14	$14 50	$17 50	$35 00	$ 12 50	Solid
10	23 25	29 25	58 75	25.10	"
8	31.05	38 30	77 95	34 75	"
6	50.60	52 65	.....	57.50	"
4	73 00	75.32	.....	81.65	"
2	110.00	112 45	.....	140 20	Stranded
1	143 90	146 15	.....	190.90	"
0	181.25	181 25	.....	231 33	"
00	.....	.....	.....	281 83	"
000	.....	.....	.....	343 22	"
0000	.....	.....	.....	416.80	

Pittsburg—23c. base; discount 50%; St. Louis—30c. base.

FREIGHT RATES—On finished steel products in the Pittsburgh district including plates, structural shapes, merchant steel, bars, pipe fittings, plain and galvanized wire nails, rivets, spikes, bolts, flat sheets (except planished), chains, etc. the following freight rates per 1000 lb. are effective:

Boston	$0.30	New Orleans	$0.38½
Buffalo	.17	New York	.27
Chicago	.27	Philadelphia	.24½
Cincinnati	.23	St. Louis	.24
Cleveland	.17	St. Paul	.49½
Denver	.99	Pacific Coast (all rail)	1.25
Kansas City	.59		

Note—Add 3% transportation tax. Minimum carload, 80,000 lb.

COAL AGE

Volume 16 New York, December 25, 1919 Number 23

An Appeal to Reason

By R. Dawson Hall

AT perhaps no time in the history of the United States has good fortune been so bright as in the opening days of 1920. Everybody is busy except the copper miners and farmers, and most people have received increases fully meeting the increased cost of living. The exceptions are wholly in the salaried classes and those whose incomes are based on bonds, preferred stock insurance, compensation and mortgages, which have not increased with increasing living costs.

At no Christmas season have expenditures been greater than in that which is just past. Never have there been fewer persons in need of pecuniary assistance. The bread lines no longer exist. Where at the Bowery Mission there was usually a long and dolefull procession—of inebriates be it noted—the line has dwindled till on one night recently there was but one hapless man asking for shelter and a free meal.

Much of our unrest is not the outcome of need, but of desire and of a sense of irresponsibility fostered by good times and by the assurance that a living can be secured whether the individual works and saves or idles much of the time and saves not at all.

When the road is good beneath and the highway ahead is clear, the automobilist is disposed to "joy ride"; the effect of prosperity on the working man is quite similar. His strikes are "joy rides", born of the certainty that comes from national prosperity. Sure of his job, or of another job as good, he wagers his present opportunity for another that is better.

The recent strike of the mine workers was a protest against the conditions existing when business lagged in the early spring. He could not strike then. His margin was too low; the future was too uncertain. But with certainity ahead of him and with a comfortable present, he struck, feeling that he was secure against any immediate want.

No one is disposed to deny the right of labor to profiteer—to accept a better paying job when it presents itself in his line of work or in another. The mine worker who becomes a national baseball figure and who comands a salary in the tens of thousands of dollars is not condemned but applauded. If Charlie Chaplin and Mary Pickford are offered a million dollars a year apiece, no one condemns them for accepting that splendid remuneration.

But this, the nation does expect, that when labor demands an increased return and enforces that demand by a strike in which all, or most of, the employees in an industry take part, it must show a new disability to earn its former living—an increased cost of living, for instance—or a new merit or ability entitling it to more pay and show itself absolutely free of the charge of violating an express contract.

If the mine workers had sought merely a 14 per cent increase or a sliding scale proportionate to the increased cost of living and had waited to make that demand until relieved, in the short process of time, of the obligation of their contract, nothing could have been said. But more than that should have been sought, if sought at all, by other methods than by a combination jeopardizing the life and comfort of the other 110 millions of their fellow citizens.

Large increases of wage should come out of the operation of supply and demand. They must not be sought by a certain class of people refusing in block to afford a service to others that they have been in the habit of rendering. Our civilization is based on certain men assuming a specialized part of the necessary labors of mankind, leaving the rest of the work to others.

The cast of the play of life must not be spoiled by the unreasonable sulkiness and abstention of any of the players. This is the rule of reason to which the public must appeal.

A Use-Classification of Coal*

Present classifications of coal do not take into consideration the use to which the fuel may be put or its adaptability to any industrial or domestic process. It is the aim of Mr. Ashley's article to present a nucleus which, expanded through research and discussion, may eventually be of vastly greater practical value to producers and consumers of coal than any classification yet employed.

By George H. Ashley†
Washington, D. C.

THE present critical state of the supply, distribution and utilization of coal calls renewed attention to the lack of any fully adequate classification for this fuel. In the past coals have been classified as anthracite, semi-anthracite, semi-bituminous, bituminous, sub-bituminous and lignite, together with a few special types, such as splint and cannel coal. But under the term bituminous are included a great variety of coals differing markedly both physically and chemically. The term sub-bituminous coal covers an equally great range of chemical differences.

In order to distinguish these varieties of bituminous coals it has been customary to designate them by the names of the places where they were mined, or by the name of the bed from which a particular variety is produced. Thus, in the market reports, coals are quoted as Pocahontas, New River or Sewell coal, Moshannon coal, Ohio coal, Williamson County coal, Jellico coal, and so on indefinitely, no limit being set as to the boundaries of the area to which a given name is applied.

Nor is there any scale by which the coal from one place may be compared with that from some other district or some other bed. On the one hand, coals from the same district may be quite distinct and sell at very different prices, or coal from the same bed may vary widely in different districts; on the other hand, coals from different states may be so similar physically and chemically that one could replace the other in practical use without any appreciable difference in service.

The following classification, arrived at after a careful review of a large number of systems of classification and of all of the recognized characteristics of coal, brings together all varieties that so nearly resemble each other physically, chemically and in heating qualities that any coal of a given type could replace any other coal of the same type and grade in use. Thus, if coals A and B are classed as of the same type and grade they have, so far as I know, approximately the same heating value when burned under the same conditions, as well as the same character, length of flame and properties affecting transportation and stocking; and if the same grade, approximately the same percentage of impurities.

The classification proposed is intended primarily to be practical, that is of use to the producer, transporter and user of coal, and only secondarily scientific; that is, to bring out resemblances and differences based on similarities or dissimilarities of origin and history of the coal. It is therefore based on obvious physical differences and proximate analyses. This paper is intended to bring the matter to the attention of coal men and students of coal, for the purpose of inviting constructive criticism, with the hope that it may then be possible to give the classification fairly permanent form, or as permanent a form as can be secured with the present available knowledge. The classification is the result of a comprehensive study of the many thousands of analyses made by the Bureau of Mines, supplemented by many state analyses, combined with studies of the physical properties of the coals of the United States, as made by myself and others during the past twenty or more years, or as described in tests of coal made by the U. S. Geological Survey, the Bureau of Mines, the Navy and others.

The available material is still far from complete, and the basal studies have not been exhaustive, as such studies will doubtless occupy many men many years in the future. Thus the classification here presented cannot lay claim to finality.

The study is based on a series of what are here called "standard" types, which have been arrived at as the result of a long series of pick-and-try tests, and which it has been decided are of sufficient difference to warrant recognition. These types are based on "standard analyses"; that is, an analysis of the coal as "received" or "as fired," but reduced (if necessary) to a standard of impurities. The impurities of the coal, the things not characteristic of the types, are ash, sulphur and, to a lesser extent, nitrogen. For the standard analysis, there has been selected as a fair average 6 per cent. of ash, 1 per cent. of sulphur and a percentage of nitrogen varying from 0.75 per cent. in anthracite to 1.5 per cent. in most of the intermediate types, and decreasing to 0.75 per cent. with lignites.

A careful study of the moisture of coal has convinced me that the moisture content, within certain limits, is a characteristic of the coal. The fact that dried coals of different types subjected to the same conditions of temperature and vapor tension will absorb different but characteristic amounts of moisture, as brought out clearly by the experiments of Porter and

*First installment of a paper presented before the fall meeting of the American Institute of Mining Engineers, Chicago, September, 1919.

†Geologist in charge section of Eastern Coal Fields, U. S. Geological Survey.

TABLE I. AIR DRYING OF LOW-RANK COALS

Lignites			Sheridan Coals			Iowa Coals			Rock Springs Coal			Indiana Coals		
As Received	Loss	Air-dried	As Received	Loss	Air-dried	As Received	Loss	Air-dried	As Received	Loss	Air-dried	As Received	Loss	Air-dried
34.5	21.0	14.5	22.7	6.6	16.1	17.1	9.4	7.7	8.5	2.3	6.2	15.3	11.3	4.0
35.7	23.3	12.4	21.4	6.6	14.8	16.1	8.6	7.5	9.7	2.8	6.9	15.9	10.4	5.5
35.4	17.0	18.4	20.3	7.1	13.2	14.0	4.5	9.5	10.9	1.5	9.4	16.9	13.1	3.8
43.7	35.3	8.4	23.2	10.0	13.2	18.5	7.1	11.4	14.4	4.2	10.2	10.9	7.0	3.9
29.7	22.4	7.3	24.7	15.0	9.7	14.2	10.4	3.8	14.5	4.1	10 4	12.9	7.6	5.3
43.5	32.6	10.9	24.7	10.4	14.3	16.9	15.5	1.4	13.5	3.8	9.7	13.5	5.1	8.4
35.9	12.7	23.2	22.8	8.7	14.1	12.0	6.6	5.6	12.4	4.0	8.4	13.9	7.8	6.1
32.0	19.3	12.7	23.5	15.8	7.8	15.8	10.4	5.4	13.1	4.4	8.7	....	....	....
32.4	23.1	9.3	19.8	7.0	12.8	14.4	9.6	4.8	11.6	6.0	5.6	....	....	....
42.6	35.6	7.0	23.5	6.9	16.6	15.4	11.0	4.0	13.0	3.4	9.6	....	....	....
35.3	23.6	11.7	22.0	5.0	17.0	11.3	7.9	3.4	11.5	7.1	4.4	....	....	....
32.6	10.4	22.2	21.4	4.5	16.9	12.0	8.0	4.0	14.9	9.1	5.8	....	....	....
42.3	38.5	3.8	23.5	6.9	16.6	....	....	....	13.1	6.1	7.0	....	....	....
36.6	12.0	24.6	23.5	14 6	8.9	....	....	....	....	....	....	....	....	....
42.3	35.8	6.5	25.3	16.5	8.8	....	....	....	....	....	....	....	....	....
....	....	....	23.9	7.8	16.1	....	....	....	....	....	....	....	....	....

Ralston,[1] is just one line of evidence of the truth of this. As far as possible, types have been chosen that do not vary greatly in moisture content at the mines (as shown by analyses of mine samples) and at the point of delivery (as shown by large numbers of analyses of coals taken at points of delivery on Government contracts).

It may be asked why "air-dried" analysis are not used. A study of the air-drying results shown in Table I seems to indicate that, as yet, air-drying methods have not been standardized, so as to give results consistent with themselves or with the analyses of the coals "as fired," which latter are, after all, the data of most value for the buyer and engineer.

It will be noted from the table that on the "air-dried" basis, some of each of the coals have a moisture content of about 8 per cent. and the air-dried analyses of those samples, on the air-dried basis, as might be expected, can hardly be distinguished.

The term "rank" of the coal is here used to designate the extent to which a coal has advanced in its progress from peat to graphite. The term "grade" is here used to designate the purity of the coal with reference to the content of ash, sulphur or other specific impurities of deleterious action. Most of the coal types are separated by a difference of 750 B.t.u. on the basis of the "standard" analysis. To have selected a smaller difference would have increased the number of types and the difficulty of classifying a given coal; and to have increased the difference would have enlarged the range of a coal so that two coals falling within the same type might give an appreciably different service.

Coals differ in three ways: in origin, rank and grade. These differences may be revealed by either the physical or chemical characteristics or both. A notable illustration of coals differing in origin is shown by a comparison of cannel and bituminous varieties.[2] Here there are both pronounced physical and chemical differences. The differences between "block" coals and similar bituminous coals are due to origin and, so far as present studies have gone, are revealed in their physical characters only.

The rank of a coal is revealed in both its chemical and physical character. Chemically, coal, in changing from peat or lignite to graphite, shows a progressive elimination of its volatile constituents and a corresponding increase in the proportion of the uncombined carbon and ash. As ordinarily analyzed, fresh peat contains from 80 to 94 per cent. of moisture, from 3 to 7.5 per cent. of volatile matter, from 1 to 4 per cent. of fixed carbon; the rest is ash. Clean peat (not muddy) will have between 90 and 94 per cent. moisture. Fresh lignite has between 40 and 45 per cent. of moisture and about 25 per cent. each of volatile matter and fixed carbon, the rest being ash. There has then, been a reduction of the proportion of both moisture and volatile matter.

A typical analysis of peat from Beaver Marsh, near Hartford, Conn., shows: 91.2 per cent. moisture, 6.6 per cent. volatile matter, 1.8 per cent. fixed carbon and 0.3 per cent. ash. If this is freed of ash and the analysis generalized, it might read: moisture 91.5 per cent., volatile matter 6.5 per cent., and fixed carbon 2 per cent., which figures may be assumed to represent the number of pounds of each in 100 lb. of peat. A typical analysis of lignite from Bainville, Valley County, Montreal, is: moisture 42.8 per cent., volatile matter 25.7 per cent., fixed carbon 26.8 per cent., ash 4.6 per cent. This, freed from ash and generalized, might read: moisture 45 per cent., volatile matter 27 per cent., fixed carbon 28 per cent. If it be assumed that this lignite had been derived from the peat just described and that in the process there had been no change in the actual amount of fixed carbon, then the 28 per cent. of fixed carbon in the lignite equals 2 lb., comprising all there was in the peat, the 27 per cent. of volatile matter equals 1.93 lb., a loss of 4.57 lb. of volatile matter from that in the peat. Likewise, the 45 per cent. moisture represents a loss of moisture from 91.5 lb. to 3.26 lb. If a similar comparison is made between North Dakota lignite and Sheridan, Wyoming, sub-bituminous coal, Iowa coal, and so on up the list, it may be noted that while the amount of moisture in the coal steadily decreases the percentage of volatile matter keeps about even with the percentage of fixed carbon through all of the lower rank coals until the moisture has reached a stabilized minimum, beyond which the percentage of volatile matter is rapidly reduced.

As a matter of fact it can be shown that the amount of fixed carbon does not remain constant but decreases from one type to the next higher so that the actual loss of volatile matter and moisture is greater than indicated, and a study of the ultimate analysis shows that the character of the volatile matter also undergoes a change. However, for the purpose of dis-

TABLE II. RATIO OF FIXED CARBON TO VOLATILE MATTER AND MOISTURE, COMBINED $= \frac{F.C.}{V.M. + H_2O}$

Coal	Ratio	Coal	Ratio
Anthracite	10.7+	Saint Clair County, Ill., coal	0.96
Bernice coal	6.8	Sangamon County, Ill., coal	0.84
Brushy Mountain, Va., coal	4.8	Grundy County, Ill., coal	0.78
Pocahontas coal	3.7	Sheridan, Wyo., coal	0.68
Sewell, New River, coal	2.8	Carney, Wyo., coal	0.62
Connellsville coal	2.0	Gillette, Wyo., coal	0.56
Pittsburg coal	1.60	Wood County, Tex., lignite	0.50
Beaver River, Penn., coal	1.2	Houston County, Tex., lignite	0.43
Gallatin County, Ill., coal	1.09	Williston, N. Dak., lignite	0.37

[1] H. C. Porter and O. C. Ralston: Some Properties of Water in Coal. Bureau Mines *Tech. Paper* 113.

[2] G. H. Ashley: Cannel coal in the United States. U. S. Geol. Survey *Bulletin* 659.

tinguishing coals by rank, the simplest system is to assume that the fixed carbon remains stationary and that there is a steady loss of moisture and volatile matter. This may be expressed as a ratio or curve as shown in Table II.

Remembering, however, that in the high-rank coals the moisture is stationary and the loss appears to be entirely in the volatile matter, while in the lower rank coals the volatile matter losses appear stationary, with reference to the fixed carbon, it is possible to arrange a double ratio table in which the higher rank coals are distinguished, as now, by the ratio of the volatile matter to the fixed carbon or by the well-known "fuel ratio" and the lower coals by the ratio of moisture (as received) to fixed carbon. A table so constructed appears as shown in Table III.

After a careful study of various proposed methods of distinguishing the rank of coal, I believe the forego-

TABLE III. FUEL RATIO AND FIXED CARBON MOISTURE (OR AS HERE DESIGNATED F.C.M.) RATIO

Coal	Fuel Ratio	Carbon Moisture	Coal	Fuel Ratio	Carbon Moisture
Anthracite	10+	10+ (30±)	Saint Clair County, Ill.	1.4–	4.0 –6.0
Bernice	7–10	10+ (27±)	Sangamon County, Ill.	1.4–	2.5 –4.0
Brushy Mountain, Va.	5–7	10+ (26+)	Grundy County, Ill.	1.4–	2.0 –2.5
Pocahontas	3.5 –5	10+ (24.5)	Sheridan, Wyo.	1.4–	1.7 –2.0
Sewell	2.5 –3.5	10+ (23)	Carney, Wyo.	1.4–	1.4 –1.7
Connellsville	1.85–2.5	10+ (21.5)	Gillette, Wyo.	1.4–	1.0 –1.4
Pittsburg	1.4 –1.85	10+ (19.5)	Wood County, Tex.	1.4–	0.85–1.00
Beaver River' Pa.	1.4 –	10+ (17)	Houston County, Tex.	1.4–	0.65–0.85
Gallatin County, Ill.	1.4 –	6.0–10.0	Williston, N. Dak.	1.4–	0.5 –0.65

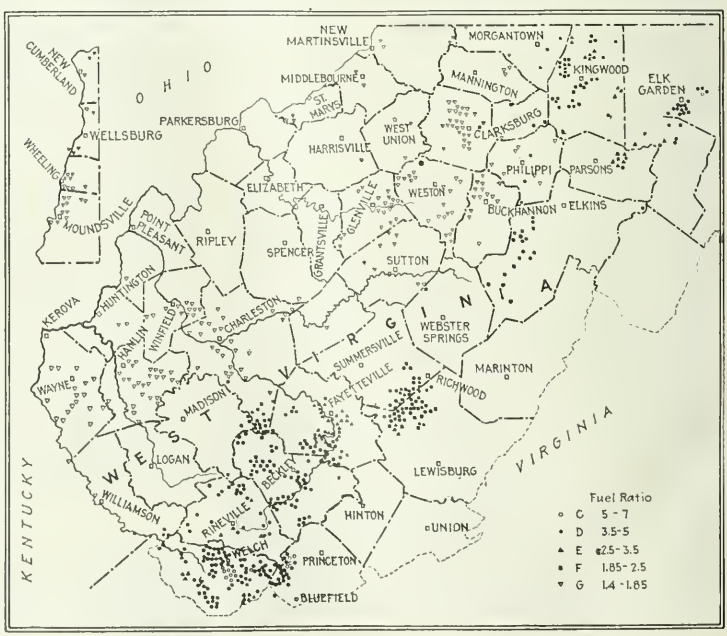
ing method the best yet found, involving, as it does, only proximate analysis results. According to the table the lignites are found to fall betwen 0.5 and 1 in the fixed carbon moisture ratio; the principal sub-bituminous coals fall betwen 1 and 2; and the so-called bituminous coals between 2 and 10+, beyond this point they are separated on the basis of fuel ratio, as now. In preparing a scheme to cover all coals, full account must be taken of the physical as well as the chemical properties, as many coals having similar chemical composition, as shown by the usual analysis, may differ greatly physically, due to difference of origin or subsequent history, and therefore should not be put into the same class. No scheme based entirely on present known chemical differences may be used to differentiate all types of coal.

In Table IV attempts have been made to cover all of the common varieties of coal known in the United States. The coals are divided into those of compact texture and those of woody, fibrous or earthy texture. As a matter of fact, woody texture occurs and may be distinguished with the microscope in coals ranging all the way to moderately high-rank bituminous varieties. Where, therefore, doubt exists as to whether a coal has compact, woody, fibrous or earthy texture, the second test given in the table is used. If the moisture, as received, exceeds the fixed carbon, as received, the coal is classed as lignite or peat. If it does not, it is classed as bituminous or higher-rank coal.

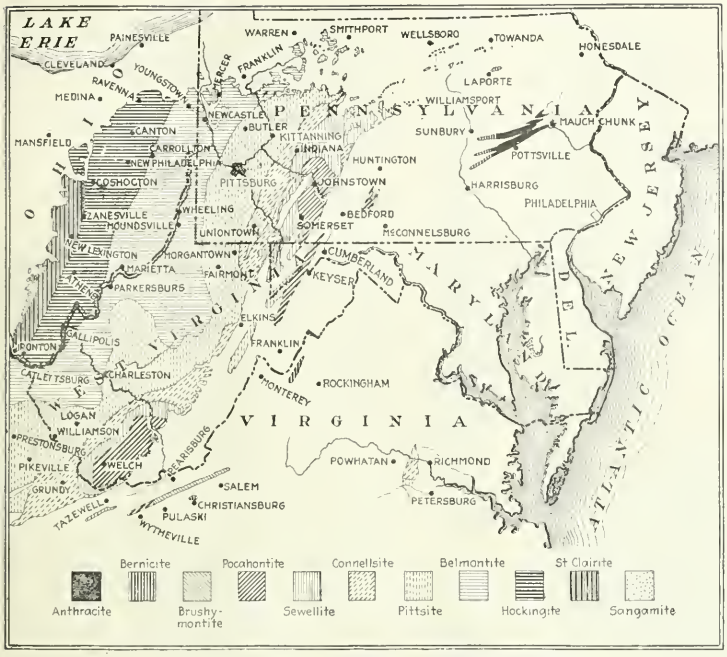
Geographic names corresponding to those now in common use in designating coals are proposed for the several types, except that the type name is made to end in *ite* to correspond to the endings of graphite, carbonite, anthracite and lignite, already in use. Thus, Pocahontas coal is called Pocahontite. Pocahontas coal may continue to mean, as now, coal from the Pocahontas district of West Virginia and Virginia; Pocahontite will mean coal of Pocahontas rank of any grade from any part of the world.

Following the key and omitting discussion of graphite and carbonite (native coke), the coals with compact texture are divided into anthracite and bitumite classes. The first class has a fuel ratio of 7 or more and a non-luminous flame. The second class has a fuel ratio of less than 7 and a luminous flame. The latter class includes the bituminous and sub-bituminous coals. The luminous flame indicates the presence of hydrocarbons in the volatile matter, and their presence is taken to indicate the bituminous character of the coal. The anthracites may then be divided into the true, or hard, anthracite, with a conchoidal fracture, high specific gravity and submetallic luster, and the soft anthracite, with semicubic fracture and low specific gravity. The type of the soft anthracites is found at Bernice, Sullivan County, Pennsylvania. The line between the two is drawn at a fuel ratio of 10.

Bitumites are first divided into those having a B.t.u. value of over 14,300 and those having a B.t.u. value of under 14,300 on the coal free of moisture, ash



CLASSIFICATION OF WEST VIRGINIA COALS



CLASSIFICATION OF THE WELL KNOWN COALS

and sulphur. As previously stated, in the change of the coal from peat to anthracite there is a more or less steady change in the composition of the volatile matter. The volatile matter of peat contains from 35 to 60 per cent. of oxygen. In the lower rank post-Carboniferous coals, this high percentage of oxygen is maintained and tends to hold the heat value of the volatile matter to a point well below the heat value of a similar amount of fixed carbon. In the coals of Carboniferous age and in a few of the post-Carboniferous coals, the oxygen in the volatile matter is commonly less than 25 per cent. and the heat value of the volatile matter correspondingly increased. By drawing the line at 14,300 B.t.u. it is believed that practically all of the Carboniferous coals, certainly those of the United States, are included above the line, and a majority of the post-Carboniferous coals placed below the line.

This B.t.u. figure has been obtained by the formula:

$$B.t.u.\ (ash,\ moisture,\ sulphur\ free) = \frac{B.t.u.\ (coal\ as\ received) - 40S}{100 - (moisture + ash + sulphur)}$$

It may be noted that due to climate, or some other cause, some of the western post-Carboniferous coals with a low B.t.u. value on ash-, moisture-, sulphur-free basis have a lower percentage of moisture than some of the coals of Carboniferous age, and therefore a higher B.t.u. value on the "as received" basis, notwithstanding the low rank and character of the volatile matter. The coals below 14,300 B.t.u. on the ash-, moisture- and sulphur-free basis include, in general, the coals commonly called brown coals in Europe, following the classification of Zincken[3] and others.

The higher-rank bitumites are then divided into the Virginites or so-called smokeless coals having a fuel ratio between 2.5 and 7, a short to medium flame, and coals having a fuel ratio below 2.5 and a long flame. The Virginites are divided into three types, those having a fuel ratio of from 5 to 7, from 3.5 to 5, and from 2.5 to 3.5. The first is a non-caking coal with a fuel ratio between 5 and 7. This coal is not abundant in this country, though found in the Brushy Mountain field of Virginia, the Coal Hill field of Arkansas, and a few other places. This is the type of the best "Admiralty" coals of Wales, so long used by the British Navy.

The other two types are both caking coals; that is, they swell up in burning and run together into a cake, and if other characteristics are favorable they may be used in the making of coke. They are separated into two types according to the length of flame. The short-flame type is typified by the Pocahontas coal of eastern-central McDowell County, West Virginia, and the medium-flame type by the Sewell coal below Thurmond on the New River. The line between them and on either side is drawn on the basis of the fuel ratio. The Pocahontas type is limited by a fuel ratio of from 3.5 to 5 and the Sewell type by a fuel ratio of from 2.5 to 3.5. In accepting the lowest fuel ratio just given, account was taken of the fact that Sewell coals with a fuel ratio of 2.8, as sampled by myself, have been on the Navy accepted list.[4]

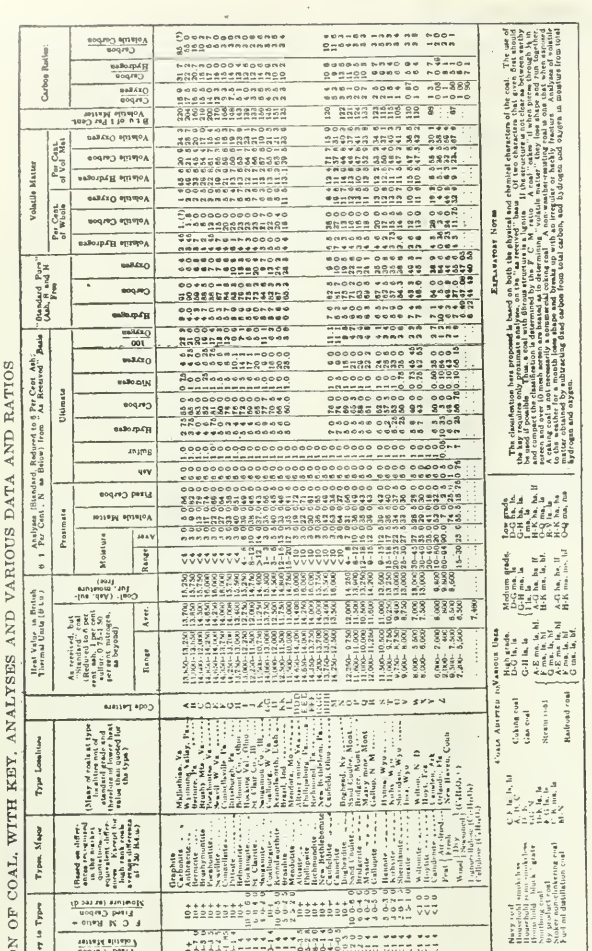
The long-flame coals are divided into the caking, or steam, coals, and the non-caking, or household, coals. The caking long-flamed coals are then divided into two groups according as their fuel ratio is above or below 1.4. The former are here called the Pennsites, from their well-known occurrence in Pennsylvania ("Pennsy"). The Pennsites include two types, according as the fuel ratio is above or below 1.85. Those above 1.85 are termed Connellsite, from their typical occurrence in the Connellsville basin in Fayette and Westmoreland Counties, Pennsylvania. They are commonly suited to the making of coke in beehive ovens if of proper grade. The lower group, having a fuel ratio of betwen 1.4 and 1.85, are called Pittsites and are typified by the Pittsburgh coal south of Pittsburgh. They are good steam fuels, and, if of proper grade, are suitable for making gas and byproduct coke.

The coals having a fuel ratio below 1.4 are then divided into the Ohioites, characteristically developed in Ohio, having a fixed carbon moisture ratio of more than 6; and Illinoites, high-moisture coals having a fixed

[3] C. F. Zincken: "Die Physiographie der Braunkohle," 5. Leipsic, 1867.

[4] Attention should be called to the statements on page 29, *Bulletin* 22, of the Bureau of Mines, regarding the unreliability of the determination of volatile matter in analyses bearing laboratory numbers between 5147 and 9120. In this study, those analyses have been discarded insofar as they bore on fuel ratio or content of volatile matter or fixed carbon.

TABLE IV. CLASSIFICATION OF COAL, WITH KEY, ANALYSES AND VARIOUS DATA AND RATIOS



carbon moisture ratio of less than 6. There is a marked change in calorific value in Ohio coals from east to west, due to increasing moisture content toward the west. On this basis, the coals are treated as of two types, Belmontites, as found in the Belmont field, having a fixed carbon moisture ratio of over 10, and Hockingites, as found in the Hocking Valley field, with a fixed carbon moisture ratio between 6 and 10.

The coals of Illinois change markedly in rank from southeast to northwest. In southern Gallatin County, the coal is of Belmontite rank. North and west of this locality the coal, as received, contains from 4 to 8 per cent. of moisture. These coals have a B.t.u. value of from 12,250 to 13,000. West of Gallatin County and typically developed in St. Clair County, just east of St. Louis, is found the type of coal here called St. Clairite. This type has a fixed carbon moisture ratio of 4 to 6 and a B.t.u. value of between 11,500 and 12,250. Farther north and centering about Sangamon County is a type of coal with high moisture, the fixed carbon moisture ratio being 2.5 to 4, and the B.t.u. value between 10,750 and 11,500; it is here called Sangamite. In the northern coal counties of Illinois, the coal commonly has over 15 per cent. moisture.

The non-caking, or household coals differ in origin from the caking coals and are divided into two groups, here called the splintites, or splint coals, which have a laminated structure and cubic or tabular fracture; and the cannelites, or cannel coals, which have a massive structure and conchoidal fracture. The splintites are characteristically high-moisture coals, as compared with other bituminous coals of the same region. I would explain this as being due to the absorption, or holding, of the moisture in the mineral charcoal layers of the coal. The cannel coals are characteristically low-moisture coals but the typical cannel coals are high in volatile matter. Four types of splintite have been picked, which differ both physically and chemically as well as in heat value. It is not necessary to describe them in detail, as probably all are well known to coal men. Coalburgite is a typical West Virginia "splint" coal named from Coalburg, W. Va., which appears to have been the first point from which that type of coal was extensively shipped. Kennilworthite is a low-moisture non-caking coal found at Kennilworth, Utah; it is fundamentally a little lower in rank than Brazilite, but probably climatic conditions have reduced its moisture content so that according to the plan of classification it stands higher. Brazilite is the type known for over a half a century as Indiana block coal or Brazil block coal. Mendotite is a type of block coal, found at Mendota, Mo., that differs from the last mainly in its lower heat value.

The cannelites, including cannel and canneloid coals, are differentiated by differences of fuel ratio. Canneloid anthracite and semi-anthracites are not listed here as their canneloid character does not affect their use.

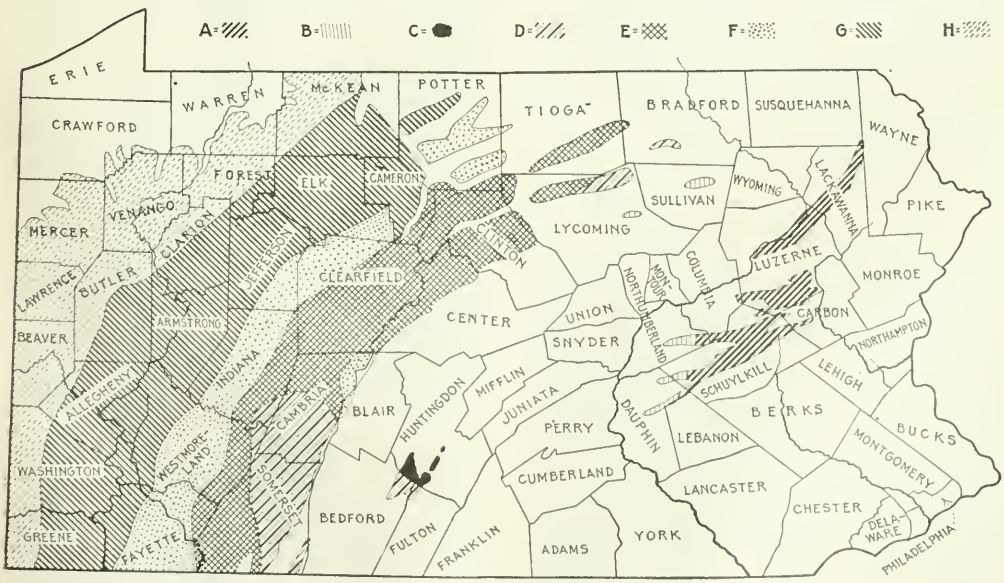
Altizite, named from the Altizer mine, ½ mile north of Faraday, Tazewell County, Virginia, is a non-coking coal in contrast with the Pocahontas coal, which is a coking coal, and therefore may possibly find a different use. The other types down to Canfieldite are lean cannels or canneloid coals having the physical properties of cannels but not the chemical properties. True cannels have been defined as coals of bituminous rank having a fuel ratio of less than 1.

The lower rank bituminous coals having a fuel value of less than 14,300 B.t.u. on the ash, moisture, sulphur free basis are divided into two groups: those that resist weathering and may be stocked or shipped long distances and those that, when exposed to sun and rain, tend to break down rapidly. If necessary to draw a definite line between these groups, it is suggested that coals, lumps of which, free of pyrite, exposed to alternate wetting and drying break down and lose their shape within one month shall be classed as non-weather-resisting. The weather-resisting group is divided into three types, according as they are low, medium or high in moisture or in the reverse order in difference of fixed carbon moisture ratio. These coals are called Montanites, as the three types are all taken from Montana.

The low rank non-weather-resisting bituminous coals, or subbituminous coals, are characterized by their lightness and tendency to break down as they lose moisture, the fracturing commonly following irregular, or zigzag lines. The types are all drawn from Wyoming with one exception, and are therefore called Wyomites. The one exception is Gallupite, of which the type locality is Gallup, N. Mex., and which is therefore grouped as New Mexite. Gallupite and Hannite have many points of resemblance, but judging by the character of the volatile matter Gallupite is of a considerably higher rank than Hannite.

The term lignite, though properly applied only to coals having a woody structure, is in this country applied to coals of all kinds in the first stages of anthracization. A study of the coals that have been classed as lignite in this country, not including those formerly called black lignite and more recently subbituminous, reveals that almost without exception they contain in the "as received" sample over 30 per cent. moisture, while the black lignites or subbituminous coals almost without exception contain less than 30 per cent. moisture. It is proposed, therefore, that coals in which the woody, fibrous or earthy texture is obvious shall be called lignite, regardless of their moisture content, but that of coals in which the woody texture is not obvious only those having a fixed carbon moisture ratio of less than 1 on the "as received" basis shall be classed as lignite. As so grouped, the class lignite includes coals that range from those obviously 75 to 85 per cent. wood to those that do not contain any wood, such as the canneloid coals derived from accumulation of algæ, spores and spore cases and other non-woody vegetal material accumulated in water to which the name "sapropel" has been given. If the term "xyloid," meaning woody, is applied to the woody lignites, the class lignites may be divided into three subclasses, xyloid lignites and sapropel, or canneloid lignites and an intermediate class.

Lignites differ greatly in percentage of moisture and thus in fixed carbon moisture ratio, in fuel ratio and in heating value. Unfortunately the coal from the same mine differs so greatly that it is not possible to classify the coal closely on these characteristics. Thus, the fuel ratio of the coal from Hoyt No. 3 mine in Wood County, Texas, varies from 0.46 to 1.14. Coal from the Snyder mine 8 miles north of Glendive, Mont., varies in fuel ratio from 0.31 to 1.0. In like manner, the moisture content will vary according as the coal is fresh or has had time to dry out. Thus mine samples from the Lehigh mine, Stark County, North Dakota, all have over 42 per cent. moisture, but samples taken from carload lots from the same mine range from 32 to 35 per cent. moisture. A classification on the fixed carbon moisture



THE CLASSIFICATION SCHEME AS IT WOULD APPLY TO COALS OF PENNSYLVANIA.

SKETCH MAP SHOWING TYPE LOCATION OF MAJOR TYPES OF COAL (CLASSIFICATION PROPOSED BY ASHLEY)

basis would put the same coal in one type as it came fresh from the mine and in another at the point of delivery, the coal meanwhile having had time to dry out. Therefore classification is restricted to differences of texture as obvious to the naked eye.

Following the key and table of types are given first the locality from which the names are derived, then the range and average B.t.u. value of the coal reduced to standard analyses on the "as received" basis; then the B.t.u. value on the ash, sulphur and moisture free basis. The next column gives the range and average moisture content of the coals when reduced to standard ash and sulphur. Then follow proximate and ultimate analyses on the standard basis, that is including moisture as received but reduced to 6 per cent. ash, 1 per cent. sulphur, and a varying content of nitrogen. Following the analyses are given a number of ratios that may prove of interest to any desiring to study further into the classification proposed. These include the inverse ratio of oxygen to the whole of the coal, the ratio of the carbon to the oxygen, of carbon to hydrogen, including the hydrogen of the moisture in the standard analyses, and of carbon to the volatile carbon. There is also given an ultimate analysis on what is designated "standard pure" basis, that is freed of ash, sulphur and nitrogen, but including the moisture. Two columns are devoted to the volatile matter, giving first the percentage of the three elements, volatile hydrogen, volatile carbon and volatile oxygen in terms of all the coal, and in the second column in terms of the volatile matter. The percentages of the elements of the volatile matter are not determined by actual analyses of the volatile mater but in the usual method of subtracting the fixed carbon from the total carbon to obtain volatile carbon, by subtracting the hydrogen and oxygen of the moisture from the total hydrogen and oxygen to obtain the volatile hydrogen and volatile oxygen. There is also inserted, as of possible interest, the heat value of 1 per cent. of volatile matter derived by subtracting from the total B.t.u. value of the coal the B.t.u. value of the fixed carbon and dividing by the percentage of volatile matter. It may be of interest to note that the figure for any coal is not far from three times the percentage of fixed carbon; in fact in an initial study of this topic, using individual analyses, the result was even more striking than is brought out in the generalized table.

In these days, so much business is done by wire that it is often desirable to have, in addition to names, some letter, symbol or word that may be used to designate the various ranks of coal. The system here proposed is to give a capital letter to each type, except that noncaking splint coals are given the same letter as the corresponding caking coal, but doubled, while three letters are used to designate the canneloid coals and at the same time indicate the type of caking coal to which they correspond. If canneloid coals corresponding to types *I*, *J* and *K* are found, they will take the corresponding letter tripled.

The classification presented is based, as stated, on a standard analysis reduced to contain 6 per cent. ash, 1 per cent. sulphur, 0.75 to 1.50 per cent. nitrogen. But coals differ in grade as well as in rank and an economic classification should provide for their classification by grades as well as by rank. Aside from the presence of phosphorus in coals in too large amounts for the making of steel, the three factors commonly affecting the grade of coal are ash, sulphur and fusibility of ash.

Little attention has, in the past, been paid to the fusibility of ash but engineers are beginning to realize that a coal with ash of a low fusing point may, by blocking the grate bars, give a much lower duty than

other coals that by the analyses alone are of lower grade and heat value. To present these facts, two methods may be adopted: the designation of the rank of the coal by name or letter may be followed by a brief descriptive statement of the coal, as—Pocahontite, 7 per cent. ash, 8 per cent. sulphur, high fusibility. Or, to facilitate brief description by wire or cable, certain letters to which are assigned definite range of meaning may be used. Thus, it is suggested that *a*, *s*, and *f* stand respectively for ash, sulphur, and fusibility, and that these be prefixed by small letters which should have the following limited meanings:

TABLE OF LETTER ABBREVIATIONS TO EXPRESS GRADE OF COAL

	Ash Per Cent.	Sulphur Per Cent.	Fusibility, Deg. F.
vl = very low	0–4	0–0.75	Less than 2200
l = low	4–8	0.75–1.5	2200 to 2400
m = medium	8–12	1.5 –2.5	2400 to 2600
h = high	12–20	2.5 –4	2600 to 2800
vh = very high	Over 20	Over 4	Over 2800

Using these letters and those that indicate the rank of the coal it is possible to describe a coal fully, as follows: *D, la, ls, hf,* stands for a smokeless coking coal with a fuel ratio between 3.5 and 5, an ash between 4 and 8, a sulphur content between 0.75 and 1.50, an ash with a fusing point of between 2600 and 2800 deg. F.

Should this proposed plan of coal classification meet with definite approval, it is proposed to prepare an extended paper discussing the whole problem in detail, together with detailed descriptions of each type and possibly maps showing the occurrence of the several types throughout the country.

Drum Controller for Series-Parallel Operation of Locomotive Motors

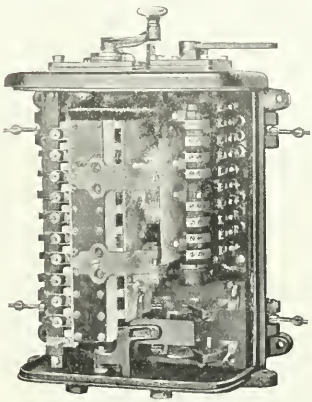
A drum type of controller for series-parallel control of two-series motors is one of the new products of the Cutler-Hammer Manufacturing Co., of Milwaukee, Wis. This controller, which is provided with both a main and a reverse cylinder, is for use on storage-battery or trolley locomotives using 250 volts or less.

The motors are accelerated by the main cylinder, which has seven points of control. A star wheel provides an interrupted motion to the lever, so that the operator readily feels the speed points. The fourth point is the full series or low-speed running point, and the seventh the full parallel or high-speed running point. All intermediate positions are resistance points. The Wheatstone Bridge method is used for transition from motors in series to motors in parallel between the fourth and fifth points of control, and as the circuit is not opened, continuous torque is obtained during the transition. Arc barriers are provided between each contact finger, and strong magnetic blowouts prevent excessive arcing.

The reverse cylinder is positively interlocked with the main cylinder so that it cannot be operated when the latter is in any but the "off' position. The fingers of the reverse cylinder are therefore not used for making or breaking the current; hence the contact parts will last indefinitely, and magnetic blowouts are unnecessary.

Two cutout switches allow either motor to be bypassed, if it becomes damaged in any way, and the locomotive operated by the other motor until repairs are made. When one cutout switch is thrown to bypass its corresponding motor, mechanical interlocks prevent closing the other cutout switch or operating the main cylinder beyond its full series position, thus eliminating the possibility of a short circuit.

A dust-tight and weatherproof construction is obtained by fitting the sheet metal cover under a ledge in the top and providing a rubber gasket between the edges of the cover and the cast-iron frame.



ARRANGEMENT OF PARTS

The contact fingers and segments may be adjusted or renewed without removing the cylinders from the drum case. Those on the reverse cylinder are exposed by merely loosening two thumb nuts and throwing back the blowout plate and arc barriers.

Most mine duty apparatus is employed where the service conditions are severe and delays in operation costly; consequently this new controller has its parts liberally proportioned so as to prevent wear and breakage, while those parts that wear unavoidably are made accessible and easily renewable.

Unconsumed Fuel

With gas or oil engines it is a comparatively easy matter to ascertain whether combustion is approximately complete, for the general behavior of the engine, and the character of the exhaust gases are indications enough as to whether this is so or not. The question of the quantity of unconsumed (though consumable) material conveyed to the ash heap from a coal-fired boiler is unfortunately not quite so simple. If one examines carefully almost any ash heap, it will be possible to find a greater or less proportion of both raw coal and coke in various stages of consumption in the ashes. This constitutes a serious waste and suggests a field wherein it may be possible to economize.

A simple check can be kept, where apparatus for analysis is available, by observing the actual percentage of ash sent out to the dump as compared with the theoretically incombustible content of the original fuel. It is, of course, never possible to bring the former down to the same figure as the latter, but by careful attention to the conditions under which combustion is carried out, the excess amount may be cut down appreciably.

This unconsumed fuel also aggravates the problem of ash disposal, which is in itself often a serious matter for consideration. In view of this it has been found possible to set fire to ash-heaps and thus reduce their bulk considerably, the combustion being a comparatively low-temperature process and the residue comprising almost entirely the genuine incombustible according to the original chemical analysis. The cubic capacity by which the ashes are thus reduced in bulk may be considered a rough indication of the amount of combustible matter which had been wastefully deposited.

Eliminating Mine Pumps

Construction of the Jack Run Drainage Ditch by the Consolidation Coal Co. is an Innovation in the Problem of Dewatering the Mine

By L. A. Riggs
Fairmont, W. Va.

In many cases the water made by a mine may be drained either to a central sump and thence pumped to the surface as in shaft or slope mines or a general drainage system discharging to the outside may be installed as in drift mines. In deep drainage ditches tile or its equivalent should be laid. It is believed that pumps should be supplanted by gravity drainage wherever this is feasible.

THE elimination of mine pumps in some instances is a difficult problem, but in a large number of mines they ought to be eliminated. This, of course, means that considerable ditching is required. There is one other way, however, to avoid the use of pumps and that is to use a siphon. This device is being employed extensively in small operations. Most people are familiar with the principle of the siphon. It is essentially an appliance for raising water over an elevation and depositing it at a lower level. This system however only applies to small mines as the siphon will not work satisfactorily over an elevation of more than 25 ft. I do not intend to deal further with the siphon as a means of supplanting pumps since its use is known to practically all mining men and it can only be considered as a temporary arrangement.

Water may be encountered either as temporary or permanent feeders. As is well known the primary source of permanent feeders is rain. Rain water in part evaporates, part is carried away by streams and a part sinks into the ground. The proportion that sinks into the earth depends upon the porosity of the strata. If the rocks are open in texture and are not interrupted by faults, the rain will penetrate them quite rapidly while if they are broken by the removal of coal or even pierced by shafts rain water may find its way into a mine soon after it falls.

In some cases the effects of a heavy rainfall are felt almost immediately while in others it requires a few days before the water is noticeable in the mines. There are some instances where large beds of porous rocks may act as reservoirs and so regulate the feeders that little if any variations are noticed. Temporary feeders occur when old workings having no external source of supply are tapped or when ponds of water contained in rocks, which are entirely isolated by faults are encountered. From the above it will be noted that in almost any coal mine, water may be expected and it is necessary to evacuate it in some manner. The three most important methods of handling this water are by ditching, siphoning and pumping. The most economical and the method in most general use where practical is the drainage ditch.

In opening a property the drainage problem is a serious one and must be given especial attention. There are few mines that have been extensively worked that do not have more or less water to contend with and which must be handled by some means. Mines are opened in various ways: Some are drifts, some are slopes and some are shafts. The drift mine no doubt is the most economical to drain, provided the mine opening is on the low side of the property and projections are so made as to allow all of the workings to be driven to the rise. This advantage is not frequently afforded as mines can not be opened at any point desired. There are always problems in the way when opening mines and all difficulties must be considered. Slope and shaft mines are more difficult to dewater and almost always require the use of pumps.

In projecting various mining properties the drainage problem must be considered along with the other propositions which, as is well known, is one of the important factors. In driving main entries from the mine opening to the limit of the property the entries may be driven to the rise for a thousand feet or more and then go to the dip and the dip workings almost invariably make considerable water. I would not recommend the immediate ditching of main entries when they first start to drive on the dip because of the fact that when the entries have been driven another thousand feet or so it may be impracticable to ditch them.

To remove water from main entries dipping in this way would require the use of a pump or if not too much water was made it might be removed by balling. This, of course, would be decided upon by the man in charge of the operation as this is one of his problems. The various manufacturers make small pumps of from 25 to 50 gal. capacity for entry driving and these machines can be moved from place to place with little trouble. I am of the opinion that it would not be practical to eliminate the small pumps from entries and would recommend their use in all such places making water, until the property has been developed sufficiently to determine upon a drainage system.

The most practical pump for entry driving is what is known as the Fairmont run-a-bout pump with a capacity of approximately 40 to 60 gal. per minute. This pump can be either direct connected or belted, is driven by a 2 h. p. motor, and can be so arranged or located that it will take care of water in several entries and can be relied upon to unwater working faces. I do not, however, recommend the use of this pump for handling large volumes of water as I know of cases where under such circumstances the pump is condemned.

When a mine has been operated for a number of years and a large number of entries have been driven it is a good idea to prepare a regular drainage map which should be made by the engineer in charge of the mine, that is, provided the development has encountered any difficulty in the way of drainage problems. It may be that in preparing the drainage map it will be found that the water could all be drained to one or possibly two central points and from this point or points discharged to the outside through a pipe line to the opening or through a bore hole to the surface. The plan to be decided upon should be worked out when all data has been obtained. Many hollows overlie various mines and these should be taken advantage of in the location of bore holes for pumping stations as the pump handling the water should not be operated against a greater head than is absolutely necessary. The capacity of the various pumping stations will be determined by the quantity of water to be handled and before any figures can be prepared some general understanding as to the amount of water to be taken care of must be determined.

After the general location of the pumping stations is decided upon it is not hard to locate the sump but this is indeed an important matter. The best practice is to locate pumps at or near the bore holes, provided the water is to be discharged to the surface. It is also important that the

VIEW OF JACK RUN DRAINAGE DITCH—ENTERING MINE

sump be located near the pump in order that the suction line may not be longer than is absolutely necessary. After the location of the bore hole, pump and sump have been decided it is then in order to determine the size of the sump and the capacity of pump and motor.

Centrifugal pumps are the most practical for underground pumping stations but the head against which the machine is required to operate determines the variety to be installed. It has been found that large underground pumping stations should be operated with alternating current taken into the mine through a bore hole. This avoids the necessity of running high voltage wires through the mine which, may be dangerous. When operating pump stations with direct current the power is almost always taken from the feeder wires nearest the pump station and of course when a fall occurs or any trouble whatever is experienced the pump will be stopped. However, if the pump is operated with alternating current a fall or any other occurrence in the mine that necessitates the cutting off of the power will not interfere with the operation of the pump.

In deciding upon the size of the sump several features should be considered as it is not practical to construct a of the water in case the pump should be in need of repairs or the power should be off, say, for five or six hours. Pumps can not be operated continuously and it is good policy to consider all these matters when deciding upon the size of the sump.

Sumps are constructed in various ways, all depending upon the location and general conditions. Some sumps are made by building dams across entries, crosscuts, etc., while others are built by excavating in the bottom. Some mines have what are known as emergency sumps sometimes located as much as a mile from the sump at the pumping station. These emergency sumps are used to keep back the water after a continued general rain. The water from the emergency sumps is drained off in amounts that the pump can readily handle. This is indeed a practical arrangement and where a large mine depends upon one main pumping station emergency sumps should be provided. This allows the mine officials to regulate and handle the water without danger of flooding the mine.

There are various ways of making ditches in coal mines and no general plan can be followed for all cases. In fact I might state that ditches can not be made in all mines, that is to say they can not be made economically because the bottom may be unusually hard. The making of small temporary ditches which are those mostly used can always be taken care of by the mine organization. However, in laying out large permanent ditches it is the duty of the engineer to handle the work. No mine foreman should be allowed to

MOUTH OF COMPLETED DITCH

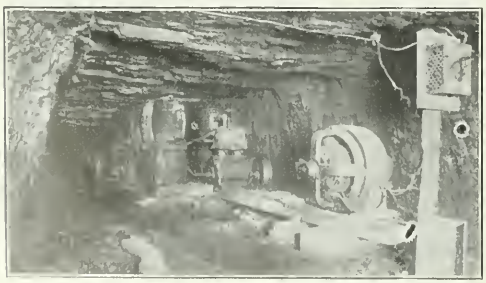
undertake a large ditching proposition unless he thoroughly understands the work and its resultant problems.

After a ditching proposition has been decided upon, when it has been determined that such a scheme is practical and that a certain section can be drained, levels should be run and permanent bench marks established. After deciding upon the proposed grade of the ditch, cuts should be marked on the rib in such a way that the mine foreman and his men will understand them. It is best to locate the grades every 25 ft. unless the ditch has considerable fall in which case it is believed that grades marked every 50 ft. would be sufficient.

The best way to give grades for an extensive ditching

AMCO SEGMENT BLOCKS IN DRAINAGE DITCH

proposition is to drive wooden plugs into the rib and place nails therein, giving the distance from the nail to the bottom of the ditch. If the ditch is to be very deep, I would recommend laying tile and refilling. However, if the ditch does not exceed 5 ft. in depth, is not along a manway or haulway and the bottom is not soft, I would recommend that it be left open. Should it be deemed advisable to place tile in the ditch it is the best practice to place manholes every 50 to 100 ft. These manholes may be used in cleaning out the drain and determine where it is blocked



COMPRESSOR USED IN THE CONSTRUCTION

if such a thing ever occurs. It may be thought foolish to imagine that a tile drain will close but this will be the case if the ditch is comparatively flat and is not cleaned out occasionally.

Almost every mine official has his own ideas in regard to the location of ditches. Some contend that they should be along the main haulways while others assert that they should be in the airways. The location of the drainage ditches should be decided upon by careful examination on the ground and after taking all features into consideration. Personally I do not believe a ditch should be placed along the main haulway if it is to exceed 2 ft. in depth, unless tile is employed. If placed along the main haulway it can be looked after to better advantage as the mine foreman

CONSTRUCTING THE JACK RUN DITCH

and his assistants pass along the ditch every day and they can see for themselves its condition at all times.

If the ditch is placed in one of the airways the chances are it will not be seen more often than once a week and if it is in an airway where exhaust steam is carried, it will not be looked after at all unless something goes wrong. A fall may occur in the airway and block the ditch and cause considerable damage to be done before the fall is located.

As stated above there are various ways of making drainage ditches, all having their particular advantages. Where the bottom is soft a pick and shovel can be used to advantage but where a ditch is extra deep and the bottom hard,

APPEARANCE OF RESTORED SURFACE

jumpers or drills and considerable shooting are required. The best progress however, can be made by using a jackhammer air drill. This, of course, necessitates the employment of an air compressor, piping, hose, etc., but when equipment of this kind is placed for use in making a ditch much better progress can be made.

My company (The Consolidation Coal Co.) is now constructing a large drainage ditch which will drain approximately 2600 acres of coal. This ditch is being driven on a 0.27 per cent. grade and is 10,000 ft. in length. Approximately 1800 ft. of the ditch is on the outside, paralleling a stream. The ditch being 20 ft. deep where it comes out of

the mine opening, requires that the outside portion must run out the grade. Where this ditch is over 6 ft. in depth tile, or in other words, Amco segment blocks, are used. These blocks form a drain 4 ft. in diameter and the portion thus tiled amounts to 1565 ft. The segment blocks are manufactured by the American Vitrified Products Co. successors to the American Sewer Pipe Company.

The 48" diameter drain requires 14 blocks to complete the circle and each block weighs 72 lbs. or 36 lbs. to the foot. These blocks are easily laid and we believe they will make a good drainage ditch. The only form work required is a template which is furnished by the manufacturer of the blocks. We find that these blocks can be used for various purposes and in fact we are experimenting with them for overcast work and for lining slopes. The ditch in which they are being used is under construction near Clarksburg, Harrison County, W. Va., and when completed we expect to eliminate pumps having a capacity of 6000 gal. per minute.

The ditch so far has cost $60,000 and it is believed it will cost at least $15,000 more to complete it. This is an expensive piece of work but we think the money will be well spent because about three times each year in the past one of our largest operations has been flooded, making it

VIEW INSIDE THE JACK RUN DITCH

necessary to close the mine for two or three days at a time. When the ditch is completed we expect to avoid this nuisance and as far as water is concerned we will be able to operate our mine throughout the entire year. The drain we estimate will carry, when running full, approximately 29,500 gal. of water per minute.

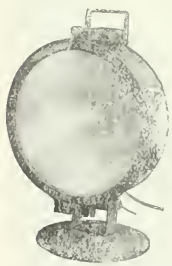
This ditch is mentioned simply to show the fact that the elimination of pumps is an expensive proposition. However, we believe it will pay in the end. The particular mine that will be drained and benefitted by this ditch is one of our largest operations and when a continued rain occurs considerable water gathers in the mine and our largest pumps can not handle it. The pumps could doubtless take care of the situation if they could be worked continuously. This, however, can not be done as during times that the pumps are most needed it seems that most trouble is experienced with power. In some cases the power is carried over transmission lines for a distance of 25 mi., possibly farther, and if any trouble occurs on the line or the power is off for two or three hours one can readily see how the pumps would be useless. We expect to eliminate this difficulty by the construction of the ditch in question which is known as the Jack Run drainage ditch.

In conclusion, I believe that it pays to eliminate mine pumps and construct ditches wherever possible. I am of the opinion that the question of elimination of mine pumps shuld be left to the engineer in charge of each mine and that he should be allowed to solve the drainage problem to the best advantage. It seldom occurs that the same solution will answer at all mines and in my opinion all drainage propositions should be considered separately; after all available data is secured the drainage problem should be solved in accordance with the general conditions. It may not always be practical to eliminate mine pumps and in fact it has been found that all pumps can not be done away with but my recommendation is that where possible pumps should be eliminated.

A Portable Utility Light

A new type of night light for highly localized lighting has recently been placed on the market by the Western Electric Co. This device, which is to be known as the Western Electric portable utility light, is for use at close ranges where the light is to be located at any distance not greater than 125 ft. from the object or surface to be illuminated.

With the light operating on a 100 ft. throw, a 100 ft. spread is obtained at an angle of 60 deg. The unit gives a smooth white light without gleam or glare. This is made possible by a new development—the hammered glass reflector. A 200-watt Mazda, Type C lamp is used. The device is of rugged construction throughout and will withstand rough usage in service.



GENERAL VIEW OF NEW LIGHT

The hammered glass reflector is spring suspended in a one-piece cast-iron housing. The housing is closed by a wire glass front which is fitted into a recessed cast-iron ring. This forms a door which is hinged at the bottom and secured by a hand latch, thus affording easy access to the interior of the housing. The recessing in the ring makes the interior of the housing fully weather-proof.

The lighting unit can be furnished in either a black or gray weather-proof enamel finish. It is 19¼ in. high and weighs approximately 30 lb. This light weight makes it easy to carry from place to place. The base is 9 in. in diameter, giving the light stability when mounted on a flat horizontal surface. It can also be mounted on either vertical or flat surfaces, such as walls, poles or roofs, by virtue of a heavy universal joint which fastens the housing to the base.

All adjustments can be made by hand—no tools are necessary. This light has a wide range of applications. In railroad work it can be used for lighting transfer tables, coaling stations, inspection pits, loading platforms, cranes, roundhouses, and drawbridges. In marine work it can be employed for lighting docks, dredges, slips, loading operations, canal locks, dry docks and pile drivers. Its industrial applications cover even a wider variety of uses, such as lighting shop yards, material yards, coal yards, well drilling operations, coal tipples, erecting shops, machine shops, tramways and inclines, conveyors and all kinds of emergency work.

The following cablegram has been received from American Minister Brand Whitlock at Brussels, dated November 28:

As an example of the rapidity with which Belgium is recovering from the effects of the war, it is a pleasure to report that the production of coal in the Belgian mines, during the month of October, was 98.6 per cent. of the normal production before the war.

Oxyacetylene Process in Collieries and Shops—II.*

In addition to the uses for the oxyacetylene torch set forth in the preceding article, it may be and is often employed for other purposes about the mines and shops. In short, this piece of apparatus is a veritable jack of all trades, but the surprising circumstance attending its use is that it is good at each.

By Charles C. Phelps
New York City

FIG. 14 shows a new 15-in. diameter pump plunger which, after machining, was found to have two holes on the surface each about as big as a hickory nut. Formerly it was the practice to dovetail pieces of copper into such cavities, peening them in to a snug fit. The copper filling, would, however, as a rule, work loose in time, because of the corrosive action of the acid mine water, and

FIG. 14. A WELDED PUMP PLUNGER

cause scored cylinders or other damage. The modern practice is to fill up such cavities with the aid of the welding blow-pipe, thus entirely eliminating all traces of the defects.

Fig. 15 shows a washing device suspended above a No. 4 buckwheat shaker screen. The material being screened passes to the left and the streams of water are inclined slightly to the right; that is, they tend to retard the movement of the material on the screen.

The novel feature is the manner in which the slits were cut in the pipe by means of an Oxweld cutting blowpipe. They were cut crosswise on the bottom and slightly inclined to the axis of the pipe. The pipe is 2½ in. in diameter and the slits are about the same length; that is, they extend about one-third around the circumference.

It required approximately one-half hour to cut all of these slots, about a dozen in number, by means of the blowpipe. The value of the gases consumed was negligible, probably amounting to less than 25 cents. Four to five hours would have been required to do the same work with a hack saw.

The slits in the front pipe were spaced 6 in. apart, while

FIG. 15. UNIQUE SPRAY PIPE IS MADE

those in the rear one were 12 in. apart. The object of this was to determine which spacing gave the best results.

This application of the blowpipe suggests its use for cutting all sorts of perforations in pipes that might be difficult and expensive to accomplish by drilling and sawing methods, and particularly for emergency applications. The shapes of

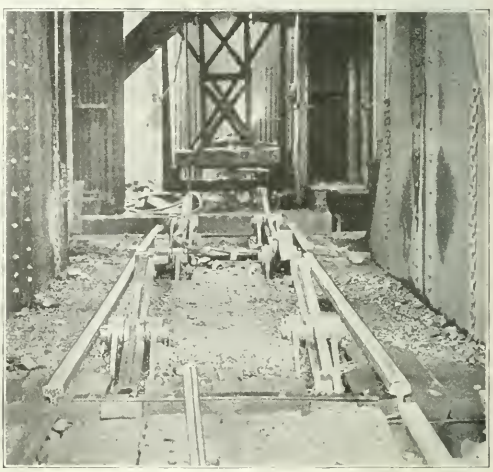


FIG. 16. RAILS CUT ON CAGE

the streams of water in Fig. 15 demonstrate the excellence of the blowpipe as a cutting tool. What slight irregularities there are in the stream forms are largely due to particles deposited from the water. Certain types of damaged or worn screens may be easily repaired by welding in a new metal

*Concluding installment of this article. First part appeared in "Coal Age," Dec. 11 and 18, 1919.

patch and cutting holes in it to correspond with the rest of the screen perforations.

Cutting Blowpipe Aids in Construction

In innumerable instances when erecting new buildings or machinery, or when altering present equipment, the cutting blowpipe is of the greatest service, eliminating much costly shop-fitting work. Fig. 16 shows rails on a cage that were cut in this way saving the time and trouble that would otherwise have been required to send them to the blacksmith shop to be cut. In another case it was desired to cut off two engine crank pins 4½ in. in diameter. Hours of work, that would have been consumed in removing the crank disc and doing the cutting with machine tools, were saved when the operation was performed in a few minutes with the blowpipe.

When steel beams, columns and partitions interfere with the installation of pipe, belt, shafting, wiring, etc., it is often feasible and quite inexpensive to cut a hole or notch entirely through the obstruction by means of the blowpipe.

In erecting steam and compressed air piping it is often found advisable to weld the sections together, as shown in Figs. 19 and 20. This is not only cheaper in many cases than employing screwed or flanged joints, but it has the additional

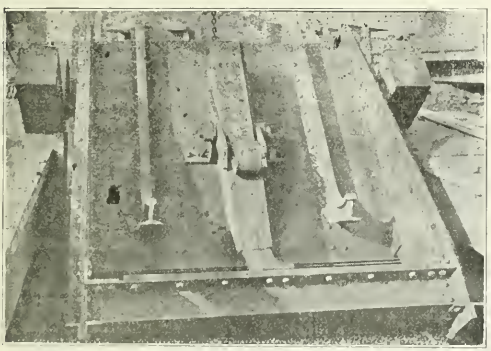


FIG. 17. VIEW OF RAILS AFTER BEING CUT

advantage of eliminating subsequent wasteful leakage and expense for gaskets. It also often simplifies the application of insulating coverings. Where piping must be taken apart at frequent intervals, it may be preferable to leave certain sections with flanged connections, but even in such cases it is often an economy to weld or braze the pipe to the flange, thus minimizing leakage and gasket troubles.

Machinery Guards

Fig. 21 shows extremely simple but effective guards for a grinder, constructed from a few plates of scrap steel. These were cut to shape by means of a cutting blowpipe. The outer plate of each guard was welded to the cylindrical body and the inner plate was bolted on, permitting the guards' easy removal. When such effective guards can be constructed so cheaply, it is an easy matter to properly safeguard every machine of this sort in use.

Fig. 22 shows three fixed guards protecting a heavy belt. Additional removable guards to be inserted between the ones shown were being constructed at the time the photograph was taken. Each guard is constructed of a frame made up of several lengths of 1¼-in. pipe welded together, and panels consisting of expanded metal lath welded to the pipes. A welder and helper required about 3 days' time to construct and erect the three guards illustrated. The pins and nipples embedded in the concrete floor which serve to hold the stanchions and guards, are held securely by pouring molten lead around them. The cutting blowpipe was employed for cutting the pipes, hooks, caps and pins and for perforating the pipe frames of the guards where the meshes of the expanded metal were welded.

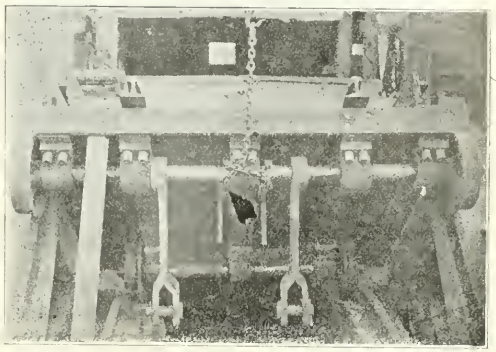


FIG. 18. ANOTHER VIEW OF CUT RAILS

Both welding and cutting blowpipes are used to great advantage in constructing bins, racks and compartments for storing tools and stock. Scrap metal can often be used quite economically by employing the oxyacetylene process.

FIG. 19. A WELDED PIPE LINE

Sometimes a machine tool or other piece of apparatus must be modified in construction to fit it for performing some operation for which it was not originally designed or to adapt it to a different form of drive. In such cases the welding and

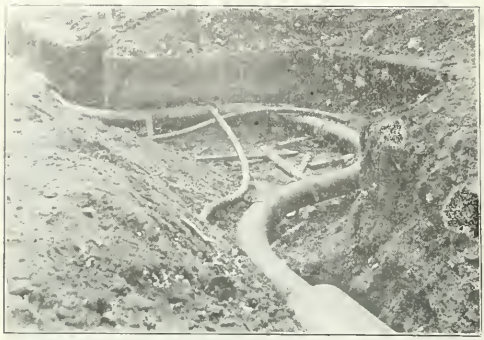


FIG. 20. ANOTHER VIEW OF THE LINE

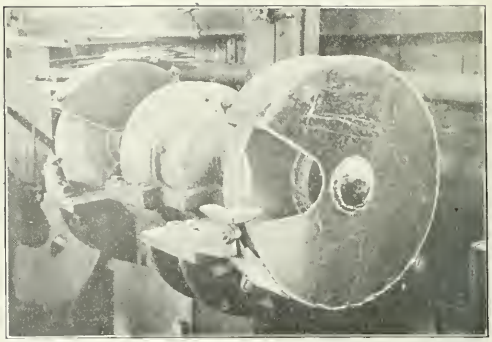


FIG. 21. GUARD CONSTRUCTED FOR GRINDER

cutting process is invaluable. Fig. 23 shows how a lathe was converted in this way from direct electric motor drive to belt drive. A support for the cone pulley bearings was constructed from several pieces of ⅜-in. scrap sheet steel.

In order to show how simple it was to construct this support, the method will be outlined. First, the end pieces of the support were cut to suitable height and shape, while the cone pulley was held temporarily in its approximate final position. These end pieces were then clamped in position, while a sheet of heavy paper, such as is used for roofing, was pressed against the end supports and used as a pattern for determining the outlines of the side pieces. The paper pattern was cut to shape and bent to indicate the positions of the upper and lower flanges; it was also marked to show the location of the bolt holes. With the paper serving as a template, the two sides were marked out and then cut with the cutting blowpipe. They were then sent to the blacksmith, who bent them to conform to the contour of the end pieces. The sides and ends were then oxyacetylene welded at the edges. This completed the support with the exception of the pockets for holding the babbitted bearings on either end. The latter consisted of U-pieces made of sheet steel in which the babbitted bearings were set loosely and secured by means of set screws. The U-pieces were also welded along their outer and two upper edges.

FIG. 22. WELDED PIPE USED AS GUARD

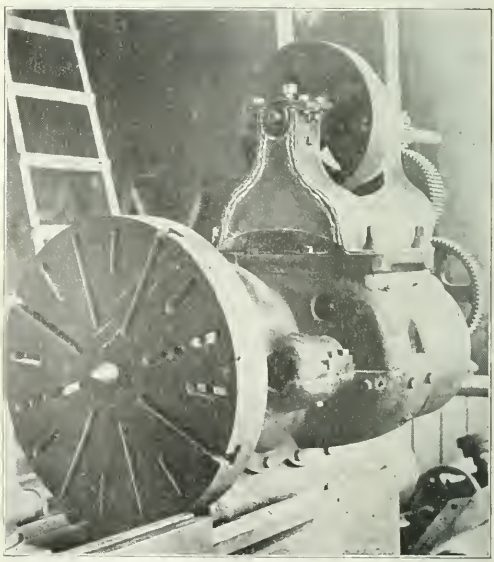


FIG. 23. LATHE DRIVE IS CHANGED

This article has dealt principally with the equipment of the mine shop and breaker. There are a multitude of equally valuable applications of the process to the repair of the mining equipment proper. In stripping operations the welding and cutting blowpipes are frequently called upon to repair various parts of the steam shovels, such as buckets, bucket points, booms, frames, gears, and levers, which parts break or wear out frequently.

In underground work the drills, undercutters and coal punchers contribute their full share to the work of the oxyacetylene operator. Electric mine "mules" and steam and electric pumps, piping, rails and electric wire supports are frequently in need of blowpipe repairs. Rails are often bonded by means of the oxyacetylene process and some operators have found that T-rail frogs are made in a more economical manner by means of welding and cutting apparatus than by means of a blacksmith forge and trip hammer.

Electrical Hazards on Low-Voltage Circuits

By G. E. Kimball
Electrical Inspector

In practically all 110-volt alternating current lighting systems, voltage which is used on the lamp circuit has been reduced through a transformer, the primary side of which is supplied with a much higher voltage. Should the insulation between the high and low voltage sides of the transformer be defective, or should it be destroyed by an abnormally high voltage on the power circuit (which might be caused in many ways) the lighting circuit would then be exposed to the much higher voltage of the primary side of the transformer. It is then that the artificial ground which is required and has been supplied on the secondary circuit is supposed to take care of this abnormal voltage, and to protect the circuit until the condition has been relieved by the blowing of the primary fuses or the "burning out" of the short circuit.

This will explain why one wire of a two-wire lighting circuit will always have a potential to ground, and why, if one comes in contact with this live wire, he will become a part of the electrical circuit to the earth.

In wiring electric lighting circuits, every care should be taken to insure that the live wire is connected to the tip of the lamp, and that the ground side of the circuit is connected to the outside terminal or shell of the lamp. Water is a good conductor of electricity, and where lamp circuits are used in damp places, or over concrete floors in basements, wash houses or any place where exposed grounded or damp surfaces are within reach of the lamp, only heavy, reinforced lamp cord and porcelain or weather-proof lamp receptacles should be used. In wash houses, ceiling fixtures, using pull-chain receptacles with linen cord pendants, or fixtures controlled from wall switches, give the maximum of safety. A brass-shell lamp receptacle is not designed to withstand moisture. A thin insulation of fiber between the current-carrying parts of the receptacles and the outside shell of the lamp does not provide a protection where moisture, steam or vapor are prevalent.

The insulation of the cord being punctured by a fine strand of the conductor, which came in contact with the victim's hand, was recently the cause of a fatal accident where the employee was working on a wet-concrete floor. The man had just completed installing a tank and was inspecting the riveting when the accident happened. The wet concrete floor served as an excellent conductor, completing a circuit of comparatively low resistance. Sufficient current flowed through the body to prove fatal.

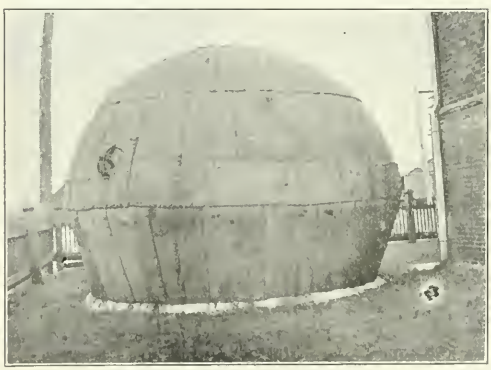
In another instance, a boilermaker's helper was killed in the fire box of a locomotive, which was standing on the repair track in a roundhouse. The portable lamp cord he was using was equipped with a brass-shelled socket. A defect in the socket or a breakdown in the insulation caused the brass shell to become charged, which in turn charged the metal lamp guard. The lamp was accidentally brought in contact with the shell of the boiler, grounding the guard light circuit and blowing a fuse. The boilermaker, who had not yet entered the fire box, went to the fuse cabinet to replace the fuse which was blown. While waiting for the current to be returned to the circuit, the boilermaker's helper in the fire box leaned back against the shell of the boiler, supposedly holding the lamp guard in his hand. When the fuse was replaced in the circuit and the switch closed, the current found its path to the ground through the man's hand, through his body and shirt—which was wet with perspiration—to the shell of the boiler and the track, which of course was grounded. When the boilermaker reached the door of the fire box, he found his helper dead.

An Interesting Old Boiler

The accompanying illustration shows one of the first steam boilers ever used for power generation in Canada. As will be observed, this is not only an old boiler but is of an old design—one seldom used at all this side of the Atlantic.

As may be seen, this boiler is of the ancient caldron, kettle or "haystack" type with slightly indented bottom. Although the hot gases circulated around the sides of the container, the under side formed the major as well as the most effective portion of the heating surface. The volume of water was large compared to the area exposed to the heat, with the result that it required a long time to get up steam, but the boiler would quickly and effectively respond to momentary overload.

The American in his boiler design has always been partial to the cylindrical container in some form or other. Even in the very earliest types built in this country we find this form



THE BOILER AS IT APPEARS TODAY

almost exclusively. Boilers of the kind here illustrated were, however, quite popular in England in the early days of steam engineering, and many of them found use at the coal mines where they were employed largely for operating the Cornish pumps then in use. Their one strong point appears to have been their simplicity, but this was not strong enough to protect them from the encroachments of the more scientifically designed and more efficient Galloway, Lancashire and Scotch marine steam generators. Even in England this type of boiler is now practically, if not entirely, extinct.

It is believed that the boiler here shown is the only one of its kind now in existence in America. It is carefully preserved as a curiosity by the Nova Scotia Steel & Coal Co., being set on a concrete foundation at one corner of this company's general office in the town of Sydney Mines, Nova Scotia.

Van H. Manning Submits Important Plans

THREE projects have been submitted by Van H. Manning the Director of the Bureau of Mines, to Harry N. Taylor, the President of the National Coal Association. Summarized, they are: (1) Full time operation of the coal mines through the coöperative action of the Government, operators, miners and transportation agencies. (2) Development of export coal trade through the coöperation of the operators. (3) A National Coal Institute to be organized along the lines of the National Petroleum Institute.

Dr. Manning describes the first plan as follows: There are periods in which the bituminous mines, especially in the spring and summer months, are not at work, from causes not under the control of either the operator or the miner. These unwelcome shut-downs constitute a considerable percentage of the possible working days in the year, and thus seriously affect the gross income of both the miner and the operator, since each suffers a loss whenever the mine stands idle. Unfortunately the roof does not stand idle—it falls and must be timbered, and water enters the mine and must be pumped out. The mines are idle from one-third to one-fourth of the time in ordinary years. The reason is well-known; bituminous mines are opened and manned on the basis of the maximum or winter output, a condition which, in large part, arises because consumers reduce their purchase of coal in the spring and summer months.

SEASONAL CONCESSIONS TO CONSUMERS

It is, of course, well known that some bituminous coal does not stock well, and although there are ways and means by which this can be done, such coal requires careful storage, and the storing and rehandling costs money. The consumer, however, does not perceive the cost of this to himself. It appears an inconvenience to him to tie up his money so far in advance, and so he does not order coal early in the season. Spring and summer coal purchasing must, therefore, be made worth while to the consumer from a money standpoint. If a business firm using a thousand tons of coal per year could save a thousand dollars by buying early, it is quite probable that it would make its purchases early. A further advantage to this firm would be that, with its supply of coal at hand, it would be independent of conditions, such as winter storms, etc., that might prevent or interfere with the handling and shipping of coal.

Since Congress has enacted laws which operate to prevent price-fixing agreements among operators, it is impossible for them to meet this situation by agreeing to sell their coal for materially less in summer than in winter. It has been suggested, however, that the Government establish summer and winter transportation rates on coal upon a sliding scale basis that would produce an equalization of coal purchases and shipments through all the months of the year.

The effect of this would be to provide steady work for the miners through a readjustment by which fewer mines could furnish the total amount of coal needed. This would not necessarily mean the shutting-down of mines. Mr. Rice, Chief Mining Engineer of the Bureau of Mines, has estimated that the average annual increase of production and use from 1900 to 1916, inclusive, was eighteen million tons, and that probably five per cent of the shipping mines, or about two hundred mines producing twenty-three million tons, were worked out annually, so that there would be required an average of about four hundred new mines each year to take care of the total increase needed of twenty-three million plus eighteen million, or forty-one million tons.

I am seriously considering propaganda work along the above lines, but I would like to have your frank expression of opinion, as representing the bituminous coal operators, as to the advisability of starting it. I realize the impotence of a federal bureau in making any efforts to establish such a plan for an industry as large as the coal mining industry of this country, but I feel that if we can convince the consuming public of the wisdom of storing coal, we could secure the necessary coöperation of the Government, the operators, the miners, and the transportation agencies. How can this be accomplished?

DEVELOPMENT OF EXPORT TRADE

For eight months or more I have been urging the forming of an organization to handle export coal. The coal industry of the country would be greatly benefited by a good export business. Coal from the mines distant from seaboard would find a market in the fields that provided coal for the overseas markets. The Canada trade is more or less a domestic business. We have never had a large export coal business, because Great Britain, through its dominant position in shipping, has had the lion's share of the business. But England has, temporarily at least, lost the larger part of its coal export business through curtailment of production, resulting from reduction in the hours of labor of the miners.

The United States coal export trade should be placed by its own great shipping facilities on a firm basis where it can compete on even or better terms because of our more easily and cheaply mined coal. The export business, while at present extremely attractive on account of high prices, has most serious disadvantages for the individual operator because of the problems of arranging for ships, taking care of demurrage, determining the responsibility of purchasers, etc. Certain large operating companies, long established in the export business, are, of course, in better position to meet the situation, but even such companies are deeply concerned in the present situation, because in the

scramble for business, overseas orders have been secured for coal entirely unsuited to the European market, and in certain instances for coal of very bad quality, thus seriously damaging the reputation of American coals.

The Government has wisely put into the hands of the operators, through the Webb-Pomerene Act, an opportunity for handling export business so that operators who export coal can dispose of their coal to the best advantage. It seems to me that coal exportation is more of a banking business than a coal production business, and my experience in following up this question of export trade leads me to believe that it can be financed if we can secure a combination of operators for the purpose. There is a market in Europe estimated at from forty million to one hundred and fifty million tons per year, to say nothing of the possibilities in the South American republics.

THE NATIONAL COAL INSTITUTE

I am sending you herewith a copy of the "Plan of Proposed Organization of the Division of Research and Statistics of the American Petroleum Institute," prepared by me as Chairman of the Committee on Improvements in Methods of this Institute. This plan was approved by the Board of Directors at a meeting of the Institute in Colorado Springs, on August 27, 1919. This Institute has no connection with the Government, but it is a national organization. This plan is sent to you with the suggestion that the coal industry consider the matter of the creation of such an organization. This plan is sent to you with the suggestion that the coal industry consider the matter of the creation of such an organization at this time, and that in doing so it give consideration to the question of its organization under a Federal Charter.

Operators Protest Settlement

In a statement issued Dec. 12 the operators of Central Pennsylvania set forth very clearly their protest to the settlement of the strike. Their statement is as follows:

Settlement of the bituminous coal strike under the plan accepted by the mine workers officials at Indianapolis, is no settlement whatever of principles at stake in the controversy. It is merely a postponement of the showdown which, in our opinion is bound to come.

The miners' strike was in direct violation of a wage contract approved by the government and to continue until April 1, 1920 or until the declaration of peace, if prior to that date. The miners violated that contract. They are left free to violate any other contract they may make to take its place. There is no restraining influence upon them. The public, under the form of settlement adopted, may be subjected again at any time to the discomfort and distress through which it is now passing. Organized labor has the say as to when this shall occur.

The method proposed by Dr. Garfield for settlement of the strike was interfered with by government officials who knew little of the situation. The problem was taken out of his hands. The operators and the public, as a result, have been delivered into the hands of the United Mine Workers of America. The operators in their resolution earnestly protest against this sham settlement of a controversy which will arise again to plague the American people—a controversy which will not down until it is permanently and finally settled.

There can be no dodging of the issue. It will arise again. It must be met. It has not been met by the coal strike settlement and until it is met, the country is at the mercy of organized labor, whose leaders have been congratulated for their patriotism by government officials.

A resolution was later drawn up and passed by the operators, who in accepting the method of settling the wage controversy state the following: The operators of Central Pennsylvania earnestly protest against the form of the commission and its powers. They demand that a representative commission, similar to that which settled the Anthracite strike in 1902, be appointed and empowered to investigate by public hearings the facts which the American people have a right to know, and the principles upon which depend the future peace and prosperity of this country, and the safety of our democratic institutions.

To neglect this duty is to surrender this industry and other basic industries to an overbearing group that has welded coal interests into a weapon for use against American freedom, and the principle of majority-rule upon which this republic was founded.

C. E. Lesher Leaves the Geological Survey

C. E. Lesher, the geologist in charge of mineral fuels for the United States Geological Survey, has resigned to become statistician for the National Coal Association. Mr. Lesher has been prominently identified with the coal industry since before the war. During the life of the Fuel Administration, he was in charge of its very extensive statistical division, and prior to that time, he served with the Peabody Coal Committee. During the recent coal strike he was a member of the Railroad Administration's Central Coal Committee.

Mr. Lesher was born in LaJunta, Colorado. His technical education was secured at the Colorado School of Mines, from which institution he was graduated in 1908.

Following Mr. Lesher's graduation, he worked as a mining engineer and metallurgist for several companies in British Colombia, Chicago and Buffalo. Nine years ago, he became a member of the United States Geological Survey. Until 1915, he was engaged in land classification work, when he was put in chare of coal statistics. In 1918, he was made head of the Mineral Fuels Division of the Survey.

F. G. Tryon will succeed Mr. Lesher as chief of the division of Mineral Fuels of the Survey.

Dr. Garfield Resigns

The week ended Dec. 13 saw more spectacular developments in connection with the strike than any week since it began. The climax came late Saturday when Dr. Garfield was summoned before the Frelinghuysen Committee and was forced to confirm the insistent rumors that his resignation was a result of the refusal of the Cabinet to carry into effect the principles which he had laid down.

It is understood that Secretary Lane stood firmly with Dr. Garfield throughout the Cabinet discussion of the matter, but the insistance on the part of Secretaries Baker, Wilson, Daniels and Attorney General Palmer for compromise agreement, which is very generally being called here a surrender to organized labor, could not be overcome and the agreement to leave the matter with a commission consisting of a representative of the operators, of the miners and of the public was made.

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Luxury Trades and Ours

WHEN LUXURIES RISE unduly no one makes any complaint. Any one may profiteer in automobiles, moving pictures, talking machines, silks, satins, linens and diamonds without any federal interference. In fact our legislators are disposed to say: "Let them profiteer all they will. The more the silk mercers, linen merchants and jewelers charge, the more the traffic in their wares will decline. High prices will only make for normal living. Men and women will not be so foolish if prices are allowed to mount without restriction."

But high prices do not discourage the buyer. He or she will give up what are almost necessities to buy himself or herself silken apparel. The higher the price for luxuries the lower the price the buyer is willing and able to pay for actual physical needs. Furthermore higher prices for luxuries mean larger stores to attract the luxurious and, in the newspapers, more luxury trades' advertising and more frequent editorial notice and illustrations relative to fashions.

Thus allowing the profiteering of the trades which cater to our love of finery, these trades are expanded. That is always the outcome of profit in commerce. Other industries proportionately suffer by the activity in the luxury class. There should be one law for trade, but if the sharp sword of restriction is to be used in any business it should be against the "Aphrodites" and not the "Atlases of commerce".

Regulation for the servitors of mankind and freedom, even favor, for those who pander to her sybaritism is undoing the country. The Government let the liquor dealers make all kinds of profit out of whiskey without a word of protest, but it got busy when the price of coal threatened to go up 14 per cent. No one has promised to get after the multitude of profiteers who oppress the poor man every time he tries to purchase what is not a necessity, but a folly.

Let the public get back to a sane point of view. A tax on luxuries brings money to the Government and may do no harm, but profiteering on luxuries feeds and multiples the profiteers.

Why Not Explain

MOST of the coal operators in this country have either been mine workers themselves or have studied the mining business at close hand. On the other hand, how many of the mine workers have been operators or mine executives? How many have studied cost accounting, coal selling, office management? How many have paid taxes or know what taxes have to be paid? How many tenants own houses or have owned them or managed them for others?

It is easy to see that the operator knows more about the mine worker than the mine worker knows about the operator. In consequence if there is to be an understanding, the mine workers must be informed about the difficulties and expenses of the operator and how he has more than his mine force to pay and more than his mine troubles to meet. Why not explain the facts to him in posters or by pamphlets? If he takes the wrong view of things, the remedy is simple. Inform him.

The public never sees a mine. A man the other day was explaining how coal that he said cost $2 to mine was costing him $7.50 delivered. He had overlooked railroad expense, retail-yard cost and delivery and many other items, among others the fact that he was accepting not the run-of-mine coal but the screened coal which was only a fraction of the whole tonnage. He agreed that it was true that the coal he got was sized coal and not run of mine but was added that if the operator sold the small coal also he must be making about $12 a ton. He was not an unintelligent man and how he arrived at his false conclusion it is hard to imagine. Evidently he thought the weight at the mine was the weight of the screened coal only, as indeed was formerly the case, or that the operator charged the purchaser with the original weight of the mined coal and extracted without deduction the undesired slack.

Another man wanted to know if the slack coal came from certain mines, and the lump coal from other workings. One would-be operator learned how much the miner got per ton for coal loaded on the car at the face of his room and overlooked all the other costs, except those of management and selling. He learned after a while, at the cost of a million dollars or more, that there were other charges in cost accounting that could not be ignored.

The public is grossly misinformed. Why not explain matters to them? The mine workers and the rest of the people are not so ill-purposed as they are ill-informed. Why not explain?

Some people insist that the world owes them a living. But they seldom convince this sad old earth of the justice of their claim even after a lifetime of effort.

College Graduates Here and Abroad

LOUD IS THE CRY that the college man of the country starts with inadequate pay and gets a job only with difficulty. Perhaps it may serve a useful end to show how it goes in Great Britain. There your newly emitted college man is not regarded as sufficiently safe and sane to be entitled to pay. He expects to put himself under a skilled professional man to whom he must pay a certain annual fee as compensation for inducting him into the mysteries of the profession.

The young man from college who pays such a fee tacitly confesses that he had not arrived to years of discretion and a practical knowledge of the work. He is therefore quite a little less bumptious than the American college graduate. He carries his honors more lightly, and, as his mentor is paid for bearing with his crudity of scholarship and with his lack of experience, professional and social, the young cub holds his job even though many exceptions may be taken to his training and behavior.

There are many objections to the British method. No one in the United States would favor its adoption, but standing as it does, it draws attention to the fact that college is but at the threshold of the professional man's career. Some of the young college men view the marble halls of their *alma mater* with too much reverence. They believe they give ripened experience, that they teach what a mixture of thought with hard work can alone indoctrinate.

Professors, perhaps, fail to instruct their charges that much learning refuses to be coaxed to the blackboard, the mine model, and the lecture. The picture of life is not life itself. Only time in the actual practice of a profession can fill with life what has been only outlined in the college course.

Neatness is an outward sign of inward efficiency. All signs fail in a dry time but when a mine surface plant presents a generally haphazard appearance it is a fairly safe bet that many other conditions in and about the works are anything but ideal.

Decline Interest in Public Utilities

A PERIOD APPROACHES when the really productive business world will stand stock still. The railroads which, at one time, absorbed most of the accumulated wealth of the country are no longer being extended or improved. The street railroads are being abandoned. Copper mines are idle for lack of demand from steel railroads, and the prospect of supplying copper for the conversion of steam railroads to electric becomes increasingly remote.

Iron and steel plants only expand because of the demand for automobile steel. No one cares what iron and steel costs because it goes less and less into real utilities. Coal mines suffer because of the lack of demand for coal. There is no longer the growth in demand that the steam and electric railroad development continually fostered. Mayor's committees may sometime get a firm grip on rents and then building will decline. A strangle hold is being put on the gas manufacturers and progress in gas manufacture may eventually be stifled.

No one puts money now into public utilities, because they are not allowed to make any more than a fair profit and are never defended against an unfair loss. The room into which the public utilities are conducted is like that into which a certain pirate drove his victims. It had a ceiling and no floor. The poor manacled creatures could not go up, but every opportunity was given for a drop to perdition.

Imagine a traveling man touring the country endeavoring to float stock for the building of a railroad and assuring those he approached that they would get 6 per cent if the railroad succeeded in attracting trade but that they, of course, must expect, if they couldn't induce people to come into the district or ship goods over the line, to lose all they invested. How many takers would he secure? None.

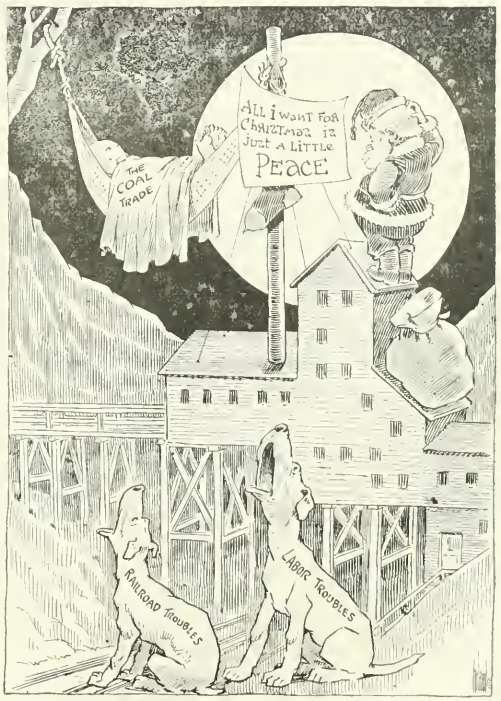
Yet that is just what we are doing with the railroads today. We are breaking faith with those who constructed them. They promised themselves that the traffic would pay them a big profit if it could be attracted to the line, and they ran the risk with that in view. Now we cut their rates to the quick, sometimes below the possibility of successful operation.

We offered them a chance for their money, a chance that was, in the bulk of instance, disastrous. They took it in the hope that it might perchance furnish them an opportunity to make generous profits. We have let the failures pass unlamented, and the successes have been regulated till there is only a moderate profit or a tremendous loss. The investor has been cheated once. Nowhere can another investor be found to build a road under the old conditions.

The public utilities are dying and development is dead. The public will stand crowding, freezing, starving, idleness, waste of time, discomfort, dirt and danger rather than pay a fair price for any public service, but for luxuries it has plenty of money to throw away. The girl who will by a $300 cloak will prove to you that she could not pay 10c more per day for transportation without keen distress. And what is more it's true. The cloak has the dimes coralled for months in advance.

He Dreams of Peace

CONCURRENT with the coming of the 25th of December will ever be the hanging up of the stocking the night before. It is then that we are privileged to direct our dreams into whatever channels Fancy may choose. The Coal Trade while having had one of the rockiest—if not the superlative itself—years in its history can well lay down on Christmas Eve and know that the coming year cannot bring forth anything that will make his journey more troublesome. In fact the spirit is well expressed in the saying, "There isn't any such thing". This Christmas Eve it is a case of "Everything to gain and Nothing to lose".



Courtesy of the Retail Coalman

DID HE GET A STOCKINGFUL?

Not unlike the one in Thanatopsis who wraps the drapery of his couch about him and lies down to thoughts of pleasant dreams, has the Trade approched his hammock as portrayed by the artist. While he has but one thing to be thankful for; that he has survived the year, he fully realizes that he is in for better days and we may assume that Christmas morning found him with more to be thankful for than when he laid down the night before. It would be almost an impossibility to have injected into his life more tumultous events than he has experienced. No wave of trial and tribulation can dash itself against the bulwarks of his soul more ruthlessly than the one that has preceeded it.

DISCUSSION *by* READERS

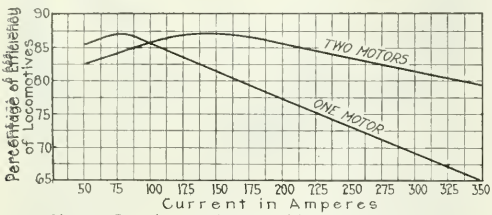
EDITED BY JAMES T. BEARD

Performance of Storage Battery Mine Locomotives

Letter No. 1—In the discussion that has taken place, from time to time, in "Coal Age," regarding the behavior of storage-battery locomotives in mine work, it would seem that some of the chief points of real value to the prospective user of this class of equipment have been ignored by the several writers.

The efficiency of mine locomotives equipped with small motors is very low, particularly when consuming large currents. A comparison of the efficiencies of locomotives equipped with different sizes and capacities of motors will, therefore, be interesting.

The standard practice of the manufacturers of the trolley type of locomotive, of installing 10 hp., per ton weight of locomotive, is essential for the efficient operation of this



Motors Rated: One Hour - 80 Volts - 175 Amperes
Gear Efficiency: Single-Motor Type 95%; Two-Motor Type 94%
Gear Loss not included in Curve
Both Locomotives Equipped with Ball Bearings

PERFORMANCE CURVES OF ELECTRIC LOCOMOTIVES

type of machine, and when larger motors are installed a greater efficiency is obtained.

Series motors are used almost exclusively for railway haulage, and these are generally rated at what is called the one-hour rating, on account of the service being intermittent. The efficiency of these motors is maximum at a much lower rating, and this point is called the "normal" or "continuous rating" of the motor.

EFFICIENCY DEPENDS ON OPERATION OF MOTORS AT THEIR NORMAL RATING

If a storage-battery locomotive is operated at a point that approximates the normal rating of the motors it will prove highly efficient and, conversely, if operated on overloads the efficiency is very low. This is a point that should be emphasized, and the attention of storage-battery locomotive manufacturers called to it, by the prospective user insisting that the largest motor equipment possible be installed in their locomotives.

The point of maximum efficiency of this type of locomotive being at the one-hour rating of the motors, it is evident that as all vehicle type motors have approximately the same maximum efficiencies, the smaller the motors installed, the point of maximum efficiency of the locomotive will be at the maximum at the smaller loads. Necessity demands, however, that the locomotive be efficient when it is consuming heavy currents and, this being the case, the locomotive that will perform hard work efficiently will also do work that is easier to preform.

The curves shown in the accompanying figure indicate clearly that the smaller motor equipment is more efficient when operating at a low-current rate, while the larger-motor equipment is most efficient when the locomotive is operated on heavy haulage or on severe grades requiring more current. In other words, the larger the motor equipment, the more efficient the locomotive becomes when the work is difficult.

GREATER PERCENTAGE OF SAVING WITH A LARGE CURRENT CONSUMPTION

The saving in current is small when the current rates are small, even if there is a difference in efficiency; but the saving in current is greatest when the current consumption is maximum, if there is any difference in efficiency at all. The curves show that there is a difference in efficiency that should not exist. The motor from which this curve was taken is the largest vehicle-type motor made by the Westinghouse Company and the curve issued by them is used in making this comparison. The errors made in retracing the curve will not vary over one per cent.

The locomotive manufacturer cannot change the performance of the batteries, and must take what the customer prefers; but they can arrange to use these batteries more efficiently, by taking every advantage that is offered, as mentioned above.

Companies have gone to great expense to equip locomotives with ball and roller bearings, and thereby save about one per cent. of the power used. If this will compensate for the extra expense of providing such bearings, how much more would it pay to save ten or fifteen per cent?

Ironton, Ohio. J. SOMERS.

Labor and Democracy

Letter No. 3—In the discussion of this subject in "Coal Age," remedies have been suggested that appear to have no appreciable effect in stemming the tide of unrest that prevails in the industrial world today. It would seem that where radical conditions exist drastic remedies should be applied, as being the only means at hand to restore normal conditions.

Conservative labor now, as in the past, readily yields to an intelligent, democratic solution of the problems that continually arise in coal mining. This element understands that something cannot be gotten for nothing and they appreciate the difficulties of the situation that, at present, are baffling the public.

An unprejudiced canvass of the labor situation will convince almost anyone that the rational and intelligent element of the labor in this country is in a mood for a constructive solution of the industrial problems that confront the nation. When both the leaders of industry and intelligent labor point the way to an amicable solution of their differences and repudiate the destructive theories that are keeping the situation in the balance, there is hope for

good results. Conservative forces will always accept a solution that is tempered with fairness and justice; and this is probably true, also, of the radical forces, to a considerable extent, although some force and discipline may be required to bring them in line and compel them to listen to reason.

OPEN VERSUS CLOSED SHOP

There is but one democratic idea, regarding labor, that ever has or ever will stand the test, and that is, the open shop. The open shop raises labor above the mere level of a machine, and gives it the dignity that it should enjoy. It stands for those principles of the Constitution of our country that distinguish labor here from the poorly paid and poorly appreciated labor of many foreign countries. The open shop is the most democratic institution that can be created. Where adopted, it has never failed to promote efficiency, increase earnings and establish a closer relation between employer and employee. It has enabled ambitious workers to realize their ambitions.

Speaking of bonuses, profit-sharing plans and similar attempts to bridge the chasm between capital and labor, it can be said that where any or all of these are scientifically applied, the result is to increase the efficiency of the open-shop plan, while they only serve to aggravate the difficulties of the closed shop. In the open shop, a man's earnings are readily measured by his ability to perform, which is the fair and only democratic method of adjusting industrial relations. The plan enables the employer to pay higher wages to the man who makes good, and sets no limit on the possibilities of the worker.

On the other hand, the closed shop is based on principles that are opposed to democracy; it puts a crimp in a man's ambition. The earning capacity of a capable and intelligent worker is restricted by a certain standard of wages, which is arbitrarily fixed by the union dominating the industry that permits it, and earnings can only be increased through the siege of long and unprofitable strikes.

I recall working in a shop where $2 was considered a good day's wage, although a few of the men employed there received $3, $3.50 and $4 a day, because of their greater skill and ability. Wages were increased voluntarily and based on the merit of the individual worker. It was nobody's fault that a man was incapable of earning more than $1.50 or 2 a day but he alone was to blame or it was his misfortune. A man who proved naturally inefficient was replaced by another man and given the opportunity of making good at some other job. The plan made every man the architect of his own fortune.

WHAT THE CLOSED SHOP MEANS TO THE HONEST WORKMAN

In strong contrast with this condition, the closed shop destroys individuality, crushes ambition in the workmen, all of whom are reduced to the same level of dependence on the union, which is expected to accomplish what the man's own initiative should bring about. The closed shop imposes its own inexorable will upon the members in a manner undreamed of from bosses. The prejudice of a committee will often cause a man's discharge or make it so hot for him that he is glad to quit of his own free will.

In the closed-shop plan, the worker is not his own master. He is not free to express himself if his thoughts are opposed to the ethics of the leaders. The very atmosphere of the shop breathes fear and distrust in the worker, who is ever in danger of offending the autocrats of the union. A man who is a bad worker but a good member is all right; but a good worker who is an indifferent member needs to watch his step, as the eyes of the committee are always turned his way. His very life is apt to be made miserable, until he leaves the employ of the company, or commits a breech that gives the committee the longed-for opportunity of recommending his discharge.

Should the company discharge a worthless, inefficient worker; or should they refuse to discharge an employee who has given offense to the committee, a strike is almost sure to follow. A company is frequently compelled to pay a poor and inefficient worker a stipulated wage when it would be more profitable to pay him the same amount to keep away from the plant altogether.

In closing, let me say that when good American workmen shall have awakened to the readjustment of our industrial chaos, and the open shop shall have come into its own once more, then there will be better coöperation between employer and employed and the labor problem will be solved.

Thomas, W. Va. LOYAL WORKER.

Finding a Mine Door Set Open

Letter No. 13—The question of finding a mine door open when the fireboss starts to make the examination of a mine is an important one, especially under the conditions that have been described by Richard Bowen, "Coal Age", Sept. 11, p. 462, where a feeder is said to be burning in Chamber 5 and gas accumulated in Chamber 2.

It has been a hard and fast rule with me, in all my experience as fireboss, whenever a door is found standing open whereby the ventilation is cut off from the section of the mine to be examined, to leave the door in the position in which it was found until a hurried examination can be made of every place in that section. If everything is all right I would then return and close the door.

On the other hand, if a condition is found similar to that described by Mr. Bowen, I would certainly leave the door open and at once place a danger signal at the mouth of the section to prevent anyone from entering the place. Having done this, I would proceed to put out the fire, taking every precaution not to disturb the ventilating current until the feeder was extinguished and an inspection had been made of the remaining portion of the section to satisfy myself that it would be safe to close the door.

Then, returning and closing the door, I would wait a sufficient time for the restored ventilation to sweep away the gas accumulated in Chamber 2, and permit no one to enter until this was accomplished and the entire section examined again.

STARTING THE EXAMINATIONS ON THE RETURN

With Mr. Bowen, I believe that the majority of firebosses are governed by geological conditions, in respect to the choice of starting the examination at the intake or the return end of their section. I am much inclined to favor commencing at the return end, for several reasons.

In the first place, beginning at the return end and finding a door open at any point of the section, the fireboss knows it is safe to close the door at once, as he has just examined that portion of the section. Second, I believe a fireboss can tell quicker when anything is wrong if he is traveling against the current, and have a better idea of the quantity of air in circulation. Of course, if a main door controlling an entire section is open, no air will be traveling and the fireboss would then proceed at once to the intake end to ascertain the cause of the trouble. Third, if the mine is warm a fireboss traveling against the air keeps cooler and does not find himself bathed in perspiration when he has finished his run. There are other reasons I could mention, but these will suffice to show the advantage of starting at the return end when examining a mine.

Forty Fort, Penn. ROBERT THOMAS.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Electric Lighting Equipment

We are considering a proposition to supply our small town with electric light, and are desirous of ascertaining if the following equipment, which we have on hand, will be sufficient to do the work. I should like to ask how many incandescent lamps can be operated without going to the expense of securing further equipment.

There is an upright cylindrical boiler 36 in. in diameter with seventy-two 1½-in. flues, 6 ft. long. The grate bars are 24 in. below the bottom of the flues and draft is supplied by a 25-ft. stack. A 25-hp. upright steam engine is located within 30 ft. of the boiler. The electrical equipment consists of one Crocker & Wheeler motor, 230 volt, 20 hp. The pinion on the engine shaft is 13.732 in. in diameter, while that on the motor shaft is 3.797 in. in diameter. The motor is run with a silent chain 5 ft. 5 in. long.

GEORGE CAIN, SUPT.
Orme, Tenn. Battle Creek Coal & Coke Co.

It is only possible to give a very approximate estimate of the number of incandescent lamps that can be operated by the use of the equipment described. The necessary data are wanting that would enable anything like accurate information of the horsepower of the upright boiler. Judging from practical experience, a 36-in. upright boiler, containing 72 1-½-in. flues, 6 ft. long, might develop, say 15 hp.

Assuming, however, a circular grate 30 in. in diameter, having an area of 4.91 sq. ft., and basing the calculation on a height of stack of 25 ft. above the grate, the calculated draft available for burning the coal is

$$\text{Draft} = 0.8\ K. = 0.8 \times 0.0075 \times 25 = 0.15 \text{ in. water}$$

Then, with a draft indicated by 0.15 in. water gage, it may be assumed that the maximum combustion rate of Tennessee coal will approximate 14 lb. per sq. ft. of grate area, per hour, or 14x4.91 = 68.74 lb. of coal burned in this furnace per hour. Then, taking the average heating value of Tennessee coal as 13,800 B. t. u., and assuming a boiler efficiency of say 50 per cent, since 1 boiler horsepower is defined as the equivalent evaporation of 34.5 lb. of water per hour (from and at 212 deg. F., and the latent heat of evaporation is 970.4 B. t. u., the equivalent of a boiler horsepower is the absorption of 34.5x970.4 = 33,478 B. t. u. per hour, and the horsepower this boiler should develop in burning this coal under the given conditions is

$$\frac{68.74 \times 13{,}800 \times 0.5}{33{,}478} = 14.16 \text{ boiler-horsepower}$$

But, for a feed-water temperature of, say 60 deg. F., and a gage pressure of 100 lbs. per sq. in., the factor of evaporation is 1.198, which makes the steaming rate of this boiler, under these conditions,

$$\frac{14.16 \times 34.5}{1.198} = 408 \text{ lbs. per hr.}$$

Now, assuming the water rate of the engine as 35 lb. per indicated horsepower-hour, we find the indicated horsepower available for driving the generator 408 ÷ 35 = say 12 i. hp. Taking the mechanical efficiency of the engine as 90 per cent and that of the generator as 80 percent, the combined efficiency is 0.8x90 = 72 per cent, and the output of the generator is equal to 0.72x12x0.746 = 6.445 kw, At a pressure of 230 volts, the current would be 6445 ÷ 230 = 28 amp.

Finally, using the 100-watt lamps, the number of such lamps that it would be possible to operate with this equipment, under the assumed conditions is 6445 ÷ 100 = 64 lamps, excepting line losses, for the calculation of which no data are available.

Coal Seams, Connellsville District

Kindly give the relative positions of the different coal seams worked in this district, together with an idea of their average thickness.

Connellsville, Penn. THOMAS MOORE.

The most important of the coal seams of the Connellsville district is the Pittsburgh coal, having a thickness of 8 ft. This seam is generally taken as a basis in describing the coal measures of that region. The upper productive measures include the Red Stone, lying from 50 to 80 ft. above the Pittsburgh coal and having an average thickness of from 3 to 4 ft. About 125 ft. above this is the Sewickley seam, average thickness of 2 to 3 ft.; again, from 150 to 170 ft. higher up is the Uniontown seam, thickness generally less than 3 ft.

The lower productive measures include the Upper Freeport, which is the thickest of the lower coal ranging from 3 to 7 ft. in thickness and lying about 600 ft. below the Pittsburgh seam. The coal is only of fair quality. About 200 ft. lower down is a seam known as the Lower Kittanning, which is irregular and has a thickness of from 2 to 4 ft. The Brookville-Clarion, lying from 50 to 75 ft. below, is generally thin and unimportant.

More detailed information regarding the relations, thickness and quality of the coal seams in the Connellsville district are to be found in the Brownsville-Connellsville Folio of the United States Geological Survey, available in most reference libraries.

Owing to the necessity of sending "Coal Age" copy out of town for publication, during the confusion contingent upon the printers' strike, numerous irregularities will have been observed in the appearance of the magazine and particularly in the matter prepared for the Discussion and Inquiry Departments. It has been impossible for the editor of these departments to see the proof or avoid numerous errors that have occurred and which could not be prevented under the existing conditions. In several instances, cuts have been unavoidably omitted from letters when much needed to make clear the meaning of the writer of the letter. Although these cuts were prepared and ready at the time the copy was set up, they were overlooked in the conclusion of getting out the delayed issues. It is earnestly, however, hoped that these conditions will not long prevail.

EXAMINATION QUESTIONS

ANSWERED BY
JAMES T. BEARD

Anthracite Foremans' Examination Carbondale, Penn., May 6, 1919

(*Selected Questions*)

Ques.—There are 100 persons employed in a mine classed as gaseous, in one split or current of air. The velocity of the air current is 900 ft. per min. and the sectional area of the airway is 90 sq. ft. (a) Do the above conditions conform with the mine law? (b) If not, explain fully the part or part of the mine law that is not complied with.

Ans.—(a) Assuming the given velocity is an average for the entire section of the airway, the quantity of air in circulation is 900 x 90 = 81,000 cu. ft. per min., which allows 810 cu. ft. for each person employed in the split of air mentioned. The Anthracite Mine Law (Art. 10, Sec. 3) provides for a minimum quantity of air of 200 cu. ft per min. for each person employed in the mine and as much more as the circumstances may require. Therefore, as far as the quantity of air supplied is concerned, it is within the requirements of the law.

However, the law states further (Sec. 7): In no case, in mines generating explosive gases shall the velocity exceed 450 lineal ft. per min. In this regard, therefore, the law is violated since the velocity is given as 900 ft. per min., in this airway or split. Again, (Sec. 6) the law limits the number of persons employed in a single split of air and provides that not more than 75 persons shall be employed at the same time in any one current or split. In this respect, also, the law is violated by the employment of 100 men in a single split.

Ques.—Find the quantity of air passing per minute in an airway 14 ft. 6 in. by 6 ft. 9 in. when the anemometer registers 542 r. p. m.

Ans.—The sectional area of this airway is 14.5 x 6.75 = 97.875 sq. ft. Then, assuming that the reading of the anemometer is an average reading for the entire section of the airway, the quantity of air in circulation is 542 x 97.875 = 53,048+ cu. ft. per min.

Ques.—State the duties imposed by the mine law on the mine foreman that cannot be delegated to others.

Ans.—This question probably refers to the provision of the Anthracite Mine Law (Art. 12, Rule 3), which gives the mine foreman charge of all matters pertaining to ventilation, stating that the speed of the ventilators shall be particularly under his charge and direction; and any superintendent who shall cause the mine foreman to disregard the provisions of this act shall be amenable in the same manner as the mine foreman.

Ques.—Explain the proper method of thawing dynamite cartridges.

Ans.—Dynamite, when frozen, is dangerous, and cannot be used until it is thawed, which requires the utmost caution. The thawing must be done gradually at a low temperature. Dynamite freezes at a temperature of about 45 deg. F. In its frozen condition, the explosive should not be cut or broken, but must be handled with the utmost caution. The frozen explosive loses much of its force and, if used in that condition, the explosion is only partial.

When frozen, dynamite should never be thawed by exposing it before a fire, or by placing it on a shovel for heating, or holding it over the flame of a candle. Neither should it be immersed in hot water, as the water is liable to cause the nitroglycerin to ooze out from the cartridge. When dynamite is to be thawed in large quantities, for daily use in a large mine, a special thawing room should be provided in a dugout or other isolated place. The room should be provided with shelves on which the sticks of frozen dynamite are placed. The room should be heated with a small steam coil and the temperature closely watched to see that it does not exceed 75 or 80 deg.

A simple and safe method of thawing small quantities of dynamite is to place it between layers of fresh manure in a box. This will supply sufficient heat for the purpose. Another method for thawing small quantities is to place the sticks of the frozen explosive in a suitable vessel or container that is immersed in another vessel containing water, which is kept at a low temperature sufficient for the thawing.

Ques.—Is it necessary to tamp holes charged with dynamite and, if so, how would you do this with the greatest degree of safety and obtain the best results?

Ans.—Owing to the fact that the detonation of dynamite is instantaneous and the force of the explosion is radiated equally in all directions from the charge, the tamping of a hole charged with dynamite is unnecessary, except to hold the charge in position at the bottom of the hole. For this purpose, a small wad of soft clay can be inserted in the hole, after the charge is forced home. In general, the tamping of a hole charged with dynamite is considered of little importance.

Ques.—Find the number of square feet of rubbing surface in an airway 4 ft. high, 9 ft. wide and 1000 ft. long.

Ans.—The perimeter of this airway is 2 (4+9) = 26 ft.; and its rubbing surface is, therefore, 1000 x 26 = 26,000 sq. ft.

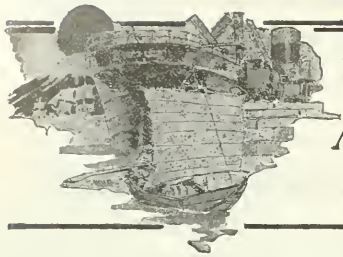
Ques.—The course of a heading is due east. A counter is driven off the heading in a direction N 30° E, and the chambers are driven on a course of N 10 W. (a) What is the angle between the chambers and the counter? (b) What is the angle between the chambers and the heading?

Ans.—(a) The angle between the counter and the chambers is found by adding the northeast course of the counter to the northwest course of the chambers, which makes this included angle 40 deg.

(b) The angle between the chambers and the heading driven due east is found by adding the northwest course of the chambers to the 90 deg. in the northeast quadrant, which gives, for the required angle, 100 deg.

Ques.—When the fireboss reports in the record book certain dangers that he has discovered during his examination, what is your duty as mine foreman?

Ans.—It is the duty of the mine foreman to examine carefully the fireboss' report each day and to sign that report as evidence that he is acquainted with it and has a knowledge of any dangers that are reported as having been discovered by the fireboss in his exmination in the morning.



FOREIGN MARKETS AND EXPORT NEWS

Market for American Coal in Argentina

Social Unrest in Argentine at the Present Time is Not Conducive for a Heavy Demand of Coal. The Future will likely see a Brisk Competion between Coal and Fuel Oil

This subject will have to be considered both in its relation to the present conditions governing the market for coal in the Argentine and what may ultimately be the conditions to be met with once business has resumed its normal trend abroad and in the industrial life of the republic.

At the present time, due to the social unrest in Argentine and the semi-paralization of manufacturing and industrial centres, the demand for coal is very limited. Along the Riachueo River where are located many of the large manufacturing concerns of Buenos Aires, the partial shut-down of the factories has reduced the consumption of coal to less than one-tenth the normal demand. Firms accustomed to consuming 5,000 tons a month are satisfied with 250 tons; while others which formerly had standing orders for 1,000 tons per month, are taking from 30 to 40 tons.

On the railroads, which are mostly British owned, during the war when coal was unobtainable, local hardwoods were substituted with fairly satisfactory results and while now one is beginning to see supplies of Cardiff coal on these roads, the consumption of quebracho logs as fuel continues to be an important industry, a condition that is likely to exist so long as ocean freights remain at high level and the cost of coal production what it is. A recent price for hardwood delivered within the city limits was $22.00 gold per ton. Even with cheaper coal, until the country begins to solve the many labor troubles and confidence is restored, the demand for foreign importations of coal, is not likely to increase.

The visible supply of coal on hand at the present time does not exceed 5,000 tons in the coal yards of the city. This does not include some 30,000 tons of bunker coal held for account of a foreign government by a certain well-known coaling firm, but notwithstanding this fact, so limited is the demand that a dealer in American coal customarily carrying large deposits in stock and with 5 steamers en route, is not hesitated to sell three of these cargoes and will keep only two cargo lots on arrival to replenish his stores.

As previous to the war the monthly consumption and importation of coal was estimated at 300,000 tons, the falling off of the demand is evident and this at a time when the need for this product usually is greatest at the beginning of the Argentine winter.

During the years 1917 and 1918 the consumption amounted to 60,000 to 70,000 tons, the gap being filled with crude oil, local and imported, hardwoods and even corn and linseed oil cake used as substitutes.

With coal at $25.00 gold a ton, a sale of fuel oil was effected recently at $20.00 gold per ton, to compete coal would have to have sold at $15.00 per ton. The possibilities of crude oil becoming in the near future a serious competitor for coal in the Argentine market, once trade conditions become normal should not be overlooked. There are those who have made a serious study of this point and who are of the opinion that within three years liquid fuel will have practically supplanted coal in the Argentine except for limited consumption and it is predicted that this will prove a more serious competitor for American coal than the Welsh product which heretofore controlled the market.

Objections to American Coal compared with British product are said to be due largely to ignorance of the methods of firing and the difficulty of forcing new methods of stoking upon Spanish firemen long accustomed to handling British coal.

American coal, due to the exigencies of the war, found a ready sale notwithstanding local prejudice and claims of inferiority to Cardiff in a market jealous of its former monopoly. One large American firm of coal mine owners foreseeing the coming coal shortage and recognizing the possibilities for introducing their product, sent experts to Buenos Aires to investigate the field and later on establish large "barracas" or yards to which they brought quantities of American coal which they preceeded to offer to the trade. Ordinarily this would have been taking chances but the move was justified by war conditions at that time, with the result that the product of this particular concern is now well established.

It will be seen therefore that study of conditions by parties interested is necessary with the probability of having to invest considerable capital and engage in the educational work before establishing a market for their product.

Coal is sold in current account, which means that bills are not presented for 30 days with an additional 15 days before payment may be expected, this in addition to the 30 days consumed on the voyage, so that it is evident that considerable capital is required to finance a business of this nature.

Present prices of coal delivered at warehouse within city limits are:

($1 Arg. Gold = 96½ cents U. S.)

Steam coal	$32.00 Arg. gold per ton
Domestic coal	42.00 Arg. gold per ton
Smithy	42.00 Arg. gold per ton
Anthracite coal	48.00 Arg. coal per ton
Foundry coal	50.00 Arg. gold per ton

Business is done almost entirely through local representatives of foreign concerns, most of whom carry stocks, principally on consignment. Owing to the prevailing scarcity, some direct orders have been placed with American concerns, but the normal trade is carried out by the representatives carrying stock here.

The avarage stocks carried amount to:—

2/3000 tons of Steam coal
1000 tons of Domestic coal
500 tons of Smithy coal
500 tons of Foundry coke
500 tons of Anthracite

Coal Trade of Italy

Small amounts of coal are produced in Italy, but none that is suitable for a steamship fuel. Italy, therefore, is dependent on foreign coal for its extensive bunker trade. The main reliance is British coal, but imports of American bituminous increased very rapidly during the first years of the war, as the following table indicates:—

Fiscal Year.	Long Tons.
1914	776,422
1915	1,328,279
1916	2,797,506
1917	1,099,508
1918	201,220

The imports of coal from Great Britain in recent years were as follows:—

Year	Long Tons.
1913	9,017,570
1914	8,113,700
1915	5,409,934
1916	5,422,949
1917	4,068,340
1918	4,054,000

The effect of the increasing shortage of shipping upon the shipment of coal to Italy is clearly indicated in the foregoing tables. German coal was supplied in small quantities at the larger coaling stations of this region before the war.

Naples is the chief bunkering port of Italy. The amount of bunker coal normally available ranges from 35,000 to 50,000 tons. The stock includes the leading British and American grades and is handled by British and Italian firms, among the former being Cory Bros. and Co., Ltd., of London. Bunkering is conducted rapidly, either from the docks or from barges, and large passenger lines have taken aboard as much as 800 tons per hour. The bunker trade of Naples amounted to over a million tons in 1913 and to 882,000 tons in 1914.

Genoa, though more important commercially than Naples, ranks below it as a coaling port. Before the war the stocks of bunker coal on hand were very large—approximately 250,000 tons—but much of this was the property of the steamship lines serving the port. By November 14, 1916, the stocks had dwindled to 80,000 tons. The usual British grades—Cardiff, Monmouthshire and Durham—and smaller quantities of American grades—Pocahontas, New River and Georges Creek—are carried in stock. The chief exporter of American coal to Italy is the Consolidation Coal Co. The principal British dealer is Cory Bros. and Co., Ltd.

Spanish Coal Trade

There are large coal-bearing areas in Spain, but their development has been so backward that their yield is insufficient for domestic consumption. The production of bituminous coal since 1913 has been as follows:—

Year	Long Tons.
1913	3,783,214
1914	3,965,080
1915	4,136,000
1916	4,847,475
1917	5,024,766

About one-half of the output of bituminous coal is mined in the province of Asturias, in the north-western part of Spain, on the Bay of Biscay. The Asturian coal is of varying quality, some being well suited for steamship fuel, but practically all the bunker coal is imported.

Before the war the imported coal was mainly British and ranged from two and a half to three million tons per year. The Spanish Government sought to encourage domestic production by offering a bounty equivalent to 54 cents per ton on the domestic coal shipped to Spanish ports, but this appears to have had little or no effect.

When the war checked transportation from Great Britain the import duty and transportation tax on foreign coal was removed, and American coal began to enter the Spanish market in increasing amounts. The exports of bituminous coal from the United States to Spain since 1914 have been as follows:—

Fiscal Year.	Long Tons.
1914	42,875
1915	100,547
1916	159,758
1917	209,712
1918	44,440

Within the limits of this trade region are included such important coaling stations as Fayal and St. Michael's, in the Azores, Las Palmas, Lisbon, Gibraltar and Barcelona. At all these stations British coal is used and is generally in the hands of British dealers. Before the war the largest dealer in bunker coal in Spain was the Anglo-Spanish Coaling Co., Ltd., of Cardiff. As only Spanish concerns are allowed to deposit supplies of coal in Spanish ports in bond, this company operates through a subsidiary corporation, the Compania General de Carbones, with its head office in Barcelona. This company maintains coaling facilities at Bilbao, Barcelona, Cadiz, Cartagena, Coreobion, Corunna Pasages, Santander Valencia and Vigo.

America's Record Exports

Returns as to America's coal export trade show that for the first eight months of this year a new record has been created. In that period the overseas coal shipments were greater than the total yearly shipments of any previous year. Exports to Canada, Cuba, and Mexico are omitted from these returns, as in such countries the United States has always been predominant as a coal exporter by reason of geographical nearness. In September of this year over one and a quarter million tons of American coal were shipped overseas, the approximate average annual exports before the war being about half a million tons, not including Canada. It will be seen that notwithstanding the troubles America has encountered with respect to her coal trade she is gradually assuming a dominant position in the world's markets. Owing to the inability of this country to export greater quantities large orders have been received from France, Italy, Spain, Portugal, and Scandinavia, and there is every indication of shipments to these countries being maintained. It can be said that the United States has never yet produced coal to the maximum of its ability. When the present labour troubles are over it is quite possible that the United States will settle down and increase its output by millions of tons per annum. The country, too, now possess the necessary ships without leaning upon this or any other nation. South America, to which country some millions of tons of British coals were annually exported, lies within her grasp. Depots are being established all over the world, and when British outputs increase and more normal times arrive it is inevitable that the United States will be enabled to permanently maintain a large slice of the overseas coal trade which at one time was exclusively supplied by Great Britain. The poor outputs which have resulted from the agitation of colliery workers has meant the loss of millions of pounds to this country—a loss which could well have been avoided if the colliery workmen chose to have avoided it. Our overseas coal trade, too, has been permanently impaired by our inability to adequately supply our foreign customers.

London Coal Trade

The London Market has been better supplied during the week, says the "Colliery Guardian" of Nov. 27, 1919, but there is still a pronounced shortage. The all-absorbing question has been the alarming announcement of the decrease of 10s. per ton in all household qualities from Monday next, Dec. 1.

The decision to reduce all house coal prices came upon the few traders who were assembled late on the market today like as a bombshell. The news did not reach the Exchange until very late and comparatively few were present when the telegram arrived from the House of Commons.

During the earlier part of the market on Monday, there was a fairly large attendance and buyers were keenly alert for any opportunities of picking up any coal that may be offering as all the merchants look upon the situation for the coming winter as being very serious, but the moment the announcement of the proposed reduction was made, the whole aspect changed and everyone seemed anxious to cancel all orders on hand or at any rate to hold them over until Dec. 1. The Metropolitan area has had a fairly liberal allocation of coal, largely at the expense of other districts. The bulk of the merchants have been compelled to put winter stocks on the ground, and although an appeal was made to the Controller during the bitterly cold weather in October, to pick up certain of the stocks to fulfill the pressing needs of the public orders, this was rigorously refused until after Christmas, and now with all the coal on hand, and paid for at the higher prices an enforced loss of 10s. per ton is brought to bear upon all the traders, unless some compensation is allowed both for coal in stock and in transit during the current week.

The Liverpool Market

During the past week the steam coal market has witnessed some changes, for the reduction of 10s per ton of household coal, commencing last Monday, has had the remarkable effect amongst other things, of putting up prices in the steam coal business. The price of best South Wales Admiralty coals has increased by an almost like amount as is shown in the reduction of house fuel. One well-known coal contractor, reviewing the situation and the anomalies resulting, said "its a question of shuffling. What is lost on the swings is made up on the roundabouts." And in this way no doubt the loss of house coal will be recovered on the steam coal. As the latter consumption is much greater than the former, it is easy to see that an adjustment is possible and comparatively simple.

In Cardiff prices are soaring, and 110s and even more is now being asked for South Wales bunkers, two-thirds large and one-third small. This has had an effect upon "local" coal prices, and it is believed these will rise correspondingly, though the increase has not so far reached the limit of the South Wales rise. Coal is difficult to obtain at time of writing, and the steaming of craft at Cardiff, etc., against charterers. Owing to the action of the American authorities the ships employed on the Atlantic trade are requiring more coal to complete the return trip. America looks after her own flag, and the hint might well be taken by our own Government during times of stress. Comparisons have been made between America's policy and that invariably followed by our own authorities.

Scotland Coal Market

Business in the west of Scotland coal trade continues on the usual lines from a statement made in a recent issue of "Colliery Guardian," and a little alteration is noticeable. Outputs perhaps, appear to be increasing a little and everything at present points to a steady trade throughout the winter months. Domestic demands have been particularly pressing, and with such keen weather as was experienced some days ago, the rationing allowance is most inadequate. Industrial requirements are steadily maintained and the situation has been improved by the restart at the steelworks. Exports continue on much the same level, and greater facility in the granting of licences and a better supply of carrying tonnage are very necessary. A little more foreign business has been done, but the bulk of this trade is still coastwise. The shipments for the past week amounted to 96,187 tons, against 88,601 in the preceding week, and 72,703 tons in the same week last year.

Collieries in the Lothians are doing a steady local turnover. While neutral tonnage is more frequent on the east coast than on the west of Scotland, the foreign shipments only aggregate about one-third of the returns for the week which amount to 29,349 tons against 28,583 in the preceding week and 14,154 tons in the same week last year. Now and then, however collieries in this district have been able to fix remunerative consignments to neutrals. Much similar conditions pertain in the Fifeshire district, only to a greater degree. Clearances are a good average for the year, but foreign shipments only amount to just over 6,000 tons, or an aggregate for the week of 46,064 tons, against 41,602 in the preceding week and 20,310 in the same week last year.

The aggregate shipments from Scottish ports during the past week amounted to 171,600 tons.

Irish Coal Trade

Although the severe weather has moderated, merchants continue to be busily engaged, and so far there is no further chance in prices at Dublin. Supplies are somewhat better and stocks are improving, but heavy storms have interfered with the arrival of steam colliers for the past week. Quotations range from 54s. 6d. per ton for standard coal to 62s. 6d. and 63s. 6d. per ton for second and best qualities respectively, retail 4s. 6d. per bag; coke 66s. 6d. per ton in the city; turf £4 10s. per ton, or 30s. per load of 16 coal bags. The total quantity of coal discharged upon the quays during the past week was 16,600 tons, as compared with 21,914 tons the week previously, coal vessels being chiefly from Maryport. A contract is open in connection with the Dublin Port and Docks Board for a twelve months' supply of coal. Last week a special meeting of the Nenagh Urban Council, Tipperary, was held to consider the coal shortage in the town, which amounted to a famine, when it was decided to communicate with the Coal Controller in order to have the situation relieved. During the past few weeks there has been an actual scarcity of fuel in Athy, Queen's County. It is stated that there is at present a very large demand upon the Irish coal mines which are working, one of the principal collieries being quite unable to deal with the orders received. By the Coal Controller's orders industrial undertakings only are being supplied, and those who were customers in 1917. It is hoped that in the course of the next few months the situation will have improved and the output increased.

Coal Shortage and Congestion in South Wales

Congestion still prevails on the railways and docks of South Wales, and the delays which wagons are subjected to is limiting to a good extent the outputs of Welsh coal.

Mr. Findlay Gibson, the secretary of the Coal Owners' Association has presented a statement which clearly shows the serious congestion on the railways and docks, the failure of clearing traffic at the collieries, and the delays of wagons in transit, all of which continue to have a serious effect upon the work of the collieries.

One of the factors, it is stated, which contributes toward the loss of shifts, is the delay in transit and return of colliery wagons sent to inland destinations, but arrangements are now being made to supply an additional 10-15,000 tons per month of anthracite coal to inland consumers, which it is stated, must have the effect of still increasing the congestion on the railways. It is essential that further wagons should be made available for coal for inland consumption if the requirement of home consumers are to be adequately met.

Coal Resources of Canada

The November number of the Monthly Commercial Letter issued by the Canadian Bank of Commerce contains an interesting item on the coal resources of Canada with particular reference to the utilization of the peat deposits of the Dominion.

The labor unrest in the coal fields of the United States has again directed attention to the fact that important districts in Canada are dependent on them. In the fiscal year ending March last the value of the coal and coke exported from the United States into Canada was $79,000,000, and two-thirds of it was consumed in Ontario. For the previous fiscal year the actual tonnage of coal imported into the Province was 16,250,000, out of a total for the entire Dominion of 21,649,000 tons. The industries of Ontario have frequently suffered from interruptions arising from labor and transportation difficulties, and the serious nature of these interruptions forced itself on the attention of the public during the war, when the supply of the much-needed munitions, 53 per cent. of which were produced in Ontario, was limited through this cause. Fear of the recurrence of such conditions and apprehension as to the supply of fuel for domestic purposes gave rise to more active efforts for the utilization of local sources of fuel.

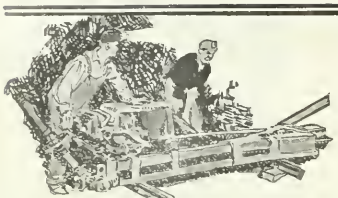
Although Canada as a whole has coal resources greater than those of any country in the world with the exception of the United States, the mines are farther from the industrial centers of Ontario than are the coal fields in neighboring States. Ontario has, however, large beds of peat, the commercial uses of which have been investigated by Government experts, and they are now able to report practical results. It has been determined that peat can be used in combination with coal; and while it will not take its place, it promises to reduce our dependence on imported fuel. Tests made at Alfred, Ontario, indicate that peat ready for use can be supplied at $3.50 per ton at that point. At this figure there is now a reasonable prospect of its production becoming an important commercial enterprise.

Coal Shortage Ties Up Japanese Shipping

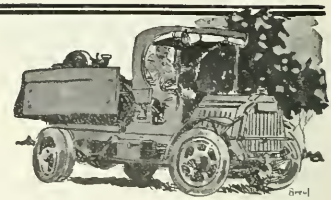
Labor troubles in the United States and England and the decrease in movements of cargo from the Orient to Europe have seriously affected the charter market in Japan.

The coal situation is very acute, and among shipping men there is uncertainty as to the effect it will have on business. There has been no material increase in the coal production, and it is thought that it will be a considerable time before adequate supplies of bunker coal can be obtained. Meanwhile many Japanese ships are indefinitely tied up.

The activities of American shipping in the Pacific are causing some apprehension to Japanese shipping. The carrying trade in this ocean was practically monopolized by Japanese ships during the war, but since the armistice the Pacific Mail Steamship Company and other American concerns have opened new service between America and the Orient. It is reported that as the terms of the American companies are more favorable certain large Japanese importers have contracted to ship a large quantity of raw cotton and steel in these ships.



COAL AND COKE NEWS



Fairmont, W. Va.

Nearly all miners at work in northern West Virginia during second week of December. Fairmont field alone loads 8177 cars of coal and coke. Much coal goes west. Railroads take 3454 cars of fuel for own use. General shortage of cars expected until equipment is restored to natural routes.

More coal was mined and loaded in northern West Virginia regions during the second week of December than at any time during the life of the coal strike. Between Nov. 1 and the second week of December there were few weekly working periods in which all the miners were at work. However, northern West Virginia miners were nearly all at work during the second week of December, as the result of a vote taken during the previous week, the miners not waiting for the temporary strike settlement reached at Indianapolis.

As a logical result of such conditions in the Fairmont field alone, a total of 8177 cars of coal and coke were loaded, that representing 407,300 tons of coal and 31 cars of coke. A total of 6767 cars of coal and coke were produced and shipped from the Monongah division alone of the Baltimore & Ohio R. R. There was a larger output of coal in fact from Monongah division mines during the week ended the thirteenth than during the same period of 1918. Loadings on the Monongahela Ry. reached a total of 1410 cars, almost equal to loadings during the last week before the outbreak of the strike.

More coal was shipped West during the week ended the thirteenth than in the other direction, the figures being 3,600 and 3,136 cars, respectively. By far the largest proportion of Western shipments went to Ohio points. More than half the fuel produced on the Monongah division of the B. & O., during the period alluded to, already was utilized by the railroads, there being 3454 cars of railroad fuel shipped to the B. & O., Central of New Jersey, New York Central and other roads. Much of the coal from northern West Virginia is now being allowed to go forward to original consignees, although subject to diversion in certain instances.

While mines in northern West Virginia, at the outset of the third week of December, were supplied with just about enough cars to meet requirements, a general shortage of empties before the end of the week was forecasted; in fact it seemed to be inevitable and will continue, railroad officials state, until equipment is restored to its natural route or routes.

There was still due operators of northern West Virginia regions on the middle of the month, approximately $3,500,000 for shipments diverted and confiscated during the period of the strike, only about one third of the total shipments made having been paid for.

Bluefield, W. Va.

More healthy conditions of marketing and collecting for coal shipments during second week of month. Cars going to southern fields. General shortage of cars anticipated. Large production in Williamson field. Little change on Winding Gulf. Pocahontas field experiences most severe car shortage of year around the twelfth.

While the production of coal in the Pocahontas and adjoining regions remained unchanged throughout the second week of December, and while there was little prospect of any change during the pre-Christmas period, yet there was a decided change in the distribution of coal, particularly because of the abandoning of diversions which during the strike have played havoc with ordinary marketing and collections. There was in fact a very marked increase in the shipment of coal to the east including tidewater points. Cars were pouring into the southern fields at a great rate throughout the second week of the month, but a general shortage of cars was anticipated owing to the fact that cars would be in demand elsewhere in view of the resumption of operations generally, and to the further fact that so many cars belonging to the Eastern Car Pool had been shipped far out of their beaten path.

Mines of the Williamson field continued to live up to their reputation of previous weeks for large production, which remained at 150,000 tons or about 80 per cent. of capacity, with only about 9,000 tons lost through a car shortage. Miners appeared to be bent upon earning as large an amount as possible before Christmas, losing only 100 hours in all; fortunately cars continued to be plentiful during the early part of the third week of the month. The tonnage of coal being diverted was limited in amount and Williamson coal was again moving eastward to some extent. Despite repeated promises, however, up to December 17, payment for coal shipped during the period of the strike was not forthcoming and producers were quite seriously embarrassed.

There was little or no change in mining conditions in the Winding Gulf field during the second week of the month, slight gains only being made. For the first time in a period of six weeks, the diversion and confiscation of coal had ceased except in cases of emergency, and coal from the Gulf was beginning to flow in its natural channels once more.

Transportation and general working conditions throughout the Pocahontas region were conducive to a large production throughout the second week of the month until about Friday, the twelfth, when there was a sharp decline in the supply of cars. In fact cars were so scarce, that it portended a suspension of operations at some of the smaller mines. Both railroad officials and coal operators, in view of the shortage which began to manifest itself on the twelfth, regarded as unavoidable one of the most severe car shortages of the year.

Delivery of more eastbound coal from the Pocahontas region and the rescinding of the order relative to the shipment of all Clinch Valley coal west over the Louisville & Nashville and the Carolina, Clinchfield & Ohio featured the week in the southern part of the state. Eastbound coal through Bluefield was almost twice as large in volume during the week ending the thirteenth as in previous weeks. Shippers in this part of the state were still facing a financial stringency owing to the delay in receiving remittances for the heavy volume of coal shipped since November first.

Huntington, W. Va.

Decrease of 50,000 tons in Logan output in second week of December. Loss due to car shortage. High water and power trouble the causes. Production 56 per cent Logan operators in serious straights. More than million dollars due on shipments. No cooperation by railroads in payment for coal confiscated.

Production in the Logan field hit the toboggan incline during the second week of December and slid downward for a loss of about 50,000 tons as compared with the output for the previous week; there being only 198,000 tons mined and loaded as against an average of well over 240,000 tons throughout the strike; so that in a large measure the gains made through the resumption of work at union mines were wiped out by losses in the Guyan field. The greatest source of loss was a car shortage amounting to the startling total of 122,000 tons or about 35 per cent. of capacity, car shortage, losses during the six weeks of the strike having been at a minimum.

It was not so much the fault of the Chesapeake & Ohio that the supply of empties was limited as it was the elements, damage to bridges in the Guyan field making it difficult to move either trains of loads or empties. Power trouble also entailed additional losses, that and high water cutting down production to the extent of over four per cent. One result of high water in the Guyan field was to shut down a few of the smaller mines. Owing to causes enumerated there was a production of not more than 56 per cent during the week ended Dec. 13, making a difference of more than 1,000 cars in shipment under the previous week. At the beginning of the third week of the month, the car supply was also limited there being only a little more than five hundred loads out of the Guyan on the fifteenth, and the car supply in the field during the early part of the week named is not averaging over 700 cars a day. All Guyan coal is still being routed to western markets, an embargo against eastern shipments to tide water still being in effect. At the present time no Logan coal is being confiscated.

By far the largest proportion of coal shipped from this field, in the period between Nov. 1 and Dec. 15 and, in fact, since the latter part of October, still remains to be settled for: Logan producers having found it necessary to borrow very extensively in order to avoid the financial graveyard. Railroads have shown an absolute lack of co-operation in making payment for coal confiscated or diverted. The sum of more than a million dollars representing shipments from this field, is still due operators for shipments made between Nov. 1 and Dec. 15. Producers of the Guyan region also have been in rather desperate straights owing to the lack of knowledge of final consignees of diverted coal and owing to the tardiness of railroads in making settlement for coal confiscated.

Gains in the tonnage handled by the C. & O. on its entire system, during the second week of December, were almost completely offset by a decrease in shipments from the Logan district. Substantial gains were made in shipments from the New River, Kanawha, Coal River, Sandy Valley & Elkhorn and Long Fork territories. As the number of cars handled during the first week of the month was 10,487 or a total of about 524,350 tons and for the second week of December 10,561 cars, it will be observed that the gain was limited to 74 cars or about 3700 or 4000 tons.

Charleston, W. Va.

Miners generally at work in West Virginia by Dec. 11. Kanawha region the exception. Amount of wage increase in question in district No. 17. C. & O. mines anticipate car shortage. Most serious question, payment for coal shipped between Nov. 1 and Dec. 13. The "check-off" controversy again to the front in New River field.

When the order to miners of districts No. 17 and No. 29, covering all the organized fields of West Virginia, was received Thursday, Dec. 11, it found practically all union miners in West Virginia at work except those in the southern part of District No. 17, in the Kanawha region. Miners elsewhere in district No. 17, or in the northern part of that district, embracing sub-districts No. 3 and No. 4 in northern West Virginia, were already at work in normal numbers and were producing almost the normal amount of coal. For what reason the agreement reached at Indianapolis, under the terms of which miners were to return to work under the 14 per cent. increase, pending an investigation of the cost of living and coal prices, did not materially alter conditions except in one part of the mining fields of West Virginia, during the second week of December. That the first order cancelling the strike had not been issued in good faith, and was never intended to be obeyed was demonstrated by the alacrity with which the miners, as a whole, obeyed the second order, except in a few isolated instances.

Even after the president of district No. 17 had ordered the miners back to work, it was by no means certain that the operators would get off with a 14 per cent. increase, because the officials of the United Mine Workers were insisting that the Central Competitive field wages also be paid in district No. 17—another case of broken contract and

bad faith, according to the operators. The cancellation of the strike order did have the effect, however, of increasing production slightly, although such increase was somewhat nullified by adverse conditions in the unorganized Guyan field.

While the Chesapeake & Ohio mines had not begun, during the second week of December, to feel the pinch of a car shortage, it was regarded as inevitable, and it was generally anticipated that it would take place during the third week of the month (or just before Christmas), owing to the large amount of Eastern Car Pool equipment in the far West and the large amount of equipment yet remaining to be unloaded at various points.

Of paramount interest to West Virginia operators in this section of the state, by the middle of the month, however, was the question of financing themselves. It presented a most serious problem owing to the fact that little or no coal, shipped from this section between Nov. 1 and Dec. 13, (most of which had been confiscated or diverted), had been paid for. Conditions were such that the companies which had not been producing a large tonnage, between the dates mentioned, were better off than the companies which had produced large quantities of coal, owing to the fact that the means devised by the Railroad Administration for financing the coal companies had proved utterly inadequate.

As instructions to miners in the Kanawha field to return to work, did not reach them until late Thursday, and as it required a day or so to get the mines in the district ready for operation, the tonnage produced in the Kanawha region during the second week of the month was almost insignificant. However, a large number of miners had reported for duty by Friday, and by Saturday virtually all the mines in the district were in operation, though of course a good many mine workers were waiting until the beginning of the following week to return to work. Miners at Lee Vale and Blakely, where radicals appear to have the upper hand, were the only ones, so far as known who were proving to be recalcitrant.

Prior to Dec. 12, however, the tonnage of coal mined in the Kanawha field was rather small. Only about 25 mines were at work at the outset of the week, although at the same time all the mines in the district (district No. 17—(northern West Virginia) were in operation. By the time an agreement was reached at Indianapolis, about 45 mines in the Kanawha field were active. Officials of district No. 17 contend that the Government intended that the miners in district No. 17 should be paid the 14 per cent. increase plus the difference paid in the Central Competitive field as between that section and the Kanawha field.

While officials of district No. 29 (United Mine Workers) had ordered the men back to work in that district which embraces the New River region, it was with the proviso that they return to work under the "check-off and closed shop." To this a number of companies demurred, it being generally understood that the contract of Sept. 1 had been abrogated by the strike of miners on Nov. 1, although the attempt is being made to have the contract be revised and along with it the "check-off", not only the operators but many miners in the New River field are objecting, especially in view of the fact that those who favored the check off were the very men who would not and did not work during the strike. Notwithstanding the uncertainty of what might transpire in the New River field, as the result of the controversy over the "check-off", there was a gradual increase in production in the New River field throughout the second week of the month, the output by Friday, Dec. 12 being at the rate of 80 percent. of normal with 91 mines in operation, as against 81 the day previous. Saturday's production was somewhat smaller.

Indianapolis, Ind.

Geologist makes report to state conservation commission on coal mining in Indiana. Cites great waste in mining. Recommends legislative action looking to improvement in conditions. Cooperation of commission's geology division and Indiana University.

W. N. Logan, geologist for the state conservation commission, in a report to the commission on coal mining in Indiana says the waste in the mining of coal in Indiana is greater than the average waste in the mining of bituminous coal, reports the "News" of Indianapolis

"In some states," reported Mr. Logan, "the waste has been reduced to 50 per cent. of the coal mined but the waste in Indiana has not been reduced to that minimum. The waste here has been much greater than it is at present, but there is need for still greater improvement."

Mr. Logan classifies the waste causes as follows: Not robbing the pillars in the room and pillar system; unclean mining in the strip pit method; leaving coal containing partings; producing unrecoverable culm; leaving coal around horse-backs, bells, etc.; mining lower beds before upper beds.

He recommends that the legislature enact "laws to require the mining of all coal beds, two feet or more thick, in the order of their succession from the surface;" he recommends the use, wherever possible, of the long wall system as the most productive method; he recommends the balancings of timber conservation against coal conservation in replacing coal pillars, and advises against the ruining of good agricultural lands to obtain coal from strip mines for temporary benefits.

The report came as the result of the cooperation the commission effected between its geology division and Indiana University. The two state forces united for a geological survey of Indiana's natural resources and the coal report is one of the first. The report goes into some detail as to coal mining in Indiana and how waste may be prevented.

Richard Lieber, director of the commission, deemed the report of such constructive value that he has arranged to have it printed in full in the Indiana yearbook which is to be off the press in January.

Pottsville, Penn.

Coal mined in the heart of Pottsville at an early date. Captain Baird Halberstadt produces authority for interesting statement at meeting of Schuylkill County Society. Historical data presented. Captain Halberstadt fuel administrator for the district.

At a meeting of the Schuylkill County Historical Society, at Pottsville recently, Captain Baird Halberstadt surprised a large audience by proving that coal was mined in Pottsville in 1784, a number of years before the alleged discovery of anthracite at Summit Hill by Philip Ginther in 1791.

Captain Halberstadt, who is Federal Fuel Administrator for this district, proved his assertion by producing a copy of an Act of the Pennsylvania Legislature, dated March 15, 1784, in which reference is made to the coal mines at Balzer's saw mill, in what is now the heart of Pottsville.

The real pioneer in the use of anthracite declared Captain Halberstadt, was the venerable Dr. Thomas C. James, of Philadelphia, who used anthracite in 1804 and predicted that it would become the general fuel for Philadelphia and vicinity, a prophecy which has been abundantly fulfilled. In thus making the first use of anthracite in 1804, Dr. James, at Philadelphia, was four years ahead of Judge Fell at Wilkes-Barre, who first used hard coal in a grate in 1808.

It is curious to note that these pioneers in the use of coal at Philadelphia and other points met much prejudice. Up to 1820 wood was so plentiful and cheap that the use of coal made little progress.

In connection with the discovery and use of coal, attention is directed to an article entitled, "The Story of Coal," which appeared in the Mar. 6, 1919, issue of Coal Age.

Birmingham, Ala.

Friendly suit to test coal and iron ore tonnage tax validity. Action to be brought against Republic Iron and Steel Co., in accordance with agreement between state and operators. All coal and iron ore operators to assist in defense. Operators claim tonnage tax is discriminatory and double taxation.

Suit is being prepared, it is stated, to test the validity of the coal and iron ore tonnage tax incorporated in the general revenue bill passed by the legislature in September. It is understood that the Republic Iron and Steel Co. will be the defendant, the state of Alabama the plaintiff and that the action will be instituted in Jefferson County. It will be in the nature of a friendly suit continues the "Birmingham Age-Herald", and it is believed that a final decision by the supreme court of the state can be obtained in a few months.

Several weeks ago an agreement was reached by the coal and iron operators and Governor Kilby, State Auditor Smith, Treasurer Bradley and the state Tax Commission, whereby the tonnage tax should be paid over to Treasurer Bradley, as an individual, in trust to be held by him until the supreme court could pass on the constitutionality of the tax act.

Under this agreement checks for the amounts due have been made out by the various operating companies and delivered to Mr. Bradley, who is holding them in a separate fund in trust, according to the agreement.

The Republic Iron and Steel Co. mines both coal and iron ore in this state, and it is understood that it was selected to contest the validity of the tonnage tax for that reason. While the action will be against the Republic company, it is understood that all coal and iron ore operators in the state will aid in the defense, each bearing its proportionate share of the cost. The state, in its petition, will set out the passage of the revenue act, including the tonnage tax; the date on which tax payments were due, and alleged failure to pay.

According to information gained from one of the operators, they will contend that the tonnage tax clauses of the revenue act are invalid in that it is discriminatory and double taxation and includes other objections, which they declare, clearly are in violation of the constitution.

In passing the revenue act the legislature classed the tonnage tax as a license or privilege tax, which, if true, probably would not make it double taxation.

The operators contend that the fact that it comes under the license classification does not in fact make it a license tax, and that the courts will be compelled to construe the act according to its real meaning and not necessarily according to the interpretation put upon it by the legislature.

Ashland, Ky.

Northeastern Kentucky ships 186,490 tons of coal in second week of December. Car supply good. Greatest handicap to production is lack of settlement for coal, $2,000,000 due operators for November shipments. Suspension of mines probable unless help is forthcoming.

While the output of mines in northeast Kentucky during the week ended Dec. 13 was about 1,000 tons less than during the first week of the month, amounting in all to 186,490 tons, yet it was 45,000 tons in excess of production for the same period of 1918, showing a gain of 25 per cent.

Transportation companies were equal to the demands made upon them for empties and for the movement of loads, although it became necessary for them to draw on their reserve crews and to use additional motive power. The 14 per cent. advance in wages had a healthy effect in northeast Kentucky fields and miners were bent upon earning as much as possible before the Christmas holidays began.

The greatest handicap imposed on producers, however, and which threatens to seriously impede production unless the situation is remedied, is the failure of the railroads to make settlement for coal received and used. Banks had about reached the limit of their lending capacity, and producers were at a loss as to how to secure financial assistance in order that they might continue operations. Fully three-fourths of the coal shipped from northeastern Kentucky during November had not been paid for up until the middle of December, there being due operators the sum of approximately $2,000,000 for November shipments of coal.

Jobbers up until the fifteenth had been the principal source of help in financing operators, but by the date mentioned the jobbers themselves had exhausted their resources and were no longer in a position to extend further help. Indeed, it was stated that unless help was forthcoming during the third week of December, there was every probability of a number of mines having to suspend operations. While the promptness of the railroads in paying for fuel diverted to the railroads for consumption has been widely advertised, operators claim that as a matter of fact there had been no such promptness. Relief was expected from the present situation through the fact that coal was to be moved to regular customers without interference by diversion and through the fact that the regular trade might make the payments sufficiently prompt to save mine owners from suspending operations.

Vancouver, B. C.

At the first annual meeting of the Canadian Mining Institute to be held in western Canada, which took place from Nov. 26 to 28 inclusive, at Vancouver, B. C., the coal mine operators of British Columbia were well represented. Special provision was made for those specially interested in the industry, the greater part of the program on Thursday morning, Nov. 27, being devoted to subjects relating to coal mining; arrangements were made to take those who wished to go on a tour of inspection to the Nanaimo, Wellington, and Cassidy collieries. Many made the trip, which took place on the following Saturday, and enjoyed it; their reception by the man-

agements of the various companies being cordial and thorough, provision was made for underground tours.

At the Thursday morning session referred to, O. E. S. Whiteside, of Coleman, Alberta, occupied the chair, and the first address was made by Prof. Joseph Daniels, of the geological staff of the faculty of the University of Washington. He told of the popularity of British Columbia coal in the state of Washington, because the consumer liked the fine large lump coal which was placed on the market. Coal mining in Washington, he said, was difficult, most of it being done by hand because, owing to the dip of the seams, machinery was not feasible. He thought that coal mining in that state was more expensive than elsewhere through high labor costs, mining difficulties and the cost of development. Furthermore much fine coal was made and consuerable of it had to be washed.

The action of the Granby Consolidated Mining and Smelting Co. in opening its own mines on Vancouver Island to supply its new by-product ovens at Anyox, had the effect of decreasing the demand for coking coal in Washington. R. R. Wilson, of the Granby company's collieries, at Cassidy, contributed an interesting paper on the Cassidy camp, plant and housing accommodation. Thos. Graham observed that the Granby company had set a pace in coal mine conditions that it would be difficult for other operators to follow. F. W. Gray, of Montreal, contrasted the conditions at Cassidy with those obtaining in eastern camps in which he reflected much credit on the former. H. N. Freeman, Black Diamond, Wash., read a paper in which he urged greater co-operation between officials and workmen in the mines. If more thought were given to this it would lead to a reduction of friction and better results. One point brought out was the practice of operators of arranging for the sale of more coal than could be produced without consultation with the mine management.

Nanaimo, B. C.

In discussing progress in first-aid and safety-first appliances and training in connection with the coal mines of British Columbia, credit is given the Canadian Western Fuel Co., of Nanaimo, as being the first concern of its kind to take up in this province the training of its employees in first-aid and mine-rescue work. It was the first company to voluntarily install mine-rescue apparatus and institute a training station. This was done when T. R. Stockett, of Vancouver, was general manager, and Thomas Graham (now general superintendent of the Canadian Collieries, Ltd.) was general superintendent of the company. It was also the first company to use seismographs in its mines, daily readings being taken to give warning of the possibility of explosions attending seismatic disturbances. The Canadian Western Fuel Co. now has organized a First-aid and Mine-Rescue Association with a membership of about 200. A meeting is held each Sunday morning, at which a lecture is given or paper read on some branch of mine-safety work, after which addresses are given by medical men on first aid. Following the inauguration of the work by the Western Fuel Co., the Provincial Government passed legislation requiring that mines be equipped with safety apparatus and that employees should be trained in its use. All important mines in the provinces, therefore, now are so provided.

Victoria, B. C.

Thomas Graham, general superintendent of the Canadian Collieries, Ltd., in discussing the present condition in British Columbia in regard to the coal supply, makes the plea frequently heard that the consumer would do much to assist the producer by purchasing his winter fuel in the summer, or at least by getting over the habit of waiting until the first cold snap comes before placing his order. Mr. Graham describes the position of the collieries as follows:

"The mines of Vancouver Island have a steady bunkering business with the steamship companies through summer and winter. A large portion of their output, however, is for domestic consumption. In order that both classes of consumers shall have a steady supply, it is necessary to equalize the summer and winter output. If the householders neglect to stock coal during the summer for winter consumption, it generally happens that a severe period of cold weather in the winter will create an unusual demand for coal, and the mines cannot keep up with both their domestic and bunker orders. Then they are faced with the disagreeable situation of refusing coal to those shipping companies that have made it possible during the summer months to keep the mines operating and give employment to large numbers of men. This, of course, endangers future business from such a source. In order to keep miners employed steadily throughout the year, it is necessary to have a steady demand all the time, and this is the reason that for years the operators have been trying to induce people to buy their coal supply months in advance."

PENNSYLVANIA

Anthracite

Hazleton—The proposed new coal washery at Silver Brook, south of here, will be operated by electricity, according to plans of the operators. The power will be obtained from the Harwood Electric Co.

Scranton.—The First Christian Church on North Main Avenue was quite seriously damaged recently by a mine cave which is thought to have occurred over workings of the Leggett Creek Coal Company. One of the main concrete supports under the church was destroyed, windows broken and the heating system demolished.

Scranton—Residences in the 900 block, West Elm St., to the number of nearby a dozen, were damaged in a surface subsidence recently. All water service in the neighborhood was discontinued. The gas main also was broken but the break occurred during the day time and no one was injured by the gas fumes. Many of the homes affected by this subsidence have been damaged by previous caves.

Pottsville.—Albert Thompson, of Philadelphia, a coal operator, has sold his coal lands in this county, he announced recently, for $300,000. There are 10,428 acres in the tract and the stamp tax alone on the deeds cost $300. The purchaser is S. Maud Kammerling. The lands were recently heavily taxed by the County Commissions at a valuation of $350,000.

Hazelton—A Philadelphia daily states that "coking" of culm from the anthracite mines, hitherto only of value in special forced draught furnaces, is being tested by George Wilmot, local iron works owner, in connection with a process invented by a Philadelphia chemist. Anthracite coal does not coke but when culm is mixed with suitable binders does form briquettes. This process noted may include some new method of this kind.

The experiments are said to be exciting wide interest, as their success would throw on the market millions of tons of coal which are available for such a purpose. The tests are in progress in a lumber yard, which is closely guarded. It is understood the anthracite culm "coken" into fuel the size of egg coal.

Bituminous

Josephine—The Smith Coal Co. recently installed electrical equipment at its Jewel No. 1 mine here and the modern installation has Pearson property at this place, announcea the battery locomotives are used to gather the coal. The present production is about 300 tons per day.
Penn.

Houtzdale—The Acme Coal Mining Co., which, in addition to its Frelin, Marjorie and Maguire mines, owns a large interest in the doubled the output of the mine. Storage opening of a second and lower seam on this tract.

Iselin—The new Ruth mine of the Lowther Coal Co. near here began operations Nov. 1 and has continued without interruption since that time. The production at the present time is 100 tons per day and this will be rapidly increased. The mine is opened in the Pittsburgh seam which is 7 ft. thick at this point. John O. Jones is superintendent in charge at the mine.

Indiana.—The tipple of the mine owned and operated by Joe Panaceti, at Starford, Indiana County, northeast of here, was destroyed by dynamite recently. The mine, a nonunion one, was in full operation and the owner believes the dynamiting to have been the work of some individual of "Red" tendencies. The tipple was totally destroyed, together with its contents, entailing a loss of several thousand dollars.

Philipsburg—Kelly Brothers, of Snow Shoe, near here, are going into business on a much larger scale. Their newest venture is the acquiring of the extensive coal mine interests of J. Fred. Kurtz and P. McGinness, of Connellsville, and the Bygate estate, of Pittsburgh, at Champion, Fayette County on the Monongahela River. The consideration is said to be $347,000. When worked to its full capacity the mine has an output of 600 to 800 tons of coal per day.

Starford—A mysterious dynamiting occurred here last week when some unknown persons ignited a charge of dynamite under the tipple at the mine of Joseph Panasiti. The entire tipple with all machinery was destroyed and the mine put out of commission for the time being. This mine had been working steady ever since the strike was called and it is thought the dynamiting was the work of some striking miners at an adjoining mine. Several suspects are under arrest and are being held by the sheriff to await trial.

Johnstown—Three men were buried alive recently as a result of a slip of material and earth in an air shaft of the Ebenburg Coal Co., at Colver, near here, and their bodies, which are under tons of debris, the excavation of which is difficult, had not been found at the time of the publication of this notice. The victims are: John Harris, address unknown; Charles Johnson, Gordonville, Va.; Harry Smith, Keyser, W. Va. The men are buried about 40 ft. below the surface and it may be some days before their bodies are recovered, it was learned.

WEST VIRGINIA

Glen Jean—There was greater production at the mines of the McKell Coal and Coke Co., in Fayette County, W. Va., after the strike beginning Nov. 1 was under way than before that time, owing to the fact that the McKell mines were closed down when the management refused to agree to the "check-off" and "closed shop". However, after Nov. 1 when the operators of the New River field abolished the check-off, then work was resumed by the miners at the McKell operations; since that time production has been steadily on the increase, with about 50 per cent. of the men at work.

Williamson—Negotiations have been consummated under the terms of which the War Eagle Coal Co. has acquired the leaseholds, equipment and assets of the Tractra Coal Co. operating in the Williamson field, at a consideration said to have been $125,000. The company acquired was owned and operated by C. L. Biddison and others most of whom were from McDowell County. The plant of the Traders Coal Co. is a comparatively new one having been in operation only a few years. Operation of what was the Trader company plant will be directed by Geo. W. Coffey, superintendent of the War Eagle Coal Company.

Macdonald—The New River Co. in expending the sum of $35,000 on the construction of a new tipple at its Summerlee mine, and expects to have the new tipple completed and ready for operation by Jan. 1. Operations have been suspended during the erection of the tipple, miners of the Summerlee mine finding employment at the Lochgelly operation. It will be possible to screen coal to four different sizes after the new tipple is put in commission. At the same mine self-dumping cages and automatic cagers have been provided. Similar equipment as well as new screens and conveyors are being installed at the Whipple mine of the company. The Whipple tipple was the first steel structure of its kind erected in the New River field.

Charleston—There was a smaller number of deaths in the mines of West Virginia during the month of November than any time in recent years, the total being only 15. Of course the fact that non-union mines only were in operation regularly, may have been a factor in limiting the number of casualties. By far the largest proportion of deaths was due to the usual cause—fall of roof and coal; there were nine deaths from that cause. Mine car accidents, however, cost four lives, while a motor accident was responsible for one death, and a mining machine for another casualty. Logan, where there was a large November production, took the lead in the number of deaths with five, McDowell having no mine casualties. While there were two mine fatalities in Fayette County, there was only one death in each of the folowing counties: Brooke, Boone, Kanawha, Marion, Mercer, Mingo, Preston and Raleigh. Of the 15 men killed 11 were Americans and four were foreigners.

Huntington—While there is no prospect of the immediate improvement of coal carrying facilities on the Chesapeake & Ohio R. R., as a result of the conference of the committee of C. & O. coal operators with high officials of the C. & O. at New York recently, yet the executives of the road have promised to have a thorough survey of the roads needs made so as to determine what steps should be taken to handle coal more expeditiously. There were fully 50 operators present at the New York meeting, their position being that as soon as industrial conditions became normal again, the present facilities of the C. & O. would prove to be entirely inadequate in handling the immense tonnage of coal which

would be produced. They therefore asked that the management appropriate $60,000,000 for the purpose of increasing side track facilities and toward purchasing new equipment. The operators were told improvements could not be ade on any extended scale until after the roads were returned to private ownership, but that in the meantime an investigation of the improvements necessary would be made.

Charleston—Confiscation and diversion of West Virginia coal between Nov. 1 and Dec. 15 the greater part of which remained unpaid for on Dec. 15, including a portion of the coal shipped from various West Virginia fields during the latter part of October, amounted to between $15,000,000 and $20,000,000 as nearly as it is possible to estimate it. Much of this coal was taken over by the railroads who have been extremely tardy, according to operators, in paying for such coal, although promises had been made of prompt remittances. However, for one reason or another railroads seemed to be bent on "passing the buck" and finding excuses for not paying, raising questions as to prices, etc. In many cases and in some sections coal was not weighed, nor were shippers in possession of information shewing to whom coal had been delivered. Therefore, in such cases it was impossible to even render bills for coal. As showing instances of the hardships worked on operators of the Tug River field, for instance, 10457 cars or 572,850 tons of coal, worth in the neighborhood of $1,750,000, had been shipped and diverted between Nov. 1 and Dec. 1, and unpaid for on the last date given. During this same period, the value of shipments from the whole Pocahontas region was approximately $10,000,000, and up until Dec. 11, only about 10 per cent. of the coal so shipped had been paid for. The great bulk of a tonnage of 409,000, shipped from the Williamson field in the six weeks already mentioned (valued at approximately $1,000,000) had not been paid for up until the middle of the month There was a total of 437,825 tons of coal diverted from the Guyan field, valued at approximately $904,629 which also had not been paid for. From all parts of northern West Virginia, between Nov. 1 and Dec. 15, total shipments of coal aggregated about 2,000,000 tons., with an approximate value of $5,200,000. The greater part of this coal was either confiscated or diverted. There was still due northern West Virginia operators on Dec. 18, about $3,500,000 on the $5,200,000 due.

OHIO

Columbus—With the settlement of the miners' strike, mining in all parts of Ohio is being gradually resumed. In fact miners generally have shown a willingness to return to work at once in order to get some Christmas money, and consequently many of the mines resumed operations Dec. 12. Some few plants were started the previous day, however, and machines were busy cutting the coal ready for the shooters. Loading started fairly active on Saturday Dec. 13. Just how quickly a full force of men will be at work depends largely upon how much the miners were scattered during the suspension. The first pay of the miners will be just previous to Christmas and will include every hour put in up to and including Dec. 15. Day laborers have been busy for several days cleaning up the mines in preparation for resumption.

INDIANA

Clinton—Six men were killed and three seriously injured in an explosion at Bogle, coal mine No. 3 at Jacksonville, near here recently. All of the men were either mine officials or employees in the office of the company, who, in attempting to get out sufficient coal for the boilers, set off a badly prepared blast. The mines had been closed by the strike. The dead are John Stark, Terre Haute; Herbert Campbell and Joe Robertson, Clinton, office men; S. G Stephens, Terre Haute, civil engineer; Charles Watson, Clinton, assistant mine boss and John Logston, Terre Haute, room boss. The mine was not badly damaged by the explosion it was stated and little difficulty was in encountered in removing the injured and the bodies of those killed.

KANSAS

Topeka—John Crawford, state labor commissioner, has notified all recruiting offices for volunteer workers that no more men are needed at present in the coal fields. All the strip mines are working with full crews of volunteers. There has been a considerable number of men who have paid their own railroad fares and have asked for work when they arrived at Pittsburg, Kan. There are enough of these men who are continually coming into the Pittsburg region to replace all who are going home. Mr. Crawford warns recruiting offices that if additional men are sent into the mines that it would result in congestion and wasted effort.

Pittsburg—General Leonard Wood has taken charge of the Federal troops in this section, where they are guarding volunteer workers in the mines. General Wood and Governor Allen, of Kansas, will confer at Topeka relative to the situation in the Kansas coal fields. Regular troops are stationed at Pittsburg and while they have not been used, there has been the closest cooperation between the regular forces under Colonel Lewis and the state troops under Colonel Hoisington. The regulars will not be withdrawn, it is said, until the national guard is dispensed with and that will probably not be done until the state relinquishes control of the mines. The receivers will continue in control of the mines, possibly until the coal famine in Kansas is relieved.

Topeka—An agreement has been made between the United States Fuel Administration and Governor Allen, of Kansas, whereby the entire western half of Kansas will be furnished with coal by the Fuel Administration, while the eastern half of the state will be furnished with coal by the state as far as possible. There are now many tons of coal being held on railroad sidings in eastern Kansas for local use. The Fuel Administration will supply all of the coal needed on the Rock Island, west of Belleville; on the Union Pacific, west of Salina; on the Missouri Pacific, west of Hoisington; and on the Sante Fe, west of Kinsley. This coal comes from Colorado and Wyoming where mines have been operating all through the strike. The state mined coal will all be shipped to eastern Kansas points and this will avoid any long hauls by both the state and the National Fuel Administration. Railroad men point ont that there is complete co-operation between the state and the railroads in handling emergency coal by the fact that a car was delivered at Liberal, including one transfer and entirely across the state, in five days. This required a haul of more than four hundred miles, much faster than the average daily haul of coal cars. A car of coal for Coldwater was delivered in four days, almost an equal distance, but not requiring a transfer.

IOWA

Perry—For almost half a century a small fortune has been lying in plain view on the farm of E. D. Ridnour, northwest of this city, about 35 miles from Des Moines, and it was not until a coal famine occurred that its value was realized. By the discovery this community had access to about 2,000 tons of good fuel. In the days when this section was one of the big coal producing centers of Iowa, coal was selling for $2 or $3 per ton, and the steam coal or slack was a drag on the market. With the steam fuel was a lot of nut or pea coal, and because it was considered worthless it was piled out on what was then cheap land. That was thirty-five years ago. Recent investigations have shown that, aside from an eight or ten in. crust on the outside of the pile, the coal is of fair quality. The owner of the pile placed a reasonable price upon it, and it was delivered here, during the recent strike, for about half the price named by the Government for newly mined coal.

OKLAHOMA

McAlester—Production of coal, which began a few days ago at many of the Oklahoma strip pits, has been hampered by the severe cold weather. Twenty-one cars of coal were mined by approximately five hundred volunteer workers in one day. The volunteer workers are said to have done exceptionally good work.

Personals

William H. Kramer, of Somerset, Penn. has been appointed manager of the Pennsylvania division of the Consolidation Coal Co. His headquarters will be at Somerset.

J. C. Green has been made superintendent of the Strader operation of the Greenmar Coal Co., the mine being located on the Coal and Coke R. R. not far from Elkins, W. Va.

Patrick J. Walsh, mine inspector of the ninth bituminous district, at Connellsville, Penn., has resigned his position to become manager of a large company in the Connellsville region in which Mr. Walsh is interested

S. S. Hall has been appointed mine inspector of the ninth bituminous district of Pennsylvania, by Chief of Department of Mines Seward E. Button, to fill the vacancy of P. J. Walsh, resigned. Mr. Hall's headquarters will be at Connellsville, Pa.

S. Steinbach, manager of the Pennsylvania division of the Consolidation Coal Co., with headquarters at Somerset, Penn., has resigned to take charge of production at the mines of the Penn-Mary Coal Company—a subsidiary of the Bethlehem Steel Corporation.

Heath C. Clark, of Punxsutawney, Penn., son of B. M. Clark, president of the Rochester & Pittsburgh Coal and Iron Co., has been made assistant soliciter and assistant to the president of the Rochester and Pittsburgh company. Mr. Clark will move to Indiana shortly where his headquarters will be located.

John A. Scott, an attorney of Indiana, Penn., has resigned as a member of the Pennsylvania State Workmen's Board to accept the position of solicitor for the Rochester & Pittsburgh Coal and Iron Co. and allied interests. Mr. Scott will make his headquarters at Indiana, Penn., where the general offices of the company will be located in a short time.

H. I. Smith has resigned his connection with the Vandalia Coal Co. of Sullivan, Ind. to go to Serbia where he will be a member of the Advisory Committee, Kingdom of the Serbs, Croats and Slovenes, American Legation, Belgrade, Serbia. In his new location, Mr. Smith will act in an advisory capacity in mining matters. His American address for mail is, Kingdom of the Serbs, Croats and Slovenes, 115 Broadway, New York City.

Frederick B. Lincoln, of Pittsburgh, Penn., on Dec. 1 severed his connection with the Pittsburgh Terminal Coal and Railroad Co., as vice president and general manager. No successor to Mr. Lincoln has been named and the duties of the office will be taken care of by the present organization, A. W. Calloway, of Baltimore, Md., is president of this company; and M. D. Kirk, of Pittsburgh, is chief engineer and assistant general manager.

E. Steck has resigned from the organization of T. C. Keller, coal operator, where he has been in charge of design, construction and installation of mechanical, electrical and steam equipment. Mr. Steck has entered the firm of C. A. Chapman, Inc., engineers and constructors, Steger Bldg., Chicago. He still continues to act in the same capacity for the Keller interests. Since Mr. Steck was graduated from college in 1901, he has been connected with various electrical concerns in the Middle West and in the East.

Obituary

Joseph Benjamin Dickson, who was chairman of the Anthracite Committee of the United States Fuel Administration during the war, died in the Post Graduate Hospital, New York City, on Friday, Dec. 12, following an operation. At the time of his death Mr. Dickson was a member of Dickson & Eddy, No. 17 Battery place and president of the Price-Pancoast Coal Co. and the West End Coal Co. He was the son of Thomas Dickson, at one time president of the Delaware & Hudson R. R. Co., and was a graduate of Lafayette College.

Industrial News

Glenn, Ky.—The Federal Coal Co. has increased its capitalization from $10,000 to $25,000 to provide for general business expansion.

Fayette, Mo.—B. N. Tanner, of this place, and associates, are arranging plans for the development of coal properties in Howard County, near here.

Williamsburg, Ky.—The High Splint Coal Co. has increased its capitalization from $300,000 to $400,000 to provide for general business expansion.

Swiss, W. Va.—The Kanawha Collieries Co. is considering plans for increasing the capacity of its plant. It is proposed to have a daily output of about 400 tons.

Drakesbere, Ky.—The Black Diamond Coal and Mining Co. is understood to be arranging plans for the rebuilding of its plant recently destroyed by fire, with estimated loss of about $20,000. W. W. Bridges is manager.

Columbus, Ohio.—The Ganaden-Goshen Coal Co., Columbus, has been incorporated with a capital of $300,000; S. H. Yoacum, L. C. Schafer, George L. Stephenson, W. J. Eckart and Fred Anthony are the incorporators.

Fayetteville, W. Va.—Plans are being matured by the Maryland New River Coal Co., with mines on Keeney's Creek, for the further development of its properties and a larger production of coal. This company is under the management of M. L. Garbey.

Pickneyville, Ill.—The Illinois Sixth Vein Coal Co., it is understood, purchased from the West Virginia Coal Co., of St. Louis, its two mines and mining property on the Wabash, Chester and Western R. R. The new purchaser maintains sales offices in Chicago.

Willsbury, W. Va.—New houses for miners are to be built by the West Virginia-Pittsburgh Coal Co., in Willsbury and vicinity at a cost of $35,000. This information has been made public by E. M. Raush, general manager of the company.

Charleston, W. Va.—New equipment has been installed at the plant of the Carter Coal Co., operating at Belle, W. Va., consisting of mining machines, etc. The company is desirous of increasing its production as much as possible. The president of the Belle company is O. Jones Dorsay.

Charleston, W. Va.—The Cowen Coal and Coke Co., of Wheeling, Va., has been incorporated to operate mines in Webster County; capital stock $500,000. Incorporators: George H. Leathers, of Oakmont, Penn.; Frank Newingham, W. W. Leach and Aaron Blumenstein of Apollo, Penn., and Harry W. Cannon, of Monongahela City, Penn.

Steubenville, Ohio.—The J. O. Arnold Coal Co., which has successfully operated a mine east of Follansbee for the past two years, will open a second mine in Cross Creek district, according to an announcement made by J. O. Arnold, president of the company. The new mine will be located on Cross Creek, one mile from the Ohio River, on the Wabash Railroad.

Murphysboro, Ill.—The Big Muddy Coal and Iron Co., of St. Louis, has bought something like 600 to 800 acres of coal lands south of the Big Muddy River, and will sink mines and build a new town a few miles off the main line of the Illinois Central R. R. The coal on this property is the No. 1 seam which averages about four feet in thickness. This is a gas and coking coal proposition.

Wheeling, W. Va.—Wheeling is to be the headquarters for the newly organized Cowen Coal and Coke Co., which will operate in this section. Pennsylvania parties being largely interested. The new concern has an authorized capital of $500,000, the company being organized by the following men: W. W. Leach, Aaron Blumenstein, Frank Newingham, of Apollo, Penn.; George H. Lealtiers, Oakmont, Penn.; Harry W. Cannon, Monongahela.

Mulkeytown, Ill.—John Henderson, of the West Virginia Coal Co., of St. Louis, has taken an option on 2200 acres of Franklin County coal lands west of this place. Drill holes show a seam averaging eight feet and better of the regular Franklin County coal. Arrangements are being made to sink new mines on the property the coming spring. It will be served by the Illinois Central, Chicago Burlington & Quincy and the Missouri Pacific railroads.

Elkins, W. Va.—Successful coal men of Upshur and Randolph counties are behind the newly organized Green-Mar Coal Co., whose general office is to be located at Elkins, but whose operation is to be continued at Adrian in Upshur County; this company being capitalized at $50,000. The following are the principal stockholders: A. F. Martin, W. H. Green, J. F. Brown, E. A. Bowers, all of Elkins; and F. A. Reed, of Tallmansville, W. Va.

Louisville, Ky.—Prof. W. R. Jillson, state geologist, in an exhaustive report on coal properties in Knox County, states that there are more than a dozen seams in the region, and that numerous small openings have been made all through the county, especially in the Stinking Creek section. There is much coal in the county and in neighboring fields, and there are good railroad facilities at the lower end of the valley, which would result in profitable operations.

Columbus, Ohio.—An investigation is being made to fix the responsibility for the placing of eight one-pound sticks of dynamite in a car of coal recently received here, the car was unloaded by the United States Scrap Iron and Metal Co., when the explosive was discovered. Whether the dynamite was placed in the car by people intending to destroy a power plant or whether it was hidden in the coal to be secreted is now being investigated.

Williamson, W. Va.—Among other structures at the plant of the War Eagle Coal Co., at War Eagle, W. Va., destroyed by fire on the night of Dec. 8, was the head-house, the fire causing considerable loss of other property, as well as loss of time. As it became necessary to order a new drum and shave, it will be fully six weeks from the time of the fire before the company is able to resume operations. However, the company was fully insured against such time loss. The origin of the fire so far remains a mystery.

Louisville, Ky.—It is reported that a deal is pending for the acquirement of the big coal properties and developments of the St. Bernard Mining Co., which has about nine operations in Hopkins and Webster counties, Ky. It is reported from Evansville, that Philadelphia capitalists, including the Drexel Banking Co., are interested in the deal, which will involve about $2,500,000 if it goes through. The St. Bernard is the largest company operating in western Kentucky, and has its headquarters at Earlington.

Cumberland, Md.—The Kalbaugh Coal Co. (Box 370), recently organized with a capital of $25,000, is arranging for the immediate development of about 500 acres of coal properties in the vicinity of Barnum, Mineral County, W. Va., to have a capacity of about 150 tons daily. Complete equipment for all features of operation will be installed. Z. T. Kalbaugh, Piedmont, W. Va., is president; T. F. Schaffer, Cumberland, Md., is secretary and treasurer; and A. E. Gamble, Westernport, Md., is superintendent.

Winding Gulf, W. Va.—Construction work is to be begun in the very near future on the central machine shop building of the Winding Gulf Colliery Co., at this place. The building to be of fire-proof construction. Special provision has also been made for the lighting of the new building and for equipping it with the latest machinery. Plans and specifications for the new structure have been submitted by the engineers and have been approved by the management of the company. The new machine shop is to replace the one destroyed by fire.

Charleston, W. Va.—The Hazy Eagle Coal Co., organized during the summer and in which Charleston people are largely interested, will soon be ready to begin operations on Marsh Fork of Coal River, near Jarrolds Valley, where the company has under lease 1100 acres of coal land. The seams to be developed are the No. 2 Gas and the Eagle coal beds. The officers of this company are George Morrow, president; C. E. Krebs, vice president; and Paul J. Newlon, treasurer. President Morrow will be in direct charge of the operations of the company.

Wheeling, W. Va.—Expansion of the operations of the J. O. Arnold Coal Co. has been determined upon by that company according to an announcement just made by its president—J. O. Arnold. This company has had a mine in operation near Follansbee for several years, and now proposes to open another mine on Cross Creek, Cross Creek district, of Brooke County, about one mile from the Ohio River. A siding will be built from the new mine to the Wabash Railroad. Surveys are being made preliminary to the beginning of actual development work. When the new mine is ready for operation about 100 men will be employed.

Charleston, W. Va.—The West Virginia Eagle Coal Co., 1101 Union Building, of this place, which recently filed articles of incorporation with a capital of $100,000, has perfected its organization, and is arranging plans for the development of about 1214 acres of coal properties located in the Boomer, W. Va., district. It is proposed to install complete mining equipment including steel monitors, electric motors, and auxiliary apparatus, to provide for a capacity of about 1000 tons daily. William G. Conley, Charleston, is president; L. S. Tulley, Mt. Hope, W. Va., vice-president; and J. E. Charlton, Boomer, W. Va., treasurer and manager.

Charleston, W. Va.—When the new plant of the Posler Coal Co., organized a few months ago by Charleston people headed by T. E. B. Siler, of the Marsh Fork Coal Co., is completed and ready for operation (as it will be very shortly) it will represent an investment of over $200,000. The plant of the company is on Campbell's Creek, near Charleston. The equipment for the mining of coal is complete in every respect including tipple and shaker screens for the preparation of different sizes of coal. The company expects to begin the production of coal early in 1920 and plans production at the rate of 1000 tons a day. T. E. B. Siler of Charleston, is the president of the company.

Cadiz, Ohio.—The Goodyear Rubber Co., of Akron, Ohio, after six months of negotiations, has closed a deal for about 5,000 acres of coal land, which is located on Short Creek, Harrison County, at this place. A big plant will be erected including a town planned to have all modern improvements of sewerage, electric lights and a water system. The erection of the houses will begin as soon as the new town is laid out and a spur of the Wheeling & Lake Erie R. R. built to the mines. The Goodyear Company uses a large amount of coal per day and the corporation is now ready to mine its own coal as soon as the preliminary work is done. The first report was that Goodyear was going to move its factory, but the company will remain in Akron and have its coal shipped.

Mt. Hope, W. Va.—A transaction of considerable magnitude in the New River field, consumated about the middle of December, was the sale of the East Gulf Coal Co., with large holdings in Fayette County, W. Va., to J. C. Sullivan, of Tralee, W. Va. and C. H. Mead and associates of Beckley, W. Va., the deal involving the sum of approximately $750,000. The East Gulf company was organized about a year ago by P. M. Snyder, S. A. Scott and others, being capitalized at $500,000. During the summer the company absorbed the Simrall Coal Co., the capitalization of the East Gulf company being increased to $800,000. It is understood that the new company has also taken over the East Gulf agreements as to the payment of royalties. The new owners also plan to increase in the production of the company.

Williamson, W. Va.—While officials of the two companies are preserving silence it is now considered certain that the large holdings, plants and assets of the Red Jacket Consolidated Coal and Coke Co. and the Red Jacket Jr., Coal Co. will be sold in the near future, as has been rumored for some time. It is believed that the deal will be consummated either before or shortly after the beginning of the new year. For the last six weeks H. S. Schoew, a former operator in the Williamson field and an expert on mining matters, has been engaged in examining and inspecting the properties, equipment, etc., of the Red Jacket companies; he has been aided by a corps of geologists and accountants, and has had the advice in such work of examination of General Edward O'Toole, general manager of the United States Coal and Coke Co., a subsidiary of the U. S. Steel Corporation. That and the fact that the U. S. Coal and Coke Company not long ago purchased large tracts from the United Thacker Coal and Coke Co., on Mate Creek, adjoining the Red Jacket properties, has confirmed the belief that the United States Coal and Coke Co. is to become the purchaser of the Red Jacket properties, although it is also rumored that the Solvay company may be an interested party.

Trade Catalogs

Proving Industrial Values. The Dorr Co., Westport, Conn. Pamphlet. Pp. 12; 7½ x 10 in.; illustrated. Artistically treated description of the laboratory of the Dorr company.

Nelson Valves—Nelson Valve Co., Philadelphia, Penn. Catalogue and Price List No. 10. Pp. 156, 5¼ x 7¾ in.; illustrated. Compete description of the valves made by this company.

Link-Belt Electric Hoists and Overhead Cranes. The Link-Belt Co., Chicago, Ill. Book No. 380. Pp. 100; 6 x 9 in.; illustrated. Complete description of Link-Belt hoists and cranes and illustrations of numerous installations.

Link-Belt Labor Saving Elevators and Conveyors. The Link-Belt Co., Chicago, Ill. Book No. 375. Pp. 108; 6 x 9 in.; illustrated. Description of the Link-Belt freight and package handling machinery and modern labor-saving equipment. Applicability to various industries illustrated.

Coming Meetings

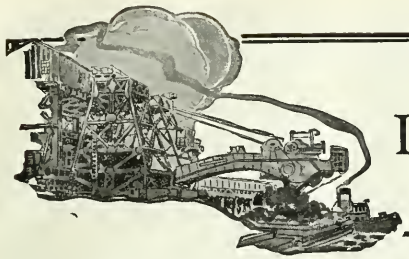
Northern West Virginia Coal Operators' Association will hold its next meeting Feb. 10, 1920, at Fairmont, W. Va. Secretary, George T. Bell, Fairmont, W. Va.

National Conference of Business Paper Editors will emet at the Astor Hotel, New York City, Jan. 16, 1920. Secretary, R. D. Hall, 36th St. and 10th Ave., New York City.

American Institute of Mining and Metallurgical Engineers will hold its next meeting Feb. 16 to 19, in New York City. Secretary, Bradley Stoughton, 29 West 39th St., New York City.

The Wholesale Coal Trade Association of New York will hold its next meeting Jan. 20, 1920, at the Whitehall Club, New York City. Secretary, Charles S. Allen, 1 Broadway, New York City.

The Rocky Mountain Coal Mining Institute will hold its winter meeting Jan. 19 to 22, 1920, at Denver, Colo., with headquarters at the Albany Hotel Secretary, F. W. Whiteside, Denver, Colo.



MARKET DEPARTMENT

Weekly Review

Now that the bituminous coal strike is over, and reports of the United Mine Workers show that nearly 90 per cent of the miners have reported for work, it is expected that the production will soon be normal. The United States Geological Survey's report show that during the fifth week of the strike the production was only 43.5 per cent of normal, which was not as large as that of the week previous, for comparatively few of the striking miners accepted the 14 per cent increase and returned to work. In addition many mines which had resumed operations during the Washington Conference again shut down, notably in Wyoming, West Virginia and the Cumberland—Piedmont Field.

The Railroad Administration having had several days warning of the possible ending of the strikes, aimed to better conditions in the West, and to relieve the shortage there by sending empties as quickly as possible for use in the Indiana and Illinois mines. Recently the acute shortage of coal in the Middle West was relieved slightly by the moving of coal by Lake to the west bank of Lake Michigan. Coal is now not available from this source as the Lake season came virtually to an end, after a week of extreme cold weather ending Dec. 1. These mid-western states will first be taken care of before the conservation regulations need be lifted. Complaints of car shortage were few in number and these shortages resulted rather from the weather than from a lack of empties at the mines.

The supply of coal received from the nonunion mines and from the union mines that are now in operation especially in the Central Competitive Fields, is being distributed through local distributing committees, largely to railroads, public service utilities and other essentials. Non-essential industries are in many cases being refused permits granting them the right to receive coal. Reports just received state that these regional directors, having authority from the Fuel Administration, have modified restrictions passed upon their local communities. Train service is to be restored here in the East and in some western sections. Exporters have received word that at Hampton Roads certain sizes of coal may be bunkered by permit, thus allowing them to fill their long delayed contracts.

Canada heard the news of the end of the strike with great relief. Fairly good supplies had been coming in right along but since Nov. 1, the first day of the strike, the supply of bituminous coal had been cut down greatly.

On Monday the first new bituminous coal arrived in the market, the supply coming from mines in Pennsylvania, Ohio and smaller supplies from Indiana and Illinois. The movement becomes heavier but it will take sometime, perhaps two or three weeks before all of the demand can be adequately supplied.

Colder weather and a rapid increase in the supply caused the consumers to make pressing demands. However, the transactions have not been many, but it is expected that next week will bring with it better prospects. The prices of anthracite have remained unchanged while the government prices on bituminous still continue. Steam sizes of Anthracite moved in large quantities to points West and into Canada, and buckwheat and rice, though hard to get, are constantly in demand.

Conservation must still be continued, even after immediate needs have been met with, but it is the belief of many that the restrictions all over the country will soon be lifted.

WEEKLY PRODUCTION

The estimated production of coke during the week ended Saturday, Decemher 13, was 191,600 tons, contributed by the two districts as follows: Connellsville, 114,430, a decrease of 50,430 tons; Lower Connellsville, 77,170, a decrease of 20,780 tons, making a total decrease of 71,210 tons, or 27 per cent. from the week preceding.

By interests the production was: Furnace 116,300, a decrease of 43,910 tons; merchant 75,300, a decrease of 22,300 tons.

There was a net gain of 120 in the number of active ovens, 201 having been fired up at the merchent plants snd 81 blown out at furnace plants.

Atlantic Seaboard

BOSTON

Situation clearing. Volume shipments to New England all-rail looked for this week. Much interest in way export coal is to he handled. Hampton Roads shipments coastwise resumed under permit. Little real anxiety over supply. Demand for steam sizes anthracite slumps completely. Anthracit comes forward with about normal regularity.

Bituminous—While New England was relieved to learn that mining was resumed, the situation has at no time been the subject of the same kind of apprehension that was justified in other sections of the country. Representative members of the trade have not shared the alarmist reports circuated by persons not at all conversant with this year's business. Too much reliance has been placed upon those consumers who seldom buy liberally except on scare, and too much stress has been laid upon comparisons with 1918, a year in which tonnage figures were never so misleading to the uninformed. As a case in point the Port of Providence, R I., shows a decrease in receipts by water for the period Apr. 1-Dec. 1, 1919 of 800,000 tons! But what of it! 50 per cent. is accounted for by the deliberate choice of the railroads to haul all-rail the heaviest proportion possible of their supply coal, the cost being so much less than by water. The other 50 per cent. is accounted for by one word.—"Oil!" The trade knows that is is comfortably supplied for the present, and if there is no further interference with car supply and normal shipments are for the most part allowed to come forward unhindered there will be fuel sufficient for all requirements.

Steam-users are confident that coal will he routed this way in good volume the current week. Reports at this writing are very favorsble. About one-half of the 4000 cars that have been held under load for periods from two to six weeks are being released, and we have yet to hear of any genuine case of distress that could not be relieved locally. Anxiety there has been on the part of distributors and re-handlers to make sales, but aside from that there has been calm and quiet everywhere except among re-constituted fuel administrators. The Massachusetts Commission on the Necessaries of Life which through the season has done some really efficient words, has not courted publicity.

The agencies are much interested in what is to he done presently in the way of loading coal for export. Some expensave detention charges have accrued st all the loading ports and it is hard to see why the coal should not be released. Some announcement is hoped for this present week. A large proportion of the output will move on contracts made prior to Oct. 30, in any case, and price regulations now in effect will not have much influence upon the flow of coal.

At Hampton Roads an average fleet for New England has loaded Dec. 13 and 15. Permits now are being freely granted and practically every requirement is within the priorities. One limitation on the number of bottoms that can load is the fact that at this end the district sub-committee is inclined to be sparing about issuing permits to re-handlers who have their storage space stuffed with coal, and one result will be a decreased tonnage for New England steam users for whose wants the same committee is so solicitous.

In our judgment there is little real anxiety over supply in this territory. The propmt action of the Regional Director in cancelling all restrictions was commended and it is felt that with a week's output coming forward, the situation will be rapidly straightened out. The far-seeing buyers who have been seeking wood and other substitutes for plants which have on hand supplies to Mar. 15 will now breathe a heavy sigh of relief.

Anthracite—Certainly the bottom has completely dropped out of the market for steam sizes of anthracite. For a day or two there was brisk demand, chiefly from buyers whose immediate supplies were ample and who, besides, had coal on cars at destination, but withheld by the authorities. The latter supported the market for buckwheat, rice, and barley nobly while they could. There are many who regret their early demise.

Domestic sizes are coming forward both all-rail and by water with fair regularity. Store is somewhat easier, but supplies of chestnut are still behind the demand. Egg is fast getting to be a drag, and now that pea is less in current demand because of the bituminous settlement there is likely again to be a surplus of that size.

Barges are moving about as normal for the season and with another month most of the out-of-the-way points usually supplied in this way will have received their usual tonnage.

NEW YORK

Demand for the Anthracite steam coals drop with the ending of the bituminous strike but prices remain steady. Lighting and heating restrictions are generally removed but public is cautioned against extravagant use of coal. Normal conditions not to be expected for several weeks. Domestic coals wanted by the dealers.

Anthracite—The steam sizes occupied the center of the stage last week. The greatest activity in the trade centered about them and while there was a good response from consumers it was not as heavy as the operators and shippers looked for. During the final week of the bituminous strike middle houses handling buckwheat and the smaller sizes had a demand which went a long way toward cleaning up some of the heavy storage piles and which called for shipments as fast as the coal could be picked up. As soon as the strike had been called off and the men ordered to return to the mines, this demand eased a little and there still remains in storage considerable of the smaller coals.

When it is considered that we are now in the middle of December, one of the best coal burning months, the demand for the domestic coals is not as strong as it should be. While there is a good call especially for stove and chestnut, there is plenty coming to this market to satisfy everybody and there are no signs of suffering.

Shippers report a good demand from inland points where any of the larger sizes are desired. With Lake navigation at almost a standstill much coal is being diverted in other directioue, principally to the West and New England.

Pea coal moves steadily both here and along the line. The demand for buckwheat, rice and barley is steady, although lighter than last week. The placing of restrictions by the Fuel Administration brought forth many protests by the trade who contended that there was sufficient small coal in storage and within easy shipment of this city to meet all requirements.

During the 8 days ended Dec. 12 there were 6132 cars of anthracite dumped at the local terminals as compared with 4307 cars the previous 6 days.

Current quotations, for company coal per gross tons, f. o. b, Tidewater, at the lower ports are as follows:

	Circular		Circular
Broken	$7.80	Pea	$7.05
Egg	8.20	Buckwheat	5.15
Stove	8.45	Rice	4.50
Chestnut	8.50	Barley	4.00
		Boiler	4.25

Quotations for domestic coals at the upper ports are generally 5c higher on account of the difference in freight rates.

Bituminous—Although the strike is ended and the restrictions on lighting and heating generally removed, it will be several weeks before normal trade conditions again exist. There was no general resumption of work at the mines until Monday of this week (Dec. 15) and shippers did not expect there would be anything like normal receipts of coal at tidewater until a week later. Then follows the holiday period—Christmas and New Years both falling on Thursday—with many workers remaining away from their work the balance of each week. With this interruption many tradesmen predict it will be well into the new year before coal will be moving freely.

The many restrictions ordered by the various governmental agencies reduced the movement of coal to a minimum at this tidewater and unless consumers could show good reasons they received little or no coal. Public service corporations were kept down to the smallest possible daily deliveries but, because of the heavy reserve stocks they had fortified themselves with, did not seriously feel the effect of the five weeks suspension.

Large consumers did not begin to show any nervousness over the situation until about a week before the strike ended. Seeing their coal supply dwindling away, most of them started to lay in a supply of the anthracite steam coals which they intend to mix with bituminous.

As soon as it was announced that the mine workers had been ordered back to the mines wholesalers began to receive orders and already many shippers have their product sold several weeks ahead.

Dealers who make a specialty of bunkering vessels and who believed they had found way out of their difficulty by using the anthracite steam sizes received a jolt when the Central Coal Committee issued an order that it would not be permissible to deliver the small sizes for bunkering and that those coals would be placed on the same basis as bituminous when intended for that purpose.

One result of the strike has been the study made by officials of some of the traction and lighting companies into the possibilities of substituting oil for coal. The one drawback however is the restrictions against the storing of oil in sufficient quantities. Many of the large buildings in New York are either experimenting or have permanently changed their coal burners into oil burners.

There were 3322 cars of coal dumped at the local railroad terminals during the 8 days ended Dec. 12 as compared with 3015 cars the previous 6 days, an increase of 307 cars. The reports of the Railroad Administration show that on Dec. 12 there were 3669 loaded cars at the various terminals.

Under the orders of the Fuel Administration the maximum prices at the mine for coal handled at this tidewater are:—

	Mine Run	Prepared	Slack
Central Pennsylvania	$2.95	$2.95	$2.95
Western Pennsylvania	2.35	2.60	2.35
Fairmont	2.50	2.75	2.25
George's Creek, Upper Cumberland and Piedmont Fields	2.75	3.00	2.50

PHILADELPHIA

Anthracite market brisk. Retail buyers ease off some, but current demand is strong. Stove and nut still to the fore. Egg fairly plentiful. Pea movement lively. Some dealers look for a let-up in mid-season. Shipments moderate. Steam sizes in good position, except barley. Bituminous still snort despite strike's end. Regulations being removed, except price. Stocks still short. Little coal expected in spot market for month.

Anthracite—With seasonable weather prevailing the consumers demand for coal continues strong. This naturally has its reflex upon the shippers, who continue to be well behind in their shipments of the favorite sizes. There has been something taken off the edge of the retail buying due to the ending of the soft coal strike, as the people now feel that everything is once more all right. The retailer is not so sure, especially, he who makes a study of the situation. As it now stands the bituminous men who had been working practically under the same agreement as the hard coal men, are now to get an increase in salary, while his fellow miner in the hard coal region works at the old scale. This it is pointed out opens the way for trouble and even now some murmurings have been heard. It is just possible that a reconsideration of the anthracite scale can be withheld until April, but it is certain then to be opened up.

All dealers still press their shippers for stove and nut coal, as the bulk of the current business received by the former calls for those two sizes. The retail men continue to urge the use of pea coal by advertising this size for sale, and some little tonnage continues to be substituted, but in the main the consumers hold out for their favorite sizes. As to egg coal the situation seems to have been met, as some of the larger retailers are advertising this size for prompt delivery along with pea. The demand for this latter eize continues to gain momentum from the regular users and the weather has been such as to send a flood of orders for half ton lots into the dealers, which is the sure barometer indicating the pea coal season is now on. The individual shippers are most all asking 75 cents per ton above company circular on pea, although a few of the smaller shippers are understood to be shading this premium a little to their preferred trade.

As to shipments into the city recently, it must be said that the demand of the public is being met, even if every dealer is not getting exactly the tonnage that he desires. Even now the dealers are finding out that orders which they have been carrying on the books for months, partially filled, have been completed by other dealers, which in itself is a sure indication of the well-filled condition of the cellars, and should the shipments be increased 30 to 40 per cent. there may be a surplus of even the favorite sizes.

The local dealers have for some time been in competition with various kinds of fuel, such as oil and coke. Early in the fall in one of the suburban communities an extensive campaign was in progress introducing an oil burning device for domestic ranges and heaters. Hundreds of families adopted them and during the mild weather of early fall they expressed the utmost satisfaction with their use. Now with the coming of colder weather the turn has come and the device is now being taken out about as fast as it was put in, as it is unable to stand up against present weather conditions. With coke, there has been an increasing number of brands introduced and while some considerable tonnage has been placed it has not been enough to affect the retail trade, and if it were not for the dearth of the favorite family sizes of anthracite it is believed the producers of coke would be hard put to to find an outlet. One kind of coke in particular, manufactured locally, has been extensively advertised as "nut" size, but is in reality only the size of anthracite pea, but the price charged for a net ton is but 25 or 30c less than anthracite nut. The producers of coke have made extra efforts to have dealers generally handle their product, but only a small number have given orders for it.

The steam sizes are in good demand. Buckwheat is quickly taken up, and most shippers are experiencing some little delay in meeting their orders. Rice is also fairly brisk, although there has been a perceptible slowing down in this size during the last five or six days, which is directly traceable to the soft coal mines resuming operations. Most of the activity in this size had come from western sources, and much of this business is now ceasing off. Barley sales remain very quiet, with very little prospect of an early rise.

Bituminous—Despite the fact that the miners were supposed to have returned to work last Thursday, there has been much delay in their doing so, and they really did not come out in any number until the beginning of the week, preferring to finish out the balance of the previous week in idleness.

All fuel is still being distributed through the fuel authorities, although most of the restrictions on railroads and manufacturing plants have been taken off. Until the freshmined coal comes on the market fuel will continue short and most of it is still being held in reserve for the railroads and the essential industrial plants. Due to the depletion of stocks it is thought that it will take more than a month until the market shows signs of getting caught up and it is believed that there will be little coal of the better grades for sale during that period. In the meantime some shippers are offering coal of ordinary grade for sale at the Government price of $2.95, but in no way guaranteeing delivery, merely stating that they will be able to make consignment from the mine.

BALTIMORE

Maryland district and immediate territory working about 30 per cent. Isolated troubles are cleared away. Tonnage movement in regional district more than two-thirds or ordinary normal. Hard coal supply tight.

Bituminous.—The coal trade and business world is slowly readjusting after the last chapter of the big fuel strike. The first steps are toward tonnage in badly needed places, and the fact that the mines of the Georges Creek region and of the portion of the Upper Potomac region in and adjacent to Maryland are now producing around 90 per cent., is encouraging. The railroad administration officials state that the loading on the entire division has passed two-thirds of normal. The first day of the present week the total loading on the division reached

nearly 2700 cars, and this has been increased several hundred per day since that time. Of the number of mines probably 96 or 97 per cent. are working. A few mines, especially of one company in Maryland, failed to open last Monday owing to labor disputes over the re-employment of certain men, and the union question was dragged in. All this is since reported straightened out.

There is at present only about 100 cars of coal at Curtis Bay, and very few more at Canton, while the incoming tonnage of the moment for the piers and the number of cars at Brunswick consigned to the piers does not give promise of early increase of material character. Most of the coal coming in is all-rail for plants selected for emergency supply by the fuel distribution officials. In connection with the scarcity the Governor of Maryland has issued a warning to consumers that the end of the strike does not mean the end of the serious fuel shortage. All plants are advised by the governor to consult R. P. MacKenzie of the Regional Coal Committee concerning their needs in order to have an equitable distribution.

Anthracite.—The hard coal supply is truly tight. Real cold weather has caused a number of consumers who had taken on but a light supply to start the winter to go after more coal. The dealers are using care in distribution, as receipts are exceptionally light, especially of the popular household sizes. There is no real trouble so far, but a long cold spell might bring about another story.

Lake Markets

PITTSBURGH

Men resuming work, local union officials encouraging them. Domestic supplies satisfactory. Market stagnant.

On the second day after the Indianapolis settlement reports are that about 10,000 coal mine workers have returned to work in the Pittsburgh district. Local officials of the United Mine Workers appear to be doing all they can to get the men back to work promptly.

The local committee of the Railroad Administration on coal distribution is understood to be in favor of reducing the restrictions on coal consumption, particularly in connection with the lighting of retail stores. The limitations as to coal consumption by factories, including steel mills, are likely to be kept on for some time, but the regulations are not interpreted as interfering with a mill consuming its own stocks of coal if it has any left. Few steel plants in the Pittsburgh district have had to close this week on account of coal shortage, but Ohio districts are more seriously affected, and there will probably be more closings next week.

If the coal is available, the distribution authorities will allow it to go to by-product coke ovens to the extent of permitting them a 50 per cent. operation, by coking 30 hours instead of the usual time, about 15 hours. Distribution of coal for domestic and other retail use is still good on account of the stocks of river coal accumulated in coal boats and barges, this accumulation being a seasonal one, although it was accentuated somewhat by prospects of a strike.

The coal market has been almost absolutely stagnant since the price restriction was reimposed, but there are occasional transactions, and there are prospects for greater activity next week. The market is quotable at the Government limit, with 15c brokerage, mine-run $2.35@2.50, screened, $2.60@2.50, screened, $2.60@2.70 per net ton at mine, Pittsburgh district.

CLEVELAND

Daily receipts of bituminous coal through the local coal committee are large enough to permit the release of some to plants not on the preferred list.—Anthracite receipts are irregular, and about 20 per cent of normal. Only an occasional car of mine-run Pocahontas is being received by Cleveland dealers.

Bituminous.—After providing for utilities, retail dealers and the so-called essential industries the local coal committee has found it has a small surplus, which it is dividing among the so-called nonessential industries. This indicates that the coal situation locally is much improved. Fairly strict observance of the Fuel Administration's regulations on office building light and heating is reported, while the ban on outdoor advertising and lighting is being followed to the letter.

By far the larger part of the Cleveland industries are operating normally or thereabouts. Blast furnaces plants are harder hit for coke than for coal. Practically all brick, tile and similar plants are down tight, and do not hope to resume until after Jan. 1. A score of plants have shut down for the holiday period, having moved inventory time up to cover the same gap as the coal shortage. At the most, not more than 10,000 persons actually have been denied employment by reason of the fuel shortage, though many more thousands have had their workday shortened.

Retail coal dealers do not expect to get near normal shipments before Dec. 25. Meanwhile, they are not quoting on bituminous coal. The government schedule is not far removed from the last-quoted prices, but some bituminous being received goes as high as $2 above this level. Coal ordered the latter part of October by steam-coal users, willing to pay any price to get their orders on operators' books, is coming through—confiscated, of course—by the railroad administration—and dealers do not know the exact price until the car is in their yards. The market for bituminous coal may be said not to exist at present, as the local coal committee dominates the situation.—Pocahontas, mine-run sells for $7.40.

Anthracite—The dealers consider themselves lucky if they get four or five cars for a week just now. The first part of last week anthracite came through in good shape, but lately receipts have tapered away off. The promise is held that within a week shipments will again approximate normal. Anthracite prices remain unchanged at $11.75 to $11.90 for grate and egg sizes, $12 to $12.20 for chestnut, and $11.90 to $12.10 for stove. One retail dealer is selling coke for as low as $11.20; another is reported getting $15. Considerable coke is being sold for domestic purposes.

Lake Trade—The last upbound cargo of coal for the head of the Great Lakes left Buffalo the morning of Dec. 12. Anthracite was taken at a rate of $1 a ton to Milwaukee. It is estimated that in the 1919 season bituminous coal dumped at Lake Erie ports, including vessel fuel, will not have exceeded 23,500,000 tons, against approximately 29,800,000 tons in the 1918 season.

DETROIT

Efforts of jobbers and wholesalers are directed toward resteration of shipments to a regular basis.

Bituminous—While consumers are waiting hopefully, jobbers and wholesalers in Detroit are working to get their sources of supply re-opened and re-established the movement of shipments into Detroit in as short an interval as possible. With all restrictions on use of light, power and heat removed by the federal and municipal authorities and the miners returning to work, there seems only the weather and the railroads as the factors of uncertainty.

Bituminous coal is coming into Detroit in rather small volume but with favorable weather and the discontinuance of confiscation of shipments, it is believed there will be no necessity of placing further limitations on operation of Detroit industries. It is likely to be several weeks, however, before the disorganization created by closing of factories will have been overcome.

The unsatisfactory results of the policy of hand to mouth buying that has been characteristic of some of Detroit's large users of steam coal in the past, in the opinion of jobbers has been conclusively demonstrated by the difficulties experienced in recent weeks. The jobbers will endeavor to impress on these buyers the wisdom of taking thought for the future by placing orders early and building up reserves of sufficient magnitude to make sure fuel will be available to keep plants running for a reasonable time.

Anthracite—Very cold weather with temperature near zero has brought an urgent demand for prepared sizes of anthracite. The supply in retailers' yard is small and in some cases it is necessary to limit distribution to one ton or a half ton. Shipments are slow in coming through the dealers say, though the hope is expressed that discontinuance of lake shipments may bring some improvement.

Lake Trade—Considerable difficulty was encountered by the three lake freighters carrying the season's last coal cargoes, in working their way through the ice which formed rapidly in the connecting rivers. All navigation aids having been removed navigation at night was impracticable except in the open lake.

BUFFALO

Anthracite becoming plenty. Lake trade closes late. Bituminous much unsettled. More coal moving. Prices not staple. Nobody knows what to expect.

Bituminous.—More business now, but of a decidedly uncertain sort, with prices as before, if any are made. Many jobbers do not know what to ask. They say that if coal becomes plenty they are going to have a hard time in holding the prices, but if consumption continues to exceed production, prices must go up. It is too early to say which will happen.

Pittsburgh is beginning to ship coal to jobbers again, notices of cars sent out have been received and more are promised. So much of the reserve held in cars has been released that the situation is much improved. If there is no further hitch the trade will soon be back to normal. The jobbers have a great task before them in getting coal moving again. The machinery has been kept up as well as it could be, but there are many things to get back into line yet.

It is expected that the car supply will be one of the chief difficulties. Other branches of business are complaining of fast-growing shortage, and this will, of course extend to coal as soon as it is moving at an ordinary rate. Reports from the mines are that the men are a little slow in getting back to work, and they are not always in condition to do a full day's work, so that not more than half the normal output has been reached yet. The holidays are not far off and they will interfere with work, so that it is likely to be well into January before the supply can be depended on.

In the meantime it is found that the consumers are not in any hurry to buy. They had plenty of coal as a rule all along. It was only the few small consumers with insufficient storage who were running out of a supply. The others are in good shape, hardly any plants in this vicinity had to shut down from coal shortage. Canada is not buying bituminous at all freely, though it is stated by shippers from there that the supply is becoming quite small in some sections.

Anthracite.—The situation is becoming much easier in the city, as the companies are keeping their promises and turning the current of coal that was flowing to the lakes into the city trestles. Already there is an end practically of the complaint of shortage and that means that nobody will order more than is needed and it is all easy.

Much complaint is heard of the refusal of our banks to accept Canadian securities and money at par. Sometimes the discount is 12 per cent. It is said that the reason for this is that British gold no longer comes in at New York to meet Canadian excess purchases. Buffalo feels the loss of trade and also misses the Canadian silver currency, which used to be so plenty here. The smallpox scare, that occasioned a quarantine against Canada, is another source of difficulty, both to the coal man and to the shipping trade.

The lake season is over with total shipments 4,156,118 net tons as against 3,594,803 in 1918 and 4,237,904 tons in 1917.

The amount shipped last season is probably sufficient for the needs of at least an ordinary winter. So far the winter is proving much more than usually severe.

Following are the prices quoted for coal to the Buffalo retailer or consumer, anthracite being as specified, with $1 to $2 premium for independent and bituminous being f. o. b. per net ton delivered on cars:

Anthracite

	On Cars Gross Ton	At Curb Net Ton
Grate	$8.55	$10.20
Egg	8.80	10.65
Stove	9.00	10.85
Chestnut	9.10	10.95
Pea	7.45	9.30
Buckwheat	5.10	7.75

Bituminous

	Allegheny Valley	Pittsburgh or No. 8
All Sizes	$4.55	
Lump		$4.80
Three-quarter		4.65
Mine Run		4.20
Slack	4.10	4.10

Coke

Buffalo.—The demand for coke by the furnace companies is still light, but it ought to improve before long, as the operations return to normal after the strike. Jobbers do not sell great amounts of it here as much is bought from producers, but they report a small demand at $9 for 72-hour Connellsville foundry, $8 for 48-hour furnace, $7 for off grades, $7.75 for domestic sizes and $5 for breeze. Iron ore receipts by lake kept up till the end of the regular season and were large, in spit of labor and other difficulties.

CINCINNATI

Situation unchanged. No car shortage. Bright prospects as to future deliveries.

Developments of little consequence were felt in the local coal market last week. Practically all coal arriving here is being confiscated at the scales by the Fuel Administration. The bulk of the output of the non-union mines at West Virginia and Kentucky which heretofore came to Cincinnati is now being diverted to other sources, principally the North and Northwest. The production of these mines, according to reports, is 75 per cent. of normal. The diversion of the coal from the nonunion fields is sort of a hardship on the local dealers, who have been receiving the bulk of their supply from these mines, since the strike was declared.

While the reserve coal in the Ohio-Indians district dropped to 1500 cars last week more than 60 cars of coal were received in Cincinnati proper, Dec. 13, for distribution to industrial plants and public utilities. This is one of the largest shipments received locally since the strike began, and is part of the 1200 cars of bituminous coal promised by Washington fuel authorities. Miners during the past week of a coal car shortage at the mines were not taken seriously by coal men, who say most of the mines have enough cars now at their doors to last for several days.

R. A. Colter, chairman of the Coal Exchange, said it would be a week of ten days before the real beneficial effects of the ending of the strike will be felt directly through receipt of coal. Cincinnati market has always received the bulk of its coal from West Virginia, where many mines did not shut down. Therefore the first effects of the ending of the strike will be an increase in the flow of coal to Cincinnati, through stoppage of diversion of coal billed here to supply other places.

F. E. Harkness, counsel for the Fuel Administration, said that prices of coal contracted for by purchasers prior to the resumption of government price-fixing could be legally raised to absorb the cost of 14 per cent. increase in miners' wages, granted under the strike settlement. Coal mined on contract in many cases sold for a price below the government maximum of $2.25 per ton, mine-run, and contracts ordinarily carried a clause binding the purchasers to pay additions in labor costs incurred after their making.

Wholesalers and retailers alike did very little business last week. The local situation was practically handled by the Fuel Administration. Local coal men have been assured 50 cars of coal a day beginning Dec. 15. This they say will greatly help the situation until the coal begins to flow in from the mines where the miners have been on a strike. Several manufacturing plants have been running full capacity by mixing with what coal they have, anthracite slack, which can be had in unlimited quantities at comparatively low prices. Coal receipts from barges coming down the Ohio River were far below normal last week. Retailers are taking all the coal they can obtain, but with production far below normal at the mines, old orders and contracts are taking up all the supplies with little coal for new business. Now that the coal strike is settled, a decided improvement in the local market is expected within the next two weeks.

LOUISVILLE

Colder weather creating better domestic demand. General situation unchanged.

Retail demand has been increased somewhat by near zero weather. The domestic demand, as a whole, is light, due to the fact that Louisville is well stocked. Buying is largely on the part of farmers, peddlers, etc. Retailers are unable to meet with the demand. A large retail owner of a number of yards reported all yards empty but one, and that yard contained only a half day's supply.

Jobbers report that conditions are a little easier for them, for they are managing to get orders through for customers, especially for essential industries.

Manufacturing plants are still on a 48 hour basis south of the Ohio River, and reports indicate that they may be placed on a three day per week basis shortly. Stores are remaining on a seven hour basis.

The situation at the mines is probably as bad, if not worse than it was last week, due to the fact that miners are very erratic. They work for short periods and then walk out again. In some sections miners are demanding recognition of their unions, thus causing trouble, as employers fail to comply to their demands.

In Clay County operations are at normal, and in Hazard fields production is good, with car supply better. The Elkhorn field is getting on its feet.

However, it is pointed out that there is hardly a mine in the state which has modern facilities that can work coal fast enough to make any money on such a basis unless they get an increase in sale price. Very few could make any money on a fourteen per cent. increase, while many are losing money on the old schedule, where they haven't facilities.

BIRMINGHAM

General conditions bettered. Restrictions lifted. Stocks are low. Rain cripples output.

With all restrictions as to the movement of coal removed by the government officials, the general conditions affecting the coal industry here have been very much bettered. Railroads are under instructions now to allow all coal mined on their lines to proceed to the consignee as billed, which will result in an early replenishment in the stocks of consumers in Alabama territory. Production on the lines of the Frisco has been diverted for western territory for several weeks past—both domestic and steam—which has taken considerable tonnage out of the district to foreign consumers.

Notwithstanding the restrictions placed on deliveries of coal, industry in the regular trade territory of this district has not been seriously crippled and inquiry for steam coal has not been insistent during the strike period, for under government control only users in the priority class could be supplied. Vessels which bunkered at the ports of New Orleans and Mobile have perhaps felt the shortage more keenly than any other class of consumers, as shipments down the Warrior river to these points has also been tied up under the restrictions, which were lifted several days ago. A strong demand for steam coal is expected to materialize from the general trade, and the movement will be exceedingly heavy from now on.

Domestic supply is short everywhere and there will also be a strong call for this grade of coal. Stocks are low and main consumers have not laid in any winter supply, which augurs a good, steady demand from householders when normal winter weather sets in.

The output of coal in the Alabama field is practically normal and the few remaining mine workers who have held out on strike are returning to work, the mines in the Cahaba field having resumed operation, which will relieve the domestic situation considerably. The tonnage for the week ending Dec. 6th, was slightly under the previous period due to unfavorable mining conditions. Rains have crippled the output the present week.

Coke

CONNELLSVILLE

Beehive coke production limited to 50 per cent. of November rate. By-product output 50 per cent. or less. Blast furnaces banking. Government price limits in force.

Shortly after the order was issued by the Fuel Administration curtailing beehive coke production by 25 per cent. a second order was issued, restricting the charging of coal to beehive ovens to amounts not in excess of 50 per cent. of the average amounts charged during the month of November. This would cut the Connellsville and Lower Connellsville region down to a coke production of about 120,000 net tons a week, and the regulation is made effective by withholding coke car supplies. An ample supply of cars is reported for loading coal.

By an order decided upon Dec. 8 the old Government price limits on coke are reimposed, the limits in the case of Connellsville being $6 for furnace and $7 for selected 72-hour foundry, per net ton at ovens. For a few days preceding there had been a wild spot market, reports being that furnace coke sold at as high as $12 and foundry coke at as high as $15. Very small lots were involved as offerings were quite limited. There was a sale of 35 carloads at $9.25, and this may have been the largest transaction after the market had gotten entirely out of bounds.

A few blast furnaces are already banked and many more will have to bank, as the furnaces do not generally feel a restriction in output until after the lapse of a week or two. As regards by-product ovens, the fuel distributors will allow them coal, if available, sufficient to enable them to operate at 50 per cent., but it is not certain that enough coal can be found, and the stocks at by-product ovens are down to a very low point.

The market is quotable at Government limits, $6 for furnace and $7 for foundry, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville region in the week ended Dec. 6 at 262,810 tons, an increase of 25,355 tons.

Middle West

MILWAUKEE

Last cargo of the season from the lower lakes received. Hard coal being drawn upon for power purposes.

Milwaukee has received her last cargo of coal by lake for the season of 1919. The close was in a way sensational as the coal strike called for every effort to forward fuel to the West for vessels sailed in zero weather and took every hazard to deliver their cargoes. Ten or more large cargoes reached port during the last week of the season. Soft coal has been moving to the interior at the rate of about 15,000 tons daily, and some industries which were deprived of their full requirements, have been cutting into the stock of anthracite to an alarming extent. If this drain is not stopped legitimate consumers of anthracite are apt to suffer before the winter is over.

As far as can be learned there is no profiteering in fuel in Milwaukee. Dealers are doing all they can to supply their consumers and at the same time comply with the Fuel Administrations restrictions. Coke is in good supply. Unofficial figures make the bulk cargo coal receipts for 1919, 969,752 tons of anthracite and 3,011,536 tons of soft coal as against 839,092 tons of the former and 3,446,061 tons of the latter in 1918.

ST. LOUIS

Conditions good in St. Louis territory. Miners back at work and a little coal rolling in. Some dissatisfaction among miners, but prospects look reasonably good.

The local situation, everything considered, is exceptionally good. Between 3,000 and 4,000 cars of smokeless and Kentucky coal were in transit to St. Louis when the strike was called off and it is understood that the railroads, for the most part, will absorb this.

A little coal was taken out on the 12th, perhaps one-tenth of the tonnage of the entire field in the Standard and Mt. Olive fields because coal had to be shot down. On the 13th the tonnage was perhaps one-fourth of the field.

With the beginning of the week the prospects are good for a heavy tonnage, for cars are plentiful. In the Mt. Olive and Standard fields there is some little dissatisfaction here and there, but this will be eliminated in a few days and all miners will be at work.

Some of the single miners have left the fields for the manufacturing centers and a number of the foreigners have gone back to Europe. Several hundred miners of Illinois are known to have gone to the oil fields in the southwest where labor is steady and wages are good.

In the Carterville field up to the end of the week there was very little prospect of work being resumed on a large scale, many of the miners having voted to stay out. In the Duquoin field, however, they were rapidly going back to work. Regional Director Aishton of Chicago made a ruling that will help St. Louis and the western and southwestern country considerably. The mines producing coal on the Missouri Pacific, Chicago, Burlington & Quincy, Illinois Central, Chicago & Eastern Illinois and Wabash R. R. must net ship any coal into Chicago or the switching limits thereof or through that gateway, thus forcing that coal into the southern and western markets, because Chicago had a large tonnage of smokeless coal in transit.

Government prices prevail on all coal, $2.55 $2.05 on screenings, with fifteen cents attached for the jobber.

A few thousand tons of anthracite buckwheat and pea sizes have come in here for steam purposes, the first time in history that this coal has been used for steam in St. Louis.

There is still a good tonnage of gas house coke moving both locally and out of town, and the same applies in a much larger measure to by-product sizes.

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